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Special Topics in Behavior Analysis

SPECIAL TOPICS IN BEHAVIOR ANALYSIS

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SADIQA REZA, MARGARET DANNEVIK PAVONE,
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**The Dissemination of Behavior Analysis Special Interest
Group of the Association for Behavior Analysis
International**



Special Topics in Behavior Analysis by Lauren Milburn, Madison Wilkinson, Sadiqa Reza, Margaret Dannevik Pavone, Brandon May, Daniel Childress, Jordyn Roady, Kodi Ernewein, Victoria Spain, Amber McCoy, Katie Harris, Jamie Zipprich, Clint Evans, and Amy Ehnes is licensed under a [Creative Commons Attribution 4.0 International License](https://creativecommons.org/licenses/by/4.0/), except where otherwise noted.

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INTRODUCTION

MARGARET DANNEVIK PAVONE

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resource is hosted online for download, remix, and adoption by any individual with an internet connection. The authors and contributors hope this will create a disruption in the current publication climate and also have long-lasting impact on the community of individuals who may want to learn about the science of applied behavior analysis. Chapters are written by BCBAs and graduate students with peer reviews by a team of volunteer BCBAs, BCBA-Ds, and other doctoral-level collegiate faculty in order to ensure accuracy and readability. As an OER, this resource is open to addition and editing and welcomes additional comments or reviews. The editor and authors have provided contact information in each section. The text should continue to improve and evolve as a growing support for the dissemination of behavior science.

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CHAPTER 1.

APPLIED BEHAVIOR ANALYTIC TREATMENT STRATEGIES FOR EATING DISORDERS



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Anorexia nervosa and Bulimia nervosa are two eating disorders that impact 0.5-1% and 1-4% of the population respectively (Beatriz Meyer, 2008). The recovery rate for both eating disorders is between 50-60% and the mortality rates for individuals diagnosed with these disorders is between 6-15% (Beatriz Meyer, 2008). The majority of the treatment literature centered on these diagnoses is outside

the corpus of behavior analytic research. In fact, single-subject studies focusing on eating disorder intervention

technology is lacking. As a result, practitioners within the field of behavior analysis must seek out interdisciplinary perspectives to inform their treatment design.

Another major challenge posed to even the most experienced behavior analyst is that diagnostic criteria for eating disorders often includes private events such as fear of gaining weight, anxiety, compulsive behaviors, and covert emission of targeted responses (The Diagnostic and Statistical Manual V, 2013). Currently there is little disseminated behavior analytic research that denotes specific methods for treating overt behaviors that are established upon covert variables. This means, the field of behavior analysis currently has very few empirically verified methods for effectively treating eating and related disorders.

Therefore, the purpose of this paper is to examine the ways in which an individual's verbal and social community affects the development of private behavior. Then, a review of pertinent and seminal literature will seek to identify the relationship between covert and overt behaviors. Finally, with these components and relations pinpointed, this discussion will analyze and evaluate potential behavior analytic intervention methods for the treatment of eating and related disorders.

HISTORICAL OVERVIEW OF EATING DISORDERS

THE ROLE OF ENVIRONMENT ON BEHAVIOR

In his text, B.F. Skinner (1974) outlines the role of the environment in shaping an individual's behavior. Specifically, Skinner identifies the relationship between the environment and the evolution of organisms. Skinner states that the evolution of species, in addition to the role

of the environment throughout an organism's lifespan, ultimately affects observable and private behaviors (Skinner, 1974). Skinner unpacks this concept further by introducing the concept of environmental control on an organism's behavior. Simply, Skinner explains that our knowledge of the environmental impact on the evolution of organisms, combined with our observation of measurable variables within an individual's present environment, facilitates prediction and control in the realm of human behavior (Skinner, 1974).

Although Skinner's text and studies were published more than forty years ago, the effects of manipulating environmental variables for the purpose of predicting and controlling human behavior continue to be evaluated within both applied and clinical behavioral settings. Throughout the corpus of behavior analytic literature, responses such as self-injury, nonfunctional vocalizations, pica, aggression, elopement, and property destruction have been analyzed and treated by means of experimental analysis (Smith & Churchill, 2002; Travis & Sturme, 2010; Mitteer, Romani, Greer, & Fisher, 2015; Stevenson, Ghezzi & Valenton, 2016; Ebanks & Fisher, 2003). Within these studies, researchers identify environmental determinants that maintain the target behavior (i.e. attention, escape/avoidance, access, and automatic reinforcement) and subsequently intervene by developing a treatment that allows the subject to contact reinforcement without engaging in the problem behavior.

The efficacy of the technology found within the aforementioned studies relate directly to Skinner's statements regarding the environment and its impact on predicting and controlling human behavior. However, a noteworthy facet of these studies is that the behaviors

under examination are considered overt. Meaning, the researchers were able to directly observe each subject emit the target behavior within the clinical setting. Currently, within the field of behavior analysis there are very few examples of experimental analysis and treatment of covert behaviors; responses such as anxiety and depression that are private and take place within the subjects' skin (Skinner, 1974). Therefore, in order to examine the historical evolution and treatment of eating and anxiety-related disorders, one must turn to scholarship outside the field of behavior analysis. Thus, an analysis of the origin and past interventions takes on an interdisciplinary perspective.

A BEHAVIOR ANALYTIC LENS FOR EXAMINING INTERDISCIPLINARY SOURCE MATERIAL

The social environment. Prior to examining the historical texts on this subject, it is critical to ensure the source materials are analyzed through a behavior analytic lens. B. F. Skinner (1974) states that after the “vocal musculature” of organisms evolved and verbal behavior came under operant control, it broadened the reach of an individual’s social environment (p. 98). Cooper, Heron, and Heward (2014) further explain that the function of the response was key; therefore, Skinner deemed that any response could be considered verbal despite its form (Cooper, Heron, and Heward, 2014). The reinforcing relationship between the speaker and the listener brings to the forefront the importance of an individual’s verbal community. The verbal community not only shapes the verbal repertoire of an organism, it also establishes the contingencies of reinforcement between speakers and

listeners. Per Skinner's statements regarding the impact of an individual's social environment, as well as the reinforcing relationship between the speaker and the listener, one can utilize the principles of verbal behavior as a lens for analyzing and interpreting historical sources. Thus, in order to synthesize historical texts behavior analytically, one must identify the verbal and social community as well as the contingencies of reinforcement in place between the speaker and the listener.

Objective and measurable definitions. In addition to maintaining a behavior analytic viewpoint in regards to verbal and social contexts within historical sources, it is essential to have behavioral definitions so that one can synthesize the literature in a scientific and methodical way. Therefore, the following objective and measurable behavioral definitions will be utilized throughout this paper. *Restrictive eating* is defined as a decreased rate of food intake across settings and over time. *Binge eating and purging* is defined as an increased rate of food intake across settings. This includes large intakes of food in a single sitting. The behavioral event is often followed by forced vomiting, the use of laxatives or diuretics, and/or a long duration of exercise for the purpose of mitigating the effects of caloric intake. Body image expectation is defined as any instance in which the social environment and verbal community indicate preferences for body size, exercise routines, and/or food intake. *Body image expectations* can be found within literature, studies, and social media. *Ritualistic behaviors* are defined as high rates of repeated engagement in public and or private activities. Examples of ritualistic behaviors include engaging in high-magnitude, long-duration exercise routines (i.e. excessive exercise) that exclude specific

behavioral skill-building criterion (i.e. training criterion set by an expert for a specified outcome such as competing in an athletic competition). With these objective and measurable definitions established, one is better able to analyze and compare eating and ritualistic behaviors within the context of ancient and modern societies; for the purpose of evaluating the chronological evolution of these targeted responses.

THE BODY AND MIND WITHIN THE CLASSICAL WORLD

Many of our modern traditions herald back to the customs found within ancient Greek society. The foundation of modern democratic systems, structure of athletic competitions, adherence to particular matrimonial and familial rites, and the pursuit of academic scholarship are practices that reflect the beliefs, tenets, and customs of the classical world. Due to the influence of antiquity upon our modern society, an analysis of historical and primary source material can uncover ancient ideals and contingencies that still shape the values of our present verbal and social community. In this section, an examination of texts within the classical corpus will take place to determine the purpose of the body and mind throughout the evolution of our social environment.

The role of the body and mind in ancient Athens. Expectations regarding the purpose and use of the body and mind was clearly defined by the social environment in ancient Athens. The structure of this civilization was dependent upon men and women fulfilling obligations and duties prescribed to them by members of their social

community. In regards to education, men began their scholarship at age seven, attending to their studies for the next ten years under the guide of a tutor (Renshaw, 2008). A young man's education was divided into three domains: academic, musical, and physical education. The academic facet of a man's education prepared them for their role in politics, farming, or business. In particular, an education in the physical realm was crucial for Athenian men.

Physical education comprised of wrestling, running, long jump, javelin, and combat training. This training took place in a gymnasium, which doubled as a meeting place for men to gather and engage in discourse (Renshaw, 2008). For the Greeks, there was a relationship between the body and the mind in regards to strength. The Greek philosopher, Plato, detailed this connection in his many works. In *Protagoras*, Plato states that Greek families "send their sons to a trainer, that having improved their bodies they may perform the orders of their minds, which are now in fit conditions, and that they may not be forced by bodily faults to play the coward in wars and other duties" (Plato, trans. 1967, 326b-c). Thus, Greek society required men to be physically and mentally suited for a life of a soldier, political entity, and as the head of the household. Therefore, a rigorous course of academic and physical training was essential.

Although there is much scholarship on the lives and education of men in ancient Athens, Renshaw (2008) notes that a true understanding of the female experience must be gathered primarily from original sources written by men. Therefore, one can infer that the role of a woman's body and mind was dictated in society and outlined in the literature by a verbal community consisting mostly of men. From the beginning of their

life, texts indicate that the birth of a baby girl was seen as a disappointment within classical Greek community (Renshaw, 2008). This is reflected in the practice of exposure within Greek communities. Exposure was the act of abandoning newborn children outside of the city proper. In regards to the treatment of newborn girls, sources indicate that baby girls were “more likely to be abandoned at birth than boys” (Renshaw, 2008, p. 150). If a baby girl was not abandoned, their inferiority was seen throughout their upbringing.

A woman’s environment was comprised of the domestic. Thus, women received no formal education. Instead, young girls remained at home and developed skills centered around working with textiles, cooking, and overseeing household finances. Domestic practices in ancient Athens further highlight the society’s viewpoint on the role and importance of a woman’s body and mind. Namely, it was not necessary for young girls to progress academically because their futures centered on marriage, child bearing, and managing their husband’s home. As a result, many Athenian women remained illiterate. In addition, the stages of a woman’s life did not include the military; thus, physical education was not required. This fact, as well as the Greek’s relationship with food and the body, was reflected in the allocation of portions at meal time. Specifically, women forfeited larger portions of food to their male family members (Renshaw, 2008). The connection between portion sizes and gender suggests that the social environment deemed women’s bodies less useful to the Greek public than their male counterparts.

The role of women within the public sphere was limited. Unlike the positions men held within political,

academic, or military circles, women were mainly allowed to take part in religious rituals and festivals that took place outside the home (Renshaw, 2008). Although the public realm for women was small, Connelly (2007) notes that women's role in religious rights, as priestesses and sacred office holders, "mirrored" their class, age, and sexual status (p. 28). Specifically, young girls of a certain status engaged in cult responsibilities as a means of contributing to their community and preparing for the domestic stages in their life (Connelly, 2007). These festivals honored Greek goddesses that held dominion over facets of an Athenian woman's life. The rituals and celebrations took place to honor goddesses such as Artemis, Athena, and Aphrodite who were patrons of childbirth, sexuality, and textiles (Renshaw, 2008). Therefore, a woman's body and mind were utilized for the purpose of praising, sacrificing, and serving deities that embodied a woman's purpose in their social environment. In this way, these practices, as well as the academic and physical rituals engaged in by Athenian men, demonstrate how variables such as socio-economic status, gender specific expectations, religion, and government impact the shaping of behaviors surrounding physical development, food, and intellectual enrichment.

The role of the body and mind in ancient Sparta.

Similar to Athenian society, young Spartan boys began their education at age seven. However, at this age, Spartan boys left their homes, lived in the city barracks, and began a course of study that centered upon the development of physical strength and intellectual compliance (Renshaw, 2008). In contrast to an Athenian philosophical education, Spartan boys only acquired academic skills that enabled them to communicate. In Plutarch's Lives,

the historian Plutarch specifically describes the Spartan education system. Plutarch states that the Spartan reformer, Lycurgus, dictated that reading and writing should give Spartan boys “just enough to serve their turn; [Lycurgus’] chief concern was to make them good subjects, and to teach them to endure pain and conquer in battle” (Plutarch, trans. 1859, 16.6). Thus, the purpose of the Spartan educational system was to cultivate unstoppable “killing machines for the state” (Renshaw, 2008, p. 240). Therefore, one can infer that Spartan men did not have possession of their own body and mind. Rather, the sole purpose of developing their body and intellect was to better serve their government and social community.

Spartan girls received an education and household treatment that was comparable to Spartan boys. In fact, by law, Spartan families were required to provide girls with the same care and allotment of food portions as their brothers (Renshaw, 2008). In regards to academics, Spartan girls remained at home and most likely learned how to read, write, and ultimately manage households (Renshaw, 2008). Despite their domestic education, sources indicate that Spartan girls also received a public education that promoted the development of strength and physical prowess. Although both men and women had strength building and endurance components to their education, unlike their male counterparts, women were not developing the physical skills necessary for military combat. Instead, the Spartan social environment and verbal community believed if a Spartan woman was physically robust and resilient, she would bear strong Spartan children.

In his work, Plutarch details and unpacks the values

of the Spartan state further. Plutarch notes that Lycurgus ordered women to learn how to wrestle, run, and throw the javelin “to the end that the fruit they conceived might, in strong and healthy bodies, take firmer root and find better growth” (Plutarch, trans. 1859, 14.2). Although the women of Sparta lived seemingly less restricted lives than Athenian women, and despite a more formal education, Spartan women were not deemed individuals within their social environment. Rather, comparable to women throughout the ancient world, Spartan women adhered to the dictates of their social community by honing their physical body and their intellect only for the purpose of bearing strong offspring.

Cultural comparisons and context for future evaluations. An analysis of historical and literary texts within the classical corpus reveals the overall status of the body and mind within each classical society. Specifically, Spartans believed the strength of the body, rather than the agility and sharpness of the mind, determined the utility of men and women within their social environment. In contrast, Athenians deemed both physical and intellectual development in male citizens was necessary to produce politicians, landholders, and businessmen. In regards to Athenian women, the advancement of their intellect and the development of their body was limited to their private roles as wife and mother.

Examining the particular cultural variables that influenced what was valued by ancient verbal communities enables one to pinpoint similar contingencies and relations later in history, as well as the values held within modern societies. Specifically, the contemporary correlations between gender roles and

food, as well as gender roles and the development of physical and intellectual competencies. With these contingencies and values identified, one possesses the context and tools necessary to begin assessing historical evidence surrounding food restriction and determine what variables possibly maintained these responses.

EARLY HISTORICAL EVIDENCE OF RESTRICTIVE EATING

In her text, Joan Jacobs Brumberg (2000) describes the role “food abstinence” played during the Middle Ages (p. 44). In particular, the historian notes that during the medieval period, abstinence from food consumption could be linked to an individual’s religious practices. The prevalence of spiritual fasting amongst followers of Catholicism became so commonplace that by the seventeenth and eighteenth centuries, physicians referred to restrictive eating as “*inedia prodigiosa* (a great starvation) and *anorexia mirabilis* (miraculously inspired loss of appetite)” (Jacobs Brumberg, 2000, p. 44). The behavior of restricting one’s food intake or refraining from food consumption altogether, directly reflects the values of the medieval, religious verbal community. Specifically, Brumberg (2000) states that individuals engaged in food restriction or religious fasting as a means of expressing spiritual “ideals” such as piety, spiritual perfection, and service to others (p. 47). In essence, the religious-verbal community established the contingency that if one abstained from food, one achieved spiritual perfection in the eyes of the Lord. Despite some decline of religious fasting towards the end of the medieval period, there is evidence that the practice of spiritually-

inspired restriction continued on into the nineteenth century (Jacobs Brumberg, 2000).

Miraculous maids and assessment of restrictive eating. During the early modern period, European doctors, clergymen, and nobility began to investigate the behavior of women who lived for a prolonged period of time despite high magnitudes of restrictive eating. These young women came to be known throughout their communities as “miraculous maids” because their lives were sustained and nourished not by food, but by the miraculous grace of God (Jacobs Brumberg, 2000). Humility, piety, and holiness were the values attributed to women’s fasting behaviors during this period. However, some individuals that comprised the religious and medical-verbal community believed these miraculous maids to be influenced by Satan. Thus, leaders in the religious and medical field set out to assess the eating behaviors of the women (Jacobs Brumberg, 2000).

The French physician Jacob Viverius and the English philosopher Thomas Hobbes were two prominent individuals that assessed the behaviors of two miraculous maids. Viverius analyzed the case of Jane Balan, a young girl who was reported to have not eaten in three years (Jacobs Brumberg, 2000). Viverius assessed Balan’s anatomy and sought to discover whether or not the young girl urinated and defecated. After intense observation, Viverius determined that the lack of food consumption and the “absence of excrement” proved Balan’s behaviors were maintained by spiritual grace (Jacobs Brumberg, 2000, p. 51). In contrast, after observing and analyzing the emaciated anatomy of a young English woman, as well as seeking out the presence of “food waste,” Hobbes described the young girl as ill and

not sustained by the spiritual realm (Jacobs Brumberg, 2000, p.51). Although the investigations of Viverius, Hobbes, and their contemporaries were devoid of procedures founded on the scientific method, these initial assessments set the precedent for future behavioral and medical research (Jacobs Brumberg, 2000). In addition, these early investigations, coupled with the behaviors emitted by the miraculous maids, wholly reflect the values and cultural standards shared by individuals living in the early modern period and beyond.

THE IMPACT OF ANCIENT AND MEDIEVAL TEXTS

Due to technological and social advancement, individuals within our modern society have the ability to choose what and how much food to consume, as well as the frequency, magnitude and duration of physical exercise. However, the variables presented within these ancient and modern texts continue to impact and shape the values of our social, medical, and therapeutic-verbal communities. Therefore, the inclusion of these texts within this present discussion is pertinent because it establishes the necessity for examining the history of reinforcement or punishment of specific behaviors within a given society. With these components identified, one is able to determine how ancient and medieval histories of reinforcement and punishment continue to impact modern day eating and exercising behaviors, as well as the theories that form the foundation of behavior analytic treatment.

THE THEORETICAL FOUNDATION FOR CULTURAL EVOLUTION

THE ORGANISM AND THE ENVIRONMENT

The theoretical relevance for examining the cultural and religious practices of ancient and medieval civilizations is found within Skinner's work, "Selection by Consequences" (Skinner, 1981). Within his text, Skinner describes the relationship between individuals (organisms) and their environment, and how this correlation ultimately shapes new behaviors. Specifically, Skinner (1981) states that what society now considers behavior initially "evolved as a set of functions furthering the interchange between organism and environment" (p. 501). Skinner unpacks this statement further by explaining that within the organism-environment relation, the environment enacts certain limiting controls that ultimately shape or extinguish behaviors (Skinner, 1981). Therefore, when an individual emits a response, environmental variables dictate whether or not the behavior will be emitted in the future. Simply, environmental variables can increase (reinforce) or decrease (punish behavior). The relationship between the organism and environment, as well as the described controlling variables, form the basic tenets of operant conditioning.

OPERANT CONDITIONING AND THE VERBAL COMMUNITY

During operant conditioning, responses are strengthened (reinforced) or weakened (punished) by environmental variables that immediately follow the

emission of the behavior. Understanding operant conditioning is vital to an examination of societal customs surrounding food and the body, as well as comprehending the role of the verbal community. Skinner's work illustrates the powerful association between the verbal-social community and shaping new behaviors. In particular, Skinner (1981) states that through imitation, an organism can come into contact with novel contingencies of reinforcement that ultimately shape or maintain behaviors. Meaning, when an individual imitates the novel behavior of another member of his or her social community, the individual may access new contingencies and reinforcement, ultimately cultivating and preserving new behavioral skills.

Although Skinner states that novel behaviors are shaped by consequences on an individual level, when the response contributes to the survival, problem solving, or success of the verbal-social community, cultural evolution occurs (Skinner, 1981). Therefore, specific behavioral practices endure and impact the evolution of civilizations by means of powerful reinforcing consequences. This means that customs centered upon food and the body can be "transmitted" through the generations, and individual behaviors related to these practices will continue to access reinforcement from the evolving verbal-social environment (Skinner, 1981, p. 502). As a result, behaviors such as restrictive eating, bingeing and purging, and over-exercising will continue to transcend ancient and medieval societies and access reinforcement from our modern verbal and social community.

THE RELATIONSHIP BETWEEN PRIVATE EVENTS AND HUMAN BEHAVIOR

Conceptualizing the principle of operant conditioning, as well as the role of the verbal community, is vital when observing and assessing overt behavior. The behavior analytic corpus is primarily comprised of research that evaluates treatment technologies focused upon utilizing operant conditioning to decrease or increase observable, overt behaviors. In regards to private events, unobservable internal experiences such as thoughts and feelings, behavior analysts have acknowledged their existence, but have not considered these internal states as controlling variables that can evoke behaviors. However, some analysts are expanding the scope of behavior analytic research to include studies centered upon developing empirical methods for studying private events and determining their role in evoking behavioral responses (Friman, Hayes, & Wilson, 1998). In order to discern the potential role internal events play in affecting overt behavioral responses, one must examine the difference between contingency-shaped and rule-governed behavior.

Contingency-shaped vs. rule-governed behavior. Operant conditioning forms the theoretical foundation of contingency-shaped behavior. Specifically, if a behavior is shaped by environmental contingencies, the response will be evoked by antecedent stimuli and strengthened or weakened by consequences immediately following the response. For example, an individual consumes a high quantity of chocolate in one sitting and then experiences a stomach ache. As a result, that individual does not consume the same quantity of candy in the future. The

behavior of the individual is “under the control of consequences” (i.e. a stomach ache) that followed consuming a large quantity of sweets (Snyder, Lambert, & Twohig, 2011, p. 4). In contrast, a child is warned by a member of her verbal-social community not to consume too much candy in one sitting because she may become sick. The young girl then refrains from consuming a high quantity of food. In this example, the child’s behavior of consuming a conservative amount of sweets is not impacted and controlled by consequences in her environment; rather, the behavior is “under the control of a verbal rule specifying the contingency” between the response and the consequence (Snyder et al., 2011, p. 4). When a verbal rule controls the behavior instead of environmental contingencies, the behavior is considered rule-governed.

Rule-governed behaviors do access reinforcement. In fact, Snyder et al. (2011) states that the behavior of rule following can be maintained by reinforcement by the social-verbal community. In addition, rule-governed behavior can contact punishers within the verbal community. This concept is crucial for the larger discussion regarding the means in which private experiences may affect behavior, specifically when considering the role of “self-rules” (Snyder et al., 2011, p. 5).

Self-rules. Self-generated rules are established when a person repeats a rule to him or herself that was previously stated by social-verbal community, but never comes in contact with the contingency itself. For example, a young girl has never experienced a stomach ache induced by overeating but repeats to herself, “Do not eat too much candy or you will have a stomach ache” (Snyder et al.,

2011). However, an individual may also “derive” a self-generated rule as a result of a history of coming in contact with an aversive contingency, and then tacting the verbal-community’s warning (Snyder et al., 2011, p. 5).

Understanding the impact of rule-governed behavior on other overt behaviors is essential to understanding the origin of restrictive eating, over-eating, and excessive exercising, because these behaviors can be strengthened or weakened without ever contacting environmental contingencies. For example, if a young man generates the rule that gaining weight will cause his peers on the hockey team to judge and humiliate him, he may avoid consuming high-calorie foods. As a result, the behavior of refraining from eating certain foods may be negatively reinforced because he is avoiding aversive social interactions. Although the young man may not be directly contacting reinforcing or punishing contingencies, the self-rule he established is acting as a stimulus that is impacting his overt eating and exercising behaviors (Snyder et al., 2011). Behavior analysis has developed a theory that acts as a vehicle for analyzing and discussing the relationship between private events and overt behavior. Relational frame theory provides behavior analysts with the language and tools for describing, conceptualizing, and treating “maladaptive self-generated rules” (Snyder et al., 2011, p. 5).

RELATIONAL FRAME THEORY

Although there are several important components to understanding relational frame theory and its impact on the study of private behavior, an unpacking of these elements goes beyond the scope of this paper. Therefore,

a basic overview of key components will be discussed here. The primary precept of this theory is that relationships are “derived among stimuli, and stimuli are responded to” based upon those relations (Snyder et al., 2011, p. 5; Torneke, 2010). This principle is called derived relational responding and it is the overall process of “relating stimuli according to an arbitrary contextual cue” that is not founded on any physical characteristics of the stimuli; these relations are derived because they are untrained (Snyder et al., 2011, p. 5-6; Blackledge, 2003; Torneke, 2010). Another tenet of this theory is relational framing, the “patterns of derived relational responding that share the properties of mutual entailment, combinatorial entailment, and the transformation of stimulus functions” (Snyder et al., 2011, p. 6). An examination of the components of transformation of stimulus functions will be the primary focus of the paper.

Transformation of stimulus functions. In essence, a transformation of stimulus function has taken place when “the function of one stimulus is transformed” as a result of its relation to other stimuli (Snyder et al., 2011, p. 6; Torneke, 2010). Meaning, stimuli have the potential of developing reinforcing or punishing functions through relational frames (Snyder et al., 2011, p. 4). In regards to verbal, rule-governed behavior, this means that the function of specific stimuli can change based upon describing verbal relationships without coming into contact with reinforcing or punishing contingencies (Snyder et al., 2011). Using the scenario presented in the prior example, suppose when the athlete was a young boy, he observed his parents eating a brownie and requested to eat one too. However, his father did not want to give him access to this sweet, so he tells him that if he eats a

brownie, he will gain weight. As an alternative, the boy's father states that eating carrots are healthier. The young boy has never consumed either food, but the "comparative and coordinative relations" identified between the brownie and the carrots "transformed the previously neutral stimulus functions" of the brownie and the carrots (Blackledge, 2003, p. 427). As a result, the carrot becomes a better, healthier food and the brownie is now considered unhealthy and has the potential to cause an undesired result.

This particular component of relational frame theory is important to the discussion of private events and disordered eating because it enables behavior analysts to identify the covert stimuli and the contingencies that may be influencing overt behaviors. In regards to treatment, behavior analysts can ascertain the "variables that influence relational framing and its properties" and then control these elements to "disrupt" rule-governed behavior (Snyder et al., 2011, p. 6). In fact, the tenets found within relational frame theory have informed the development of Acceptance and Commitment Therapy, which will be discussed later within this paper.

APPLYING A BEHAVIOR ANALYTIC FRAMEWORK TO THE TREATMENT OF EATING DISORDERS

A BEHAVIOR ANALYTIC APPROACH TO EATING DISORDER ASSESSMENT AND TREATMENT

Although there is an expanse of research surrounding feeding disorders within the behavior analytic corpus, there are very few recent studies on treating eating disorders by means of a behavior analytic approach.

Therefore, this section offers a framework for evaluating interdisciplinary research for the purpose of developing a behavior analytic intervention model for assessing and treating eating disorders. More specifically, the literature review is divided into sections that reflect the main components of a functional behavior assessment. First, historical and cultural data are evaluated to determine the significance of eating disorders within a contemporary verbal-social community. Then, literature surrounding private events and their contribution to eating disorder diagnoses are examined. Finally, texts centered on private events and their relationship to behavioral functions are evaluated and compared to previous research. In regards to treatment methods, behavior analytic and non-behavior analytic treatment procedures are presented and considered for efficacy and compliance to ethical codes later in this paper.

CULTURAL SIGNIFICANCE IN THE EVOLUTION AND DIAGNOSES OF EATING DISORDERS

In their review of literature surrounding culture and eating disorder development, Miller and Pumariega (2001) examine the effect of westernization on the eating behaviors of various social-verbal communities. As a result of their examination of medical, anthropological, and sociological research, they conclude that the “idealization” of a slim body type has been shaped within Western culture and is a possible contributing factor to the development of eating disorders within certain populations (p. 94). In addition, this idealization may affect or be the result of certain values placed upon activity choices and patterns, the significance and role of

food consumption, and “dieting behaviors” of adolescents (Miller & Pumariega, 2001, p. 94).

Dell’Osso et al. (2016) also considers the impact of the ever-changing standards for an ideal body type dictated by members of Western communities. Specifically, Dell’Osso et al. (2016) notes the transformation of the epitomized body shape, at one time curvaceous now “progressively thinner,” is a result of a globalized society, as well as the evolving criteria for personal fitness set by the health industry (p. 1654). Both Dell’Osso et al. (2016) and Miller and Pumariega (2001) state that variables such as immigration, the media, cultural and religious attitudes toward food, socio-economic status, and private events, such as the fear of gaining weight, may be impacted by Westernization and influence the development of disordered eating behaviors. Meaning, assimilation to Western standards and principles may directly affect and establish social contingencies that shape food consumption and exercise behaviors.

Despite the lack of single-subject research and the heavy reliance on statistical analysis and socio-anthropological theories, the work of Dell’Osso et al. (2016) and Miller and Pumariega (2001) are relevant to the present discussion of eating disorder assessment. In particular, the data and commentary found within these reviews reflect the environment-organism relation described by Skinner (1981). Specifically, their assertions that Westernization of certain populations and customs have led to the reshaping of food practices and private events regarding weight gain and body perception. From a behavior analytic perspective, the statements and statistical data found within the reviews indicate that strong reinforcing or punishing environmental

contingencies ultimately maintain eating and exercising behaviors regardless of race, religion, gender, and sexual orientation.

The authors' review of pertinent literature is also valuable to a behavior analytic eating disorder assessment because it once again brings to the forefront the role of the verbal-social community and its influence on rule-governed behavior. For example, say an adolescent, who identifies as male, transfers to the United States in order to attend college. After arriving to the States and commencing his coursework, he begins learning about popular culture by means of connecting with peers and consuming various forms of American media. Soon, he notices that the majority of men represented on television wear clothes that display muscular hypertrophy, and that his peers often make social media posts about their strength and body building routines. In addition, when he dines with his group of friends, he notices that they all consume high-protein and low-carb meals. Soon, this university student begins to adopt similar exercise and diet practices. As a result, his peers begin to praise him for his physique and his dedication to meal-planning. This student continues to engage in long physical training sessions, is invited to more social gatherings, and receives more body and eating specific social reinforcement from his broadening circle of friends.

The example signifies the ways in which one's verbal-social community, as well as reinforcing environmental contingencies, can establish and maintain eating behaviors. Prior to moving to the United States, the student had never made contact with the particular contingencies present within his university and social-

media environment. In addition, no one directly stated that adapting certain lifting and eating behaviors would result in contact with reinforcing social praise. Despite the lack of contacting these specific contingencies, the student cultivated private self-rules as an effect of interacting with stimuli within his verbal-social community.

This example reflects the suggestions put forth by Dell'Osso et al. (2016) and Miller and Pumariega (2001) in that the university student developed private self-rules that mirror the standards for the male physique set by a Western culture. Thus, the student's behaviors surrounding food consumption and training were ultimately shaped by contacting novel environmental stimuli characteristic of a more Western culture. Although the work of Dell'Osso et al. (2016) and Miller and Pumariega (2001) do not adhere to behavior analytic research criteria, the data and the conclusions presented in these articles reflect and support the theoretical foundation of verbal behavior. Therefore, these interdisciplinary works are crucial to shaping eating disorder assessment and treatment procedures.

AN EMPIRICAL EVALUATION OF PRIVATE RESPONSES AND THEIR RELATION TO OVERT BEHAVIOR

As discussed in a previous section, the behavior analytic corpus is limited in regards to published empirical research on the role of private events and their affect on overt human behavior. However, in response to the breadth of psychological research on internal states, namely fear, anxiety, and depression, some researchers

have conducted single-subject research and reviewed relevant literature to broaden the behavior analytic community's understanding of the relationship between private and public responses. One study in particular demonstrates the difficulties that accompany the examination of private events and their relation to overt behaviors.

In their two-phase study, Taylor and O'Reilly (1997) analyzed the effect of overt and covert self-instructions on the successful completion of tasks in a grocery store. In addition, the researchers evaluated the relationship between trained self-rules employed as external directives and accurate overt behavioral responding. Overall, the results of the study demonstrated that overt and covert self-rules may control non-verbal responding (Taylor & O'Reilly, 1997). Furthermore, visual inspection of the data reveal that when the researchers implemented the pre-taught, self-instructions as external directives, the participants emitted correct task completion responses. This ultimately suggests that both private and public "self-verbalizations acquired a regulatory function" within the research setting (Taylor & O'Reilly, 1997, p. 54). Meaning, both overt and covert self-rules, as well as self-instructions employed as directives, affected behavioral responding. Therefore, this study indicates there may be a functional relationship between private self-rules and non-verbal behavioral responding (Taylor & O'Reilly, 1997).

Although the authors note several limitations within their research, specifically in regards to the lack of self-instruction data collected during the one phase of the study, the combined results of both phases are crucial to the present discussion. First, the authors detail the ways

in which components of this study reflect the principles of contingency-shaped and rule-governed behavior. In particular, the authors put forth in their discussion that behavioral responses emitted in baseline as well as in self-instruction blocking phases were “automatic and therefore relatively free from rule-governing effects” (Taylor & O’Reilly, 1997, p. 56). Therefore, these responses can be considered contingency shaped. Additionally, the authors state that responses that occurred in the absence of overt self-instruction can be considered rule-governed responses (Taylor & O’Reilly, 1997). Finally, the authors state their findings expand upon previous research that demonstrated task-related self-talk “impairs” contingency-shaped responses but does not impact rule-governed behavior (Taylor & O’Reilly, 1997, p. 56).

The results of this study, as well as the discussion of the authors’ findings, are valuable to our analysis of the relationship between private responding and overt behavior. Specifically, they are valuable in regards to the ways this study provides empirical evidence that suggests a functional relationship between self-rules (i.e. rule-governed behavior) and overt behavioral responding. These findings are essential to the process of designing a behavior analytic model for eating disorder assessment and treatment because, as indicated by Dell’Osso et al. (2016) and Miller and Pumariega (2001), internal states, such as fear and anxiety, are often reflected in eating disorder diagnostic criteria. Therefore, with the empirical evidence of a functional relationship between private behavior and the occurrence of overt responding provided by this study, one is able to infer that private

behavior may be a variable when analyzing responses through the lens of the four-term contingency.

THE FUNCTION OF PRIVATE EVENTS

In their separate reviews of the literature surrounding private events, Anderson, Hawkins, Freeman, and Scotti (2000) and Friman, Hayes, and Wilson (1998), both acknowledge the difficulties of classifying private experiences behavior analytically. In regards to categorizing anxiety, Friman et al. (1998) note that “categories are not empirical events,” meaning “they cannot be observed directly” (p. 138). However, the authors state that despite some challenges in regards to its “essential composition,” behavior analysts can study the conditions that elicit an anxiety response (Friman et al., 1998, p. 138). Likewise, in their review, Anderson et al. (2000) suggest behavior analysts examine the relationship between private and overt behaviors and their “stimulus properties” (p. 5). Although each literature review differs in its approach to unpacking private events, collectively, the authors seek to determine scientific procedures and theories that enable analysts to identify how private responses factor into environment-behavior relations.

The question posed by the authors of each review is how to include private behaviors in an analysis of the relationship between the environment and overt responding (Anderson et al., 2000; Friman et al., 1998). Anderson et al. (2000) suggest several means of determining the role of private events in regards to four-term contingency. First, the authors state that private events can be considered “stimuli,” viewed as “causal events” such as “discriminative or motivative

antecedents” (Anderson et al., 2000, p. 5). Within the confines of the four-term contingency, private events would be considered discriminative stimuli that set the occasion for or evoke an overt behavioral response. The authors note this could occur through direct training, (as exemplified in the technology described by Taylor and O’Reilly (1997)) or through derived relational responding (Anderson et al., 2001). In addition, Anderson et al. (2000) state that private responses could be deemed stimuli that are “functionally related to the occurrence of overt behavior” (p.6). Harkening back to rule-governed behavior, private events act as “contingency-specifying stimuli (CSS), also called rules,” that affect the function of other stimuli” (Anderson et al., 2000 p. 7). This hypothesis was also empirically supported in the work of Taylor and O’Reilly (1997).

Although the works of Anderson et al. (200) and Friman et al. (1998) do not include their own direct empirical support for their theories, their reviews are critical to our present discussion because they provide a framework for which behavior analysts can determine the role of private events in the prediction and control of eating behaviors. In terms of environment-behavior relations, labeling private events as discriminative stimuli enable behavior analysts to evaluate whether or not disordered eating increases (access reinforcement) in the presence of the private response. Likewise, if a behavior analyst views private events as contingency-specifying stimuli, through stimulus equivalence and stimulus generalization (i.e. via derived relational responding), private and overt responses can be considered a part of the same “relational class;” thus impacting behavioral function (Friman et al., 1998, p. 142). This means,

behavior analysts can include private events as a variable within environment-behavior relations and therefore develop function-based interventions that treat eating disorders.

FUNCTIONAL BEHAVIOR ASSESSMENT

By using components of a functional behavior assessment as the framework for reviewing and synthesizing pertinent literature, an informal task analysis has been created to guide practitioners as they design a treatment for disordered eating and excessive exercising. First, behavior analysts should identify any cultural or historical variables that may have contributed to the evolution of the client's social-verbal environment. Then, practitioners can determine whether or not clients are making contact with contingencies that are effectively shaping these target responses. Next, depending on the presence of self-rules and other private internal responses, behavior analysts can assess whether private stimuli are evoking overt responses or should be considered as variables within the whole of the client's environment. With motivational operations, discriminative stimuli, and potential environmental consequences identified, a practicing behavior analyst can design a technology for treating disordered eating and excessive exercising that is individualized and effective. In the next section, potential behavior analytic treatment methods will be analyzed and evaluated by means of the Professional and Ethical Compliance Code for Behavior Analysts.

ETHICAL CONSIDERATIONS FOR BEHAVIOR ANALYTIC TREATMENT METHODS

When designing behavior analytic technologies for the treatment of eating disorders and excessive exercising, practitioners must ensure their interventions reflect and are in compliance with the Professional and Ethical Compliance Code for Behavior Analysts (PECC) (Behavior Analyst Certification Board, 2014). In this section, potential treatment methods will be introduced and tested against the tenets of the PECC. Due to the interdisciplinary nature of eating disorder treatment, the behavior analytic intervention principles and methods selected for review will also be examined through the lens of the Ethical Principles of Psychologists and Code of Conduct (EPPCC) (American Psychological Association, 2017). Finally, some of the treatments presented in this section were utilized prior to the establishment of the Behavior Analyst Certification Board. However, these methods will still be analyzed and held to the same ethical standards as the more modern treatment methods presented later in this discussion.

1.01 RELIANCE ON SCIENTIFIC KNOWLEDGE

Comparable to our discussion on private events, there are very few published empirical studies on eating disorder treatment within behavior analytic literature. The majority of the studies surrounding this topic are antiquated and found within the corpus of behavior modification research. As a result, there is some evidence of behavior analytic methodologies being utilized to treat individuals with eating disorders; however, these procedures are limited in regards to data driven efficacy

and sound ethical practices. Eckert, Goldberg, Halmi, Casper, and Davis (1979) describe the difficulties of treating anorexia and related disorders. Eckert et al. (1979) state:

Evaluation of behavior therapy in anorexia nervosa is complicated by several factors. There is virtually no controlled study evaluating its therapeutic effectiveness. Often, medications are used concurrently with behavior therapy so that it is impossible to see which treatment is the effective one. Diagnostic criteria are often not carefully specified, resulting in the inclusion of patients suffering primarily from phobias, hysteria, or schizophrenia in the treatment studies. (p. 55)

In the section of the authors' work, the researchers describe the presence of several confounding variables that they believe may limit a practitioner's ability to determine the effectiveness of behavior therapy. Namely, the presence of medication and co-morbidity. However, PECC standard 1.01 establishes the necessity to evaluate the key historical, environmental, and medical variables prior to designing and implementing treatment. Thus, in order to be in compliance with the PECC standard 1.01 practitioners must document these variables and analyze their relevance by means of scientific procedures. Meaning, behavior analysts are responsible for determining empirical methods that not only treat the target behavior, but are also analytic and conceptionally systematic (Baer, Wolf, & Risley, 1968). Therefore, despite a multitude of variables that may pose a challenge when designing treatment, practitioners must plan and implement treatment methods that are founded on behavior analytic principles.

2.05 RIGHTS AND PREROGATIVES OF CLIENTS AND 4.02 INVOLVING CLIENTS IN THE PLANNING AND CONSENT

The role of the client within behavior-change procedures is crucial and is also outlined within the PECC. Standards 2.05 and 4.02 describe the specific rights of our clients. Especially in regards to their entitlement to detailed explanations of their legal prerogatives and their right to participate in, and consent to potential intervention components. In the past, patients diagnosed with eating disorders had many of their rights restricted in the initial stages of their treatment. Shmidt and Duncan (1974) and Eckert et al. (1979) both describe on-boarding in-patient procedures that included the removal of privileges such as receiving visits from relatives, access to the telephone, monetary funds, and personal clothing items. In addition, Blinder, Freeman, and Stunkard (1970) describe limiting a client's access to physical activity until he or she gained a sufficient amount of weight. Although some may argue that denying clients privileges (at the commencement of treatment) are antecedent measures, the literature indicates informed consent and client involvement in treatment planning were absent from these studies. Therefore, these on-boarding protocols do not reflect ethical practices and should not be considered for behavior analytic therapy.

In addition to violating the PECC, proceeding with treatment without informed consent violates the EPPCC. Specifically, tenets 3.10 and 10.01 describe the client's right to informed consent using language and/or methods that are comprehensible to the individual

(American Psychological Association, 2017). Further, these standards indicate that therapists must describe the “developing nature of the treatment, the potential risks involved, and alternative treatments that may be available, and the voluntary nature of their participation” (American Psychological Association, 2017, p. 14). By ensuring the client has a comprehensive understanding of treatment components and their potential risk factors, therapists guarantee clients are legally and physically protected. In addition, both behavior and non-behavior analytic therapists must engage in acts of justice and “accord dignity” to their clients (Bailey & Burch, 2016). This means, regardless of diagnosis, behaviors, or skill level, therapists must establish appropriate rapport with their clients that are founded on ethical standards and trust. In doing so, behavior practitioners uphold their professional codes and ensure procedures reflect the dimension of “applied” treatment and research practices (Baer et al., 1968, p. 92).

2.09 TREATMENT/INTERVENTION EFFICACY AND 4.03 INDIVIDUALIZED BEHAVIOR-CHANGE PROGRAMS

In her review of the literature, Ellen Haller (1992) puts forth that researchers and medical professionals have found:

The prognosis for persons with eating disorders is extremely variable. Some patients with anorexia may improve without treatment; for others, however, the course can be long and pernicious. After, treatment, 50% of patients with anorexia nervosa may continue having persistent

psychological impairment, and after achieving remission through successful inpatient treatment, about 50% may relapse within a year. (659).

These findings, although based upon medical and not behavior analytic research, indicate the necessity of effective and generalizable treatment for individuals with eating disorders. One way to guarantee efficacy of eating disorder treatment is to evaluate intervention components by means of the dimensions of behavior analysis. Meaning, behavior analysts must identify and analyze environmental variables that may be maintaining the target responses and utilize behavior analytic principles to inform treatment planning (Baer et al., 1968, p. 92).

In their seminal article, Ayllon and Michael (1959) describe the specific technology and staff training procedures they utilized to decrease food refusal in two patients. In their work, the researchers describe two clients whose restrictive eating was maintained by a “combination of escape and avoidance,” and the focal point of behavioral treatment procedure relied upon “food spilling as the aversive stimulus” (Allyon & Michael, 1959, p. 330). During the study, the researchers trained the nursing staff to continue spoon-feeding the clients, but to do so in a way that would ultimately create a mess. Then in order to escape the aversive mess, the patients would begin to feed themselves. Social praise was only delivered contingent upon the patients feeding themselves (Allyon & Michael, 1959). The researchers indicated that once the patients began to independently feed themselves, the behavior would access natural reinforcement by coming under the “control of environmental variables which maintain this behavior in

most people, such as convenience, social stimulation at mealtime, etc.” (Allyon & Michael, 1959, p. 330).

Although the BACB was not established at this time, the intervention and staff training reflected PECC standards because the authors utilized behavior analytic methods, and executed the procedures in a way that promoted client independence (Allyon & Michael, 1959). Results suggest that as the staff implemented the treatment with fidelity, the rate of meals consumed by means of self-feeding increased, as well as the clients’ weights. This is one of the first examples found within the literature of function-based behavior analytic protocols treating restrictive eating behaviors. Notably, Allyon and Michael (1959) indicate that one of the clients did “relapse;” however, within five days the client began engaging in the alternative self-feeding behavior. This anecdote is crucial to the present discussion because it implies that when interventions are designed with behavior analytic principles behavior-change will occur. Further, this study demonstrates the importance of upholding an underlying behavior analytic principle, the client’s right to effective and individualized treatment. As previously discussed, analysts can achieve this mission by implementing appropriate on-boarding records review procedures. In addition, behavior analysts can ensure they are implementing effective treatment by individualizing reinforcement procedures that promote independence through self-monitoring and the shaping of alternative responses.

Reinforcement. In their review of the literature, Lappalainen and Tuomisto (2005) discuss the challenges of reinforcement and schedules of reinforcement when treating individuals with eating disorders. The authors

state that when working on decreasing restrictive eating or binge-purging responses, analysts may confront complex schedules of reinforcement that prevent clients from engaging in alternative behaviors (Lappalainen & Tuomisto, 2005). For example, the authors put forth that despite being in a state of food deprivation, alternative reinforcers such as exercising or purging can still “compete with the reinforcing value of food” (Lappalainen & Tuomisto, 2005, p.173). Thus, an analyst may have to evaluate and increase the value alternative reinforcers (i.e. preferred or novel activities) that are strong enough to “decrease the value of food and eating” (Lappalainen & Tuomisto, 2005). Simply, the authors suggest putting more emphasis on targeting and reinforcing alternative responses that in turn could affect the client’s eating behaviors. In order to effectively determine which alternative behaviors and activities should access reinforcement, practitioners can integrate self-monitoring and values-guided practices within their individualized treatment protocols.

Self-monitoring and values-driven treatment.

Incorporating components of Acceptance Commitment Therapy (ACT) into eating disorder treatment protocols is one means of establishing values-driven, self-monitoring intervention procedures. Derived from the behavior analytic concepts discussed in previous section of this paper, ACT was founded on the principles of radical behaviorism, verbal behavior, relational frames theory, and the importance of acknowledging private events within the four-term contingency (Cullen, 2008; Zettle, 2005; Hayes & Shenk, 2004). The overall objective of ACT is to accept the discomfort of internal states while still engaging in meaningful, values-guided actions

(Harris, 2006). There are six essential components and processes that create the framework for this treatment method: *acceptance, cognitive defusion, present moment awareness, understanding self as context, determining values, and taking committed action* (Cullen, 2008; Harris, 2006; Hayes & Wilson, 1994).

During the *acceptance* phase the client identifies private events (i.e. anxiety, anger, sadness, hopelessness etc.) that may evoke avoidance responses such as restrictive eating, binge-purging events, or excessive exercising. Next, the client engages in *cognitive defusion*, by tacting private events as simply emotions, “thoughts, images, memories, and other cognitions,” without emitting avoidance responses (Harris, 2006, p. 7). Then, the client engages in *present moment awareness* by tacting private experiences as he or she “notices” them, while still emitting an alternative or other behavioral response such as eating a meal, adhering to specified exercise duration criteria, or engaging an activity other than purging. During *understanding self as context* component, the client begins to develop the skill of discriminating between “the person he or she calls “I,” and the problem behavior the client wants to eliminate” (Hayes & Wilson, 1994, p. 294). This means the individual can make the distinction between “I am anxious about eating with my family” and “I am having the feeling or thought that I am anxious about eating with my family.” In the last two phases of ACT, *determining values* and *taking committed action*, the client defines alternative behaviors and values that are meaningful to him or her, and then emits the alternative, values-guided behavior.

Integrating the six core ACT processes into eating disorder and excessive exercising treatment procedures

promotes intervention efficacy and individualized programming. Namely because ACT relies heavily upon identifying meaningful alternative activities and cultivating self-monitoring skills. Specifically, ACT acknowledges that while clients with similar behaviors may experience comparable feelings or states such as anxiety, depression, shame, or sadness, the manner in which these private events present themselves is wholly unique to the individual client. This means, the client becomes an integral part of identifying and determining whether or not their private events ultimately play a part in evoking the targeted responses (i.e. private events as discriminative stimuli) or are simply one variable in the environment-behavior relation (i.e. private events as motivating operations). Then, together with the client, the behavior analyst can determine and define alternative behaviors that align with the client's goals or values.

These alternative responses (i.e. eating at a restaurant with peers, shopping at a grocery store, exercising to a specified criterion etc.) will access immediate, highly preferred (i.e. quality) and powerful reinforcement that is strong enough to impact future behavior (Schramm, 2006). Finally, by integrating ACT principles into treatment procedures that involve self-monitoring, the behavior analyst inevitably increases individualization of treatment and client independence. In addition, behavior analysts will adhere to the PECC and the EPPCC as they help clients discriminate between which responses they can control (i.e. value-driven alternative behaviors) and which responses (i.e. private events) they must acknowledge, but not attempt to avoid by emitting the target behavior (Beatriz Meyer, 2008; Hayes & Wilson, 1994). In this way, behavior analysts ensure the

acquisition of alternative behavioral skills and treatment efficacy.

4.07 ENVIRONMENTAL CONDITIONS THAT INTERFERE WITH IMPLEMENTATION AND 4.09 LEAST RESTRICTIVE PROCEDURES

The final PECC standards 4.07 and 4.09 go hand-in-hand with EPPCC tenet 3.04 (Avoiding Harm), and are pertinent to eating disorder treatment protocols. When designing effective behavior analytic treatment for eating disorders behavior analysts are charged with the responsibility to utilize resources and methods that are reinforcing and supported by the environment. As previously mentioned, past intervention procedures for disordered eating and excessive exercise included withholding access to physical activity and forcing food consumption by means of a feeding tube (Blinder et al., 1970; Schmidt & Duncan, 1974). Without oversight from medical professionals, these two protocols can be considered punishing, and in regards to the feeding tube, a mechanical restraint (Bailey & Burch, 2016).

Instead of limiting a client's ability to choose or denying access reinforcement, behavior analysts must make treatment decisions that promote alternative behavior acquisition within a safe and humane therapeutic environment (Van Houten et al., 1988). This can be accomplished by ensuring clients are a part of the treatment planning, identifying quality reinforcement, and by selecting alternative behavior skills that impact and reshape the manner in which the client interacts with his or her environment. One means of achieving least restrictive and environmentally supported treatment

procedures is to utilize coping skills identified within the framework of ACT.

While delving into the breadth of ACT metaphors and experiential exercises goes beyond the scope of this paper, it is through a trusting client-practitioner relationship that these technologies can be utilized and evaluated for efficacy. For our purposes, employing verbal behavior principles such as tacting private events (i.e. shame), and then embedding these tacts into distancing phrases (i.e. “ I am having the *thought* that my action was shameful”) creates “separation,” so that engaging in values-based alternative responses becomes more reinforcing than emitting the target behavior (Hayes & Wilson, 1994; Harris, 2013). Although this is only one of many examples of ACT exercises, this technique represents the ways in which practitioners can employ ACT methods to support clients as they make value-driven alternative choices.

In addition to using ACT techniques, behavior analysts can also implement antecedent procedures that can potentially reshapes the manner in which clients engage with their environment and/or emit targeted responses. For example, instead of denying access to exercise, practitioners can model and teach more appropriate ways to engage in the target response. In their article, Moore and Quintero (2019) state that engagement in rigorous, “high-intensity” exercise programs have increased in popularity (p.50). However, in order to access the health benefits that are associated with weightlifting, clients must learn how to properly engage with and lift the barbell. Thus, the authors implemented a successful forward chaining procedure to teach novice lifters to safely and effectively complete the Olympic lifts. (Moore & Quintero, 2019).

Although this article may not directly relate to individuals with disordered eating or excessive exercising behaviors, the goal of the research study was to apply behavior analytic principles in fitness-oriented environments. Therefore, one can infer that behavior analysts have the ability to utilize the technology and empirical evidence presented in the work of Moore and Quintero (2019) to design teaching protocols that enable their clients to safely and appropriately access gym environments. In doing so, practitioners facilitate healthy, value-based choice making and promote safe and alternative ways to access reinforcement. Finally, by enriching the client's environment with proper training protocols, behavior analysts can effectively implement reinforcement procedures that impact the motivating operations affecting the targeted response. This is exemplified in the following scenario.

Suppose an adolescent client with restrictive eating and excessive exercising target behaviors identifies exercising for health and strength as two of her values. However, despite meeting with her barbell coach and learning about training related "stress, recovery, and adaptation," she tacts private events surrounding food consumption and short training durations (Rippetoe, 2013). Partnering with the barbell coach, the behavior analyst supports the client as she utilizes defusion techniques, encourages the client to make contact with her values, and helps her to choose the alternative behavior response despite her private events. After weeks, the client's body weight is still not increasing. As a result, the behavior analyst decides to re-focus the intervention on the alternative behavior activity of training. The analyst invites the client to be a part of the treatment planning process. The

behavior analyst, barbell coach, and the client agree that the center of the treatment protocol will be to increase the client's ability to accurately and safely complete the three major barbell lifts. They also agree that the client will keep a journal and indicated on a scale the magnitude of her private events. The new treatment procedure is implemented and after a month the client's body weight has increased to a healthy criterion, the magnitude of her private events have decreased, and the client's ability to safely train has also increased. Notably, the client no longer trains every day to excess, instead she utilizes rest days to sleep, eat, and try other novel activities. As a result, the client's weight is maintained and she is able to access other environments and reinforcement that is typical for individuals her age (i.e. social gatherings with peers).

This scenario depicts the ways in which behavior analysts can partner with their clients to integrate activities that enrich treatment and encourage values-driven choices. It also demonstrates the ways in which analysts can design antecedent procedures (i.e. a safe barbell training protocol) that affects the target behavior. In addition, this scenario reveals the manner in which intervention choices can ultimately lead to clients accessing natural forms of reinforcement (i.e. eating, sleeping, social gatherings, eating at restaurants etc.) without directly programming these contingencies. In fact, the very nature of the barbell training antecedent procedure establishes a differential reinforcement component because the client gains access to technique-focused social praise (i.e. from the coach and analyst), automatic reinforcement in the form of living her values, and tangibles such as food (i.e. heavy training creates a

deprivation of food and water) contingent upon her adhering to the program. Finally, this scenario also reveals the importance of developing relationships with professionals in related fields when designing treatment programs for individuals with eating disorders. Developing relationships with stakeholders and other professionals on the treatment team is crucial for client success. In the next section, the Missouri Leader Standards (Department of Elementary and Secondary Education, 2012) will be analyzed through the lens of Van Houten et al. (1988) work and then utilized to create organizational and interdisciplinary supports for behavior analysts specializing in eating disorder treatment.

FUTURE DIRECTIONS

Identifying and classifying the specific private events that may evoke restrictive eating, binge-purging, or ritualistic exercise behaviors in clients is a challenge (Anderson et al., 2000; Friman et al., 1998). Further, isolating the specific environmental variables that may be maintaining these target behaviors also pose a challenge to the experienced behavior analysts. Especially in regards to pinpointing the exact social or cultural contingencies that have historically punished or reinforced our clients' targeted responses, or shaped their private verbal behavior (i.e. self-rules) (Dell'Osso et al., 2016; Miller and Pumariega, 2001). However, after thoroughly reviewing the literature, it is evident that our field already has the tools necessary to ensure clients with eating and related disorders have access to safe and enriched therapeutic environments, as well as the most

effective behavior analytic treatment (Van Houten et al., 1988). By conducting observations, implementing assessments, and designing technology that is reflective of scientific and behavior analytic principles, practitioners have the ability to support clients as they engage in values-guided, alternative behaviors (Baer et al., 1968; Hayes & Wilson, 1994).

Despite possessing the technology to affect behavior change, there are several avenues within private and covert behavioral research that needs further examination. First, several authors note the impact a client's immediate family may have on shaping and maintaining disordered eating behaviors (Haller, 1992; Blinder et al., 1970). Although delving into the exact way family systems influence eating behaviors goes beyond the scope of this research, future analysis is warranted to determine the manner in which immediate family members potentially contribute to a client's overall history of reinforcement or punishment.

Second, as discussed in the ethical considerations section, selecting alternative skills and activities to focus treatment upon may be more beneficial than solely programming technology to decrease target responses (Lappalainen & Tuomisto, 2005). However, behavior analysts must select measurement procedures for both the target and alternative response that are meaningful. In the past, increased body weight signified effective and successful treatment (Blinder et al., 1970). Nevertheless, using body weight as the sole form of measurement does not provide a comprehensive picture of client's path to recovery. Instead, practitioners treating individuals with eating disorders should additionally choose measurement

procedures that accurately depict the acquisition of alternative skills.

For example, behavior analysts could record the total duration of a client's pre-treatment and during treatment exercise routine. Comparing this data would provide a means of determining whether or not the client is adhering to treatment criterion and making value-guided choices. Further, practitioners could train clients and other members of the treatment team to collect frequency/rate data to determine how many times per day the client tacts private events surrounding the target or alternative response. Additionally, analyst could measure the latency of utilizing ACT coping exercises after the client tacts private events. Although some may argue that self-reporting is not an accurate form of measurement, having a precise method of determining an effective measurement system allows practitioners to correctly account for specific environmental variables impacting treatment (Le Blanc, Raetz, Sellers, & Carr, 2016). Effective forms of measurement, in regards to both the target and alternative response, is crucial to creating successful and conceptually systematic treatment technologies.

Finally, future researchers should focus on conducting more single-subject studies that demonstrate effective or non-effective eating disorder treatment methodologies. One of the greatest weaknesses in this present discussion is that the majority of the reviewed literature came from researchers in non-behavior analytic fields. Although an interdisciplinary model may be warranted for the treatment of eating disorders, it is crucial that behavior analysts disseminate technology that may enable other analysts to intervene on these challenging behaviors.

CONCLUDING REMARKS

The purpose of this research was to examine the ways in which our verbal-social community impacts the shaping of private events. In addition, this review of pertinent literature sought to determine the relationship between private experiences and overt behaviors. With these elements and relationships identified, this research strove to present and evaluate potential behavior analytic strategies for the treatment of eating and related disorders. Despite some areas where future research is necessary, the findings and intervention methods presented in this paper represent scientifically sound, behavior analytic approaches to treating challenging covert and overt eating behaviors. With this preliminary evidence, behavior analysts have the means of selecting effective and individualized treatment methods to begin reducing these life-threatening behaviors and supporting clients as they cultivate the skills necessary to live a meaningful and rich life.

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CHAPTER 2.

A BEHAVIOR ANALYTICAL APPROACH TO RUMINATION

It is essential to understand that rumination and vomiting were once analogous but today are defined differently. Rumination involves contents from the stomach being brought back up and are typically described as tasting good or undigested (Talley, 2011). The content is then either re-swallowed or spat out. In comparison, vomiting refers to the forceful ejection of digested or partially digested gastric contents up from the stomach and out of the mouth (Talley, 2011). Vomiting is more forcible and spitting out the food that is regurgitated is described as uncontrollable. Rumination



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has always been defined to include both behaviors of regurgitating and re-swallowing.

In 1981, 6% of people institutionalized with a mental disorder were reported to be diagnosed with rumination syndrome (Singh, 1981). Due to the lack of recorded data, the prevalence of rumination today is unknown (Talley, 2011). Rumination has not always been considered a disorder that is harmful to individuals. We know today that rumination can cause esophagitis and tooth decay, severe weight loss, dehydration, gastric disorders, malnutrition, and in chronic cases, death (Rast, Johnston, Drum, and Conrin, 1981; Thibadeau, Blew, Reedy, & Luiselli, 1999). A study published in 1983 defined rumination as a benign disorder (Levine, Wingate, Pfeffer, & Butcher, 1983). The behavioral intervention used in the study was reported to be unsuccessful in all 8 out of 9 participants. The researchers were ignorant to the harmful effects of rumination and even told the participants who did not have significant results that the behavior was harmless (Levine et al., 1983). According to Talley (2011), professor of medicine, the cases of individuals diagnosed with rumination syndrome has increased. It was predicted that the increase in diagnoses is due to physicians noticing the disorder and asking patients about specific symptoms related to rumination and not because of an increase in people experiencing rumination. Individuals diagnosed with Autism Spectrum Disorder (ASD) are being treated for rumination with behavior analytical techniques after parents and caregivers report the symptoms to therapists and teachers. Without parents and caregivers speaking up, the behavior might never be treated for some individuals. Behavior analysts are expected to collaborate

with families and stakeholders and without this collaboration, teachers and behavior analysts might not fully understand what the client needs (Leader Standards, 2013a). What behavior analytic intervention plans have been used to treat rumination and how successful were the interventions?

Researchers in the past have used different behavior analytic techniques to treat rumination. All researchers defined rumination to include re-swallowing of the regurgitated food, and thus the most common treatment interventions used in the recent literature were antecedent interventions involving food satiation for automatic reinforcement. According to Cooper et al. (2007), antecedent interventions can decrease the effectiveness of reinforcers that are maintaining the problematic behavior but alone they usually do not produce permanent changes in problem behavior and are most often paired with another intervention that will create more sustaining effects. Antecedent based food-related treatments alone have shown to be effective in past research studies. These are treatments that change the environment that the behavior occurs in such as removing or adding food to an individual's meal. Researchers reported that antecedent interventions for rumination are particularly easy to implement and are often socially acceptable compared to other interventions such as punishment interventions (Wilder, Register, Register, Bajagic, & Neidert, 2009). Long term effects of these interventions have not been published.

One study used antecedent-based, satiation procedures to treat rumination maintained by automatic reinforcement. Kenzer and Wallace (2007) used both large portions and supplementary feedings in a treatment

plan for Dan, a 59-year-old man diagnosed with profound mental retardation. There were four conditions. The first condition presented was baseline and involved Dan's regular mealtime routine with data collection during the 30 minutes following meal completion. The next two conditions were supplemental feedings after meals for every minute either for 15 or 30 minutes. The last condition was labeled "large portion" where Dan was given a small portion of additional food following his meal. The results showed that frequency of rumination was lower following supplemental feedings (for 30 minutes) compared to baseline and the large portion condition. The researchers found that since the food consumed in both the supplementary feedings and the large portions conditions were the same number of grams, the critical variable to reducing the frequency of rumination for Dan was time (Kenzer & Wallace, 2007).

Lyons, Rue, Luiselli, and DiGennaro (2007) also incorporated supplemental feeding on a fixed-time interval to treat rumination. There were two participants involved in the research. The first boy, Alex, was put through three conditions. Intervention 1 was 15 min in length and included a noncontingent presentation of a food or juice item on a fixed-time 30 s schedule. Intervention 2 involved a noncontingent presentation of only the juice on a fixed-time 30 s schedule for 30 min. The last condition was the control condition. The second boy, Tom, was put through three conditions as well. The first two conditions were 20 min in length and involved either the presentation of food or juice on a fixed-time 30 s schedule. The third condition was noncontingent access to a chew ring. The results showed that rumination that occurred after a meal was reduced when supplemental

feedings were introduced (Lyons et al., 2007). The researchers stated that the reduction of rumination might be dependent on the type of food and liquid offered because rumination was eliminated when juice was an option for Alex in intervention 1. Then when water was offered, the behavior returned to baseline levels. For Tom, the supplemental presentation of food, liquid, and the chew ring eliminated the target behavior. But when the intervention was replicated, the frequency of rumination returned to baseline with the presentation of the chew ring, increased with the liquid, and stayed absent with the food presentation (Lyons et al., 2007). The researchers made it clear that even though the supplemental feedings were effective, the reason is not known. Their idea was that the extra food and liquid intake might have produced a satiation effect, or it provided sensory stimulation that was like rumination.

Other researchers have used the behavior analytical technique of fixed-time intervals to present supplemental feedings or liquids to treat rumination. Specifically, the duration of rumination was measured during juice delivery and immediately following the termination of juice delivery in a research study (Kliebert & Tiger, 2011). This study was different than others in the fact that rumination was measured by duration rather than by frequency. Kliebert and Tiger (2011) determined the behavior to be automatically maintained for an 11-year-old boy after finding out the behavior occurred across all FA conditions and was not influenced by social reinforcement. The results state that noncontingent delivery of juice on a fixed-time 15 s schedule resulted in an elimination of rumination in all but one of the sessions conducted (Kliebert & Tiger, 2011).

Researchers Rast et al., (1981) studied the relationship between food quantity and the frequency of rumination in three individuals with mental disorders. Rast et al. (1981) varied the quantity of food given to the participants and the amount of time it took the participants to eat. This resulted in mixed findings. For one of the three participants, the results showed that regular quantity meals spaced out over time correlated with a slightly reduced frequency and duration of rumination. Another participant's results showed that spacing the meals out over time was not effective in reducing the frequency and duration of rumination.

Noncontingent access to white bread was used to treat rumination in a different study. Researchers Thibadeau et al. (1999) had tried different interventions for a client, Bill, who was engaging in rumination but were not able to find something long-lasting. They decided to implement a differential reinforcement of other behaviors (DRO) procedure that involved reinforcing the participant's manding for "eat" with contingent access to white bread. In the baseline phase, the participant was engaged in rumination on average 14.5 times per day. After access to white bread for 1 h following a meal was in place, the rumination behavior decreased to an average of 1.6 times per day (Thibadeau et al., 1999). Dudley, Johnson, and Barnes (2002) found similar results when they gave a 9-year-old girl engaging in rumination access to unlimited quantities of starchy foods after she ate a meal.

Just like in Kenzer and Wallace's (2007) study, satiation was the focus in the intervention used in 1975. Researchers Jackson, Johnson, Ackron, and Crowley (1975) were one of the first researchers to use a non-aversive procedure to treat rumination. The two

participants in the study were introduced to a satiation procedure (i.e., double portions) until they met the satiation criteria. Jackson et al. (1975) defined the satiation criteria as the point in time when the participants refused food twice within a 1 min interval between food refusals. Unlike Kenzer and Wallace's (2007) study, this study did not compare a satiation intervention with supplemental feedings on a fixed-time schedule. The results showed a 94% reduction of the target behavior for one participant and a 50% decrease for the other (Jackson et al., 1975).

Besides using food-based antecedent interventions, researchers have studied the effects of alternative antecedent-based interventions to treat rumination. Researchers Wilder et al. (2009) wanted to administer a flavor spray on a fixed-time interval while measuring the frequency of rumination. They, too, defined rumination to include re-swallowing of the regurgitated food and found that automatic reinforcement maintained the behavior. Dillion, a 37-year-old man, diagnosed with ASD, was taught to self-administer a flavor spray on a fixed-time 10 s interval. Therapists first administered the spray for Dillion until he was capable of doing it himself. The results concluded that the fixed-time delivery of a flavor spray could reduce rumination, but the researchers stated that because of the dense schedule (flavor spray every 10 s) and the reduction of rumination not being clinically acceptable, the intervention might not be practical to use when treating rumination (Wilder et al., 2009).

Different from other research found Wagaman, Williams, and Camilleri (1998) wanted to study the effects of reinforcing an incompatible behavior on rumination.

Explicitly, the researchers taught diaphragmatic breathing to a 6 year-old-girl diagnosed with rumination disorder. They stated that the behavior of diaphragmatic breathing would be incompatible with rumination and would provide a simplified habit-reversal intervention. Habit-reversal interventions are considered antecedent interventions that are usually used in conjunction with a different intervention (Cooper et al., 2007). Using the habit-reversal approach encompasses three components: awareness training, an incompatible behavior, and social support. Reinforcement was given contingent on diaphragmatic breathing during the intervention. The results indicated that the participant did not engage in the target behavior for 107 days in a row. Researchers Thomas and Murray (2016) also integrated self-monitoring and diaphragmatic breathing in an intervention for a 27 year old woman engaging in rumination and intermittent binge eating. The participant reduced rumination during both baseline and active intervention phases. A 23-week post intervention follow up showed that the reduction of rumination was maintained (Thomas & Murray, 2016). It is important to note that the participants in these two studies were estimated to have average intelligence. Awareness training may not be as attainable for some individuals in the ASD population.

Besides antecedent procedures, punishment procedures have also been used to treat rumination. Cooper et al. (2007) define punishment as a stimulus change following a response that decreases the future frequency of similar responses. Professors of gastroenterology and hepatology at the Academic Medical Center in Amsterdam used punishment in the

form of a loud tone to treat rumination in their formal research study (Smout & Breumelhof, 1990). The loud tone was administered contingent on a detected pressure in the participant's stomach. The researchers stated that the pressure in the gastric-fundus (upper part of the stomach) was a physiological marker of rumination (Smout & Breumelhof, 1990). The results were insignificant with no improvements in rumination for the participant.

Another study that used punishment as an intervention technique found significant results. Foxx, Snyder, and Schroeder (1979) looked at the effects of using both food satiation and an oral hygiene punishment program. The methods of the study included the presentation of a Listerine-soaked toothbrush contingent on rumination behavior. Two people, both institutionalized for mental delays, participated in three conditions after lunch. Besides baseline, the conditions consisted of food satiation and food satiation plus oral hygiene. The procedures for the oral hygiene condition were as follows for both participants; after the rumination occurred, a verbal reprimand was given along with the demand to brush their teeth for 2 min with the Listerine-soaked toothbrush, and then wipe their face with a Listerine-soaked facecloth. What they found was that when the participants were subjected to the satiation condition after baseline, rumination decreased by an average of 40.7% for participant 1 and decreased by an average of 42% for participant 2. During the satiation plus oral hygiene condition, rumination dropped to 3% for participant 1 and 1.4% for participant 2 (Foxx et al., 1979). Ethical considerations concerning using this punishment intervention for other clients could be debated since

participant 2 only had an average difference of 6.5% between the satiation program and the punishment program used.

Researchers Singh, Manning, and Angell (1982) based their research design on Foxx et al.'s (1979) previous study. They used the same procedures previously in place for the oral hygiene intervention for two boys, Paul and David. Following the implementation of the oral hygiene procedures after breakfast, lunch, and dinner, rumination was reduced dramatically, and stereotyped behavior increased spontaneously for both participants. The researchers stated that they did not reinforce stereotyped behavior and did not know the exact cause for the increase after the intervention was in place. The results showed a dramatic decrease in rumination for both men. Paul's behavior decreased an average of 79%, and David's behavior reduced an average of 82% from baseline (Singh et al., 1982).

ETHICS AND INTEGRITY

The behavior analysis field is comparatively new when thinking about other helping fields such as psychology and education (Bailey & Burch, 2013). In the beginning, questions related to the ethics of the interventions used were not discussed. For example, literature published before 1980 relied heavily on using punishment to treat rumination. An astonishing number of articles published in the late 1960s and into the 1970s addressed treatment for rumination that primarily used electric shock punishment procedures (Galbraith, Byrick, & Rutledge, 1970; Kohlenberg, 1970; Lang & Melamed, 1969; Linscheid & Cunningham, 1976; Luckey, Watson, &

Musick, 1968; Toister, Condrón, Worley, & Arthur, 1975; White & Taylor, 1967). One could make the argument that by using punishment, the behavior analysts are following their obligation to provide individuals with the most effective treatment procedures available (Houten et al., 1988). Bailey and Burch (2010) would argue that using punishment is wrong in this situation because the client has the right to an effective, but most importantly, less restrictive treatment.

More recently, most of the research on rumination that has been published uses reinforcement and antecedent procedures instead of punishment. Ethically, researchers and practitioners in the field of behavior analysis know that using punishment when reinforcement produces significant results is wrong. Behavior analysts can damage the reputation of ABA if they practice unethical procedures to treat behaviors (Brodhead & Higbee, 2012). This not only includes refraining from using outdated procedures but also refraining from using scientific, critically analyzed methods.

Researchers in the field of behavior analysis have the ethical obligation to base all decisions for treatments and interventions on the science of behavior. Behavior analysts are required to keep up with new research that is being published and become familiar with past research that has already been published to stay compliant with both the PECC and the Teacher Standards (Behavior Analyst Certification Board, 2014; Missouri Department of Elementary & Secondary Education, 2013b). Subscribing to behavior analytical journals, keeping up with continuing education units, and attending conferences will help professionals stay current on

outdated treatments and new interventions supported with statistically significant results.

After reviewing the published literature, it is evident that professionals in the fields of behavior analysis, psychology, and gastroenterology have all treated rumination. The assessments used depends on the researcher's field of study. Gastroenterologists conduct tests to assess the functions of an individual's livers, renal, abdomen, and blood before intervening in the behavior (Raha, Sarma, Thilakan, & Punnoose, 2017). Gastroenterologists such as Raha et al. (2017) might also look for esophageal obstructions, biliary tree obstructions, and pyloric stenosis. On the other hand, psychiatrists in the psychology field will use interviews, physical examinations, and a mental status examination (such as the Wechsler's Intelligence Scale for Children) to assess what is causing the individual to engage in rumination (Raha et al., 2017; Wechsler et al., 2003). Behavior analysts use FBAs and FAs to assess rumination. The frequency of the behavior and the duration that an individual engages in the behavior have both been measured by professionals working with rumination. Kliebert & Tiger (2011) measured the duration of rumination for an individual they were working with to determine the percentage of the session with rumination. Duration data were collected at the onset of chewing and stopped 3 s after chewing ceased.

An FBA is systematic method used to gather information about the function of a problematic behavior (Cooper et al., 2007). It includes indirect assessments, descriptive assessments and experimental analyses. The assessment starts with interviewing key people involved including the client (if applicable), parents, teachers,

personal care assistants etc. Behavior analysts will review medical history and treatment history to rule out medical reasons for the behavior. For rumination, individuals usually see gastroenterologists to see if there are other health reasons for the behavior. Next, behavior analysts or behavior technicians will collect ABC data. The ABC data may identify antecedent variables, reinforcement contingencies, and reinforcers for alternative replacement behaviors (Cooper et al., 2007). Sometimes the function of the behavior can be determined after collecting ABC data. Three strategies that are often used after FBA results are analyzed include altering antecedent variables, altering consequent variables, and teaching alternative behaviors (Cooper et al., 2007). With rumination, ABC data from current research was inconsistent and resulted in researchers relying on FA results.

An FA, the experimental analysis component of an FBA, is considered to be more scientific in that variables are manipulated. An FA usually consists of 4 conditions that reflect the different functions of behavior: attention, escape, alone (automatic), and control (Cooper et al., 2007). A control condition is used to set up an environment free from demands and with low reinforcement available. When rumination is assessed with an FA, researchers see the behavior occurring in all conditions. A behavior that occurs across all conditions is hypothesized to not be socially mediated and under automatic control (Cooper et al., 2007).

Behavior analysts are taught to conduct assessments when addressing a new behavior or working with a new client. Instead of assuming an individual's rumination behavior is maintained by automatic reinforcement

because almost all past research articles stated that their participant's behavior was maintained by automatic reinforcement, the researchers in the articles discussed above conducted original FAs that were individualized to their participants. An FA can be a long process that involves interviews, direct observations, and experimental analysis (Cooper et al., 2007). Guessing the function of the behavior and starting a behavior intervention plan would be quicker than going through with the formal intervention assessment process. This is neither ethical nor fair to the individual. Even if the function of the behavior seems clear based on brief observations or interviews, professionals in the field might miss if the behavior is multiply maintained or if different environmental factors contribute to the behavior. Beavers and Iwata (2011) conducted a meta-analysis and found that 16.9% of subjects in past research studies met the criteria for engaging in a behavior that was maintained by multiple sources of reinforcement. It is known that when a behavior is multiply maintained by two different functions, both functions need to be addressed in the intervention so that the behavior is not being reinforced (Smith, Iwata, Vollmer, & Zarcone, 1993). The intervention created could produce only a slight reduction in the problem behavior if only one function is addressed (Bachmeyer, Piazza, Fredrick, Reed, Rivas, & Kadey, 2009; Day, Horner, & O'Neill, 1994).

Even though there is no research supporting rumination behavior being maintained by multiple sources of reinforcement, professionals working with individuals with this behavior should always conduct a new assessment for their client. As discussed earlier, the most common interventions developed for rumination

are based on the hypothesis that the behavior is likely maintained by direct access to positive reinforcement in the form of automatic sensory input. Behaviors were once thought to all be socially mediated. Then in the 1990's, researchers discovered that some behaviors were not socially mediated and instead were being maintained by direct access to reinforcement (Mason & Iwata, 1990). Today, rumination is treated as a direct access behavior which means that reinforcement is obtained directly from the problem behavior (Cipani & Schock, 2011).

There were different types of interventions used to treat rumination with significant results. What is lacking is an intervention plan that decreases rumination altogether or research that follows up after an extended period (i.e., more than 1 year). Before researchers Thibadeau et al. (1999) used a DRO schedule of reinforcement using white bread, Bill participated in multiple other interventions with no lasting results. Treatments used in the past for Bill included different types of DRO schedules, increased fluid consumption, the presentation of gum, the presentation of peanut butter during meals, an oral hygiene punishment procedure, and contingent aversive stimulation (Thibadeau et al., 1999). Even though some of these treatment plans resulted in a decrease in rumination, none of them was a permanent fix. Access to white bread was successful for Bill when it came to maintaining a low frequency of rumination. After a 9 month, 12 month, and 15 months follow up, Bill was ruminating on average .43 times per day. Research involving the oral hygiene implementation contingent on the target behavior found success in the follow-up assessments for multiple participants (Foxx et al.; Singh et al., 1982). Other researchers did not see as good of

results and stated that the interventions used were not applicable to the natural setting (i.e., dense schedules of reinforcement or shock therapy) or there was no follow-up assessment noted in the article (Wilder et al., 2009). Wagaman et al.'s (1998) study was the only one that conducted a follow-up assessment and rumination reduced to 0%. The relaxation techniques were thought to have caused the reduction in the target behavior, but it should be noted that this study relied on self-reported frequencies of rumination and may not be as reliable as direct observation.

MEASUREMENT AND ASSESSMENT

Researchers studying rumination behavior used single-subject experimental designs. Single-subject designs are used to validate clinical interventions. Different from group designs, single-subject research focuses on the functional relationships between independent and dependent variables (Horner, Carr, Halle, McGee, Odom, & Wolery, 2005). Single-subject research is thought to be experimental compared to case studies and observational studies that are correlational and descriptive. A case study is different than a single subject design because non-experimental observations occur that happen due to natural or personal causes. Internal validity of single-subject research can be achieved by confirmation of experimental control (Horner et al., 2005). By using ABAB reversal designs, multiple baseline designs, and alternating treatment designs, researchers can verify that the changes to the dependent variable are controlled by the experimental independent variable.

The importance of single-subject designs when

researching topics in special education has been discussed in the literature. Horner et al. (2005) stated it is helpful to look at participants as individual units rather than a sample of a larger population. By using single-subject designs, causal relationships can be determined without more complex analysis such as normal distribution (Horner et al., 2005). Alnahdi (2013) stated that single-subject designs are flexible and cost-effective.

The difficulties of running single subject design experiments is that the sample size is minute, and the procedures used for one individual may not work for an entire population of people. Since this is true, external validity increases when researchers operationally define the participants, the reason the study was conducted, and the known function of the behavior prior to the intervention (Horner et al., 2005). Replication of known successful research studies could also help increase the external validity for rumination interventions. With rumination research, behavior analysts can determine what research to replicate with their own clients based on the operational descriptions of the study details. A client engaging rumination maintained by attention may not benefit from an intervention derived from a study that studied rumination behavior maintained by a different function. Still, researchers state that external validity and generalizability are the main concerns of single subject research designs (Alnahdi, 2013).

Finding a behavioral intervention for rumination behaviors socially valid is important. In a school setting, rumination can be considered gross by peers, unsanitary, and interruptive causing an individual to have to be removed from their peers or be removed from learning. Some of the interventions that reduced rumination are

not socially valid due to the procedures used or the lack of significant reduction in the behavior. Social validity can be measured by the extent to which an intervention is chosen by behavior analysts (Carroll, 2014). Before the 1980's, least restrictive procedures were not the primary concern and interventions such as electric shock therapy were chosen most often (Bailey & Burch, 2013; Galbraith, Byrick, & Rutledge, 1970; Kohlenberg, 1970; Lang & Melamed, 1969; Linscheid & Cunningham, 1976; Luckey, Watson, & Musick, 1968; Toister, Condron, Worley, & Arthur, 1975; White & Taylor, 1967). Electric shock therapy would not be considered an acceptable procedure to use today even if the results from past research state the procedure reduces rumination. Interventions that involve supplemental feedings for an extended period following a meal may not be applicable when the behavior occurs in a setting where an individual cannot receive one-on-one care for extended periods of time. Likewise, interventions that reduce the frequency of rumination but not to a statistically significant percent may not be accepted as effective enough to implement in the applied setting therefore the intervention would not be chosen often and would have little social validity (Carroll, 2014).

Behavior analysts need to decide how they want to measure rumination before they start with an intervention. Almost all of the articles researching rumination measure the frequency of rumination behaviors. One article, instead, measured the duration of rumination to get a better understanding of the percent of the session that rumination occurs. Cooper et al. (2007) label the number of responses emitted during an observation period as the frequency of the behavior.

Frequency is used to measure rumination behaviors because each instance of rumination behavior omitted is repeatable and countable. It is thought that measurement helps behavior analysts answer questions, operationalize empiricism, and gauge progress (Cooper et al., 2007). Without measuring the frequency of rumination, behavior analysts would not fully understand what effects the intervention had on the behavior.

Behavior analysts will also need to decide behavioral goals for the student. These goals will help behavior analysts stay on track and show when the intervention is considered mastered. A goal written well will be measurable and objective (Visualrealm, 2018). Clarifying time frames, stating the intended frequency of the behavior, and using observable language ensures the goal is measurable and objective. Refrain from using vague language and instead use specific descriptors. A goal stating that “rumination behaviors will decrease to a frequency of 2 times a session by the end of the school year” is more specific than “The behavior will decrease”. Important to rumination behavior, the goal should be realistic. There is research that believes rumination behavior can be considered habit (Chitkara Tilburg, Whitehead, & Talley, 2006). A goal that states rumination behavior should decrease to 0 occurrences after 2 days of the intervention” may not be realistic or achievable when a student has been engaging in rumination for the last 9 years after every meal.

COLLABORATION WITH FAMILIES AND STAKEHOLDERS

Based on current and past research, rumination is

commonly seen as a problem behavior for children with developmental disabilities such as ASD. Required by the Individuals with Disabilities Education Act (IDEA), students with disabilities between the ages of 3 and 21 are given an individualized education program (IEP) based on their needs (Felix & Tymeson, 2017). In an IEP, the student's functional and academic levels are presented along with annual goals and the different educational services that will be provided. An IEP is comprised of many content areas depending on the special education and related services provided to the student (Felix & Tymeson, 2017). Typically, a BIP for rumination would be included into a student's IEP. With annual goals and meetings, the IEP helps professionals work together on common goals to increase skills and appropriate behaviors for students.

Since BIPs are included in IEPs, after an intervention plan has been created for a client, behavior analysts will need to communicate with the other professionals who are a part of the IEP team. This typically includes paraprofessionals, parents, speech-language therapists, and occupational therapists. Behavior analysts will be in charge of providing training and materials needed to implement the intervention. To make sure that care providers and other professionals follow through with intervention plans, behavior analysts need to be flexible. Flexibility is appreciated in applied settings, and inflexibility is often punished with personnel failing to follow through on your requests and avoiding you in future circumstances (Cipani & Schock, 2011). The behavior is less likely to decrease if it receives reinforcement in other environments while one

environment is using an intervention plan (Cipani & Schock, 2011).

Even after paraprofessionals and teachers are trained on intervention plans that should be followed, staff are prone to treatment drift. Treatment drift is defined as a person failing to implement the intervention as they were trained to do (McIntyre, Gresham, DiGennaro, & Reed, 2007). Therapists are also susceptible to observer drift which is defined as a decline in performance during data collection compared to during training (Taplin & Reid, 1973). Reid (1970) described the drift in therapist's behavior not as a continuous decline but rather a drop in performance followed by a stable level of performance (as cited in Taplin & Reid, 1973). Performing treatment integrity spot checks with the professionals in charge of implementing the treatment procedures and data collection can prevent treatment and observer drift. Results from a study looking at the effects of observer reliability conducted by Taplin & Reid (1973) found that reliability of the therapists to collect correct data and implement the treatment plan appropriately significantly increased when a supervisor conducted a spot check. Taplin & Reid (1973) also recommend to take into consideration that therapists may understand the treatment procedures during training with simple stimulus procedures but then could get confused when they are in the applied setting. Teaching antecedent intervention procedures may be more difficult to apply in the natural setting when working with ruminations. Making sure that the definition is objectively defined, clearly written, and completely includes all "boundaries" (including exclusions) will help therapists when they are

working in the natural, applied setting (Cooper et al., 2007).

Keeping up data collection and following through with the intervention plan until goals are met is important for individuals with any problem behavior and not only rumination behaviors. It is common for behavior analysts to incorporate reinforcement during behavior skills training to ensure that therapists and paraprofessionals are implementing the intervention appropriately and consistently. Examples of reinforcement schedules include a paraprofessional getting their name entered in a drawing to win a gas card contingent on passing a treatment integrity spot check. Another example of reinforcement used is paraprofessionals receiving company fake money when interventions are implemented consistently over a large time period. The company fake cash is then exchanged for goods or abstract things like extra breaks.

Working closely with the community and families can also bring about available resources that might not have been known otherwise. Other people might have resources or leads to ideas when they know what you are interested in. An individual diagnosed with ASD, engaging in rumination behaviors, and attends a special education classroom has a team of individuals who are impacted by this individual's behavior. This could include parents, behavior analysts, speech therapists, occupational therapists, physician, gastroenterologist, paraprofessionals, teachers, camp counselors. If all these stakeholders networked with each other to collaborate about rumination, the amount of resources and ideas being shared would be dramatic.

Not only do behavior analysts have valuable skills and

diverse knowledge that could be helpful to other professionals in the community and other stakeholders, but the other professionals have specific skills and knowledge that could benefit behavior analysts. Behavior analysts may also need to shift priorities and resources after they discover what has already been researched or what other people are already doing to address the problem. After bringing up the topic of rumination at a meeting with psychology professors at Lindenwood University, a professor shared names of researchers that she knows has worked with rumination. Networking researchers Provan, Veazie, Staten, and Teufel-Shone (2005) state that collaboration with the public can help people understand the range of problems and needs that the community faces. Community leaders and public and nonprofit organizational administrators are responsible for working towards building and sustaining networks that addresses health, social, and other problems in the community (Provan et al., 2005). Provan et al. (2005) recommend using network analysis to examine the relationship between organizations. Network analysis is defined as a data collecting procedure that compares individuals and organizations and how they are connected (Provan et al., 2005). Lindenwood University's Student Learning Outcome Standard 4 states that community resources are necessary not only for student achievement but also for the achievement of the behavior analysts' goals. Understanding what other stakeholders already know about the behavior, what they have already done to understand the behavior, and what problems they face with people engaging in the behavior is a crucial part of fully understanding the impact of rumination and what can be researched to help people afflicted with it.

TEACHING AND LEARNING

Personal learning and academic growth does not end when a student walks across the stage at their graduation. Specifically to behavior analysts, additional training beyond the requirements for graduation from a behavior analysis program is required in order to maintain certification through the Behavior Analyst Certification Board (“Maintaining BCBA Certification”, 2018). The specific number of Continuing Education Units (CEUs) needed depends on the level of education the practitioner has. CEUs guarantee that behavior analysts continue expanding their behavior-analytical skills (“Continuing Education”, 2018). Even though academic development may seem like it has come to an end, professional development will be more prominent and still require learning. Continuing to research the topic of rumination to increase the awareness of different intervention options available for individuals engaging in rumination behaviors will not only increase one’s professional development but also improve the education experience for the student (“Student Learning Outcomes”, n.d.).

Professional development with other professionals that behavior analysts will work with is also important to continue working on. It has been seen in the field that school professionals and home therapists currently do not have a set of rigid collaboration standards. Developing a new set a guidelines for more meetings (other than an Individualized Education Program meeting) and communication could potentially increase a student’s progress. Something that sets up more days that the different therapists can share the student’s progress together, and a stronger communication system to share

program ideas and what has and has not worked with the student would benefit all involved. Currently, there are strategies used to increase the collaboration between speech-language pathologists (SLPs) and occupational therapists (OTs) in the school setting but the collaboration between different therapists in different settings is not strong (Jordan & Lofland, n.d.). All professionals involved with a student have the same goal, to increase the student's success in a targeted skill. As long as the student and the student's caregivers give permission to discuss information, why not increase the communication and update other people involved on progress and regression?

There has been an initiative to use more behavior analytical techniques in a school wide settings. Researchers Sprague and Horner (2007) have developed a practice based on research to use positive behavioral supports to increase students' appropriate positive behaviors. This idea, termed School Wide Positive Behavioral Supports (SWPBS), revolves around faculty teaching and modeling expected behavior to students school wide. This approach incorporates prevention, multi-tiered support, and data-based decision making (Sprague & Horner, 2007). It is amazing to see that the approach incorporates ABA fundamental techniques such as: using incentives, incorporating motivational systems, providing staff training with constructive feedback, systems in place to measure and monitor effectiveness, scheduled instruction and assistance to students based on their individualized needs and differences, and long term staff commitment. This system does talk about how office referrals and suspensions may work short term but are not long term solutions to antisocial behavior.

Sprague and Horner (2007) back up their opinion about punishment by referencing research articles that have found when punishment is used alone in school settings, antisocial behaviors such as vandalism, aggression, truancy, and dropout increase.

Rumination behaviors could also benefit from the SWPBS approach. More research could look at the effects of explaining the consequences of rumination to the individual engaging in the behavior. A key practice to SWPBS is clear definitions of the behavior and the consequences involved (Sprague & Horner, 2007). This may not be beneficial for some individuals who have low levels of communication or awareness of cause and effect.

There is more research published than expected studying effective interventions to treat rumination disorders. The behavior falls into different categories of treating physicians including behavior analysis, psychology, and gastroenterology. The interventions discussed in current literature have not been replicated (or at least no replication has been published) and the interventions do not significant longevity results. The need for an effective treatment for rumination is critical to individuals engaging in the behavior considering that the effects of rumination are damaging to one's health and have even been life threatening. When individuals engage in rumination, they stand out from their peers. Regurgitating previously swallowed food is not socially acceptable behavior and is often considered repulsive to witnesses. More research needs to be conducted on interventions effective in treating rumination.

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CHAPTER 3.

PIVOTAL RESPONSE TRAINING IN EARLY INTERVENTION



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Pivotal Response Training (PRT) is, "a method of systematically applying the scientific principles of applied behavioral analysis (ABA) to teach learners with autism spectrum disorders (ASD)" (Wong, 2013). It was originally developed by Drs. Lynn Koegel and Robert Koegel of the University of California, Santa Barbara, Koegel Autism Center through the publication of their seminal article "A natural language teaching paradigm for nonverbal autistic children" (Koegel, O'Dell and Koegel, 1987).

According to Koegels, PRT is, “used to teach language, decrease disruptive/self-stimulatory behavior, and increase social, communication, and academic skills” (Koegel Autism Center, 2014). The current name pivotal response treatment is a registered trademark of the Koegel Autism Center. However, there are many other names for the same method, including pivotal response training, pivotal response therapy, pivotal response intervention, and even National Language Paradigm (McClelland. 2016).

Pivotal Response Treatment is a child directed, naturalistic teaching strategy, unlike other structured models, like Discrete Trial Training (DTT). In the PRT model, learning opportunities are determined by the child’s interests with emphasis on natural reinforcers, rather than contrived reinforcers. The Koegels, and those who follow PRT, believe natural reinforcers are a stronger form of reinforcement than contrived reinforcers (Koegel Autism Center, 2014). The Koegel Autism Center’s website offers resources of over 200 peer reviewed journal articles and 30 books and manuals based on Pivotal Response Training. Since PRT is often termed as lifestyle, rather than a teaching method, as it requires minimum of 25 hours per week to be successful, the advocates of PRT emphasize that it should not be done solely by professional interventionists; it as an important component of PRT that it is recommended that family members continue the process at home for generalization and to optimize its effects.

Pivotal Response Training targets four pivotal areas of a child’s development, which are identified as motivation, responding to multiple cues, self-management, and self-initiation. By focusing on pivotal areas, PRT produces

improvements across other areas of social skills, communication, behavior and learning. These learning variables have multiple components and may overlap when being taught. If a child cannot fully participate in the learning process (i.e., sit still, follow directions, etc.), then they will have a harder time mastering skill such as self-management or self-initiations (McClelland, 2016).

Since responding to multiple cues teaches the child how to discriminate between more than one stimulus and significantly enhances learning and generalization to other areas of development, PRT states response to multiple cues as an important pivotal response by aiming to reduce stimulus over selectivity in children with ASD and teaching them to respond to multiple relevant cues. (Koegel, Koegel, Shoshan and McNERNEY, 1999). This is done by scheduling the delivery of reinforcement, as each cue is added or response required, and increasing the criteria required, for example, big red car vs. car (Vismara and Lyons, 2007).

The second important pivotal area that produces prominent gains in a child's development in other areas of learning is motivation. Motivational procedures can be used to teach communication, self-help, academic skills, social skills, and recreational skills (Koegel, Koegel, Shoshan and McNERNEY, 1999). The earliest PRT package developed by Koegel in 1987 was based on motivation, in which the research established that by adding specific motivational variables, such as child choice and natural reinforcers, the children were far more motivated and happier to learn in a play-based session, which also resulted in less disrupt behaviors (Koegel. O'Dell and Koegel, 1987).

The third area of pivotal learning is self-management.

“Self-management is defined as individuals discriminating and self-initiating their own appropriate behavior and then self-reinforcing or self-recruiting reinforcement for their own appropriate behavior” (Koegel, Shoshan and McNERney, 1999). By teaching a person to self-manage their behavior, and we are training them to be independent within other environment and situations, with minimum support from intervention provider.

A final important pivotal area for growth for a child with Autism is self-initiation. Koegels define self-initiation as an individual beginning a new verbal or nonverbal social interaction, self-initiating a task that results in social interaction or changing the direction of an interaction. Self-initiating is a very important skill that opens the world to the child. Be it initiating a request for cookie or asking a question, self-initiating increases the autonomy of a child, and makes the world outside any specific teaching context.

OFFICIAL PRT TRAINING

Pivotal Response Training is trademarked by the Koegel institute in UCSB and there is an official PRT training program (Koegel Autism Center, 2014). This is a long-distance learning program, allowing people from anywhere in the world to get certified. There are five levels of training that everyone can participate, depending on what services they plan to provide. The first level is a basic introduction to PRT including the research and methodology. The second level provides instruction on how to implement strategies. Level three provides information about generalization and how to

use PRT for more than one child at a time. Level four is an advanced level that uses PRT to teach skills such as self-initiations, self-management, and facilitating social interactions. The fifth and final level is designed to teach participants to become PRT trainers, allowing them to teach others, the skills they have learned (Koegel Autism Center, 2014).

HISTORY OF PIVOTAL RESPONSE TREATMENT

During 1960's behavioral interventions for ASD focused on consequences through highly intensive and structured trials, where adult-chosen stimuli were repeatedly presented to teach target behaviors. (Lovaas, Berberich, Perloff and Schaeffer,1966). This was the start of Discrete Trial Training (Hewett, 1965; Lovaas et.al.1966; Sloane and MacAulay, 1968; Wolf Wolf, Risley and Mees, 1964) which was the first evidence-based teaching method done in structured, isolated environment, one on one by trained therapists in which the child received contingent rewards or punishment as consequences. (Lovaas et.al., 1966). Some target goals addressed by these studies were imitation training and social behavior, speculating that if those areas could be improved, it would make learning by children with ASD as close to typically developing children. Although some ground-breaking results were achieved by these studies, the participants did not generalize the learned skills to another person or/and environment and most importantly the learned skills did not contribute to other areas of learning. (Lovaas, Schaeffer and Simmons, 1965; Lovaas et. al.,1966). Therefore, the results of these studies implied that imitation and social behaviors were not

pivotal skills for ASD, which prompted Dr. O. Ivar Lovaas and a team of his graduate students to identify Pivotal areas of development by children diagnosed with ASD (Lovaas, Koegel, Simmons and Long, 1973). Two of PRT's original developers, Dr. Robert L. Koegel and Dr. Laura Schreibman, share early publications that led to the development of DTT for example; Lovaas, Koegel, Simmons and Long, 1973; Lovaas, Schreibman and Koegel, 1974; Lovaas, Varni, Koegel and Lorsch, 1977; Russo, Koegel and Lovaas, 1978; Varni, Lovaas, Koegel and Everett, 1979.

While still using the discrete trial training method for teaching individual target skills, Lovaas's students started the search for a teaching method that was not as laborious and time-consuming and would contribute to widespread improvement in children's overall learning. This led to the Koegel and Egel (1979) revolutionary study, "*Motivating Autistic Children*" about motivation as a pivotal skill for children with Autism in which they suggested that reinforcing attempts keeps the child motivated to learn. They found that children learned faster when they experienced a steady rate of success and the learning experiences were much more pleasant for the therapist and families.

Henceforth, during the 1980's several studies researched on individual components of PRT; "*Motivating autistic children through stimulus variation*" (Dunlap, Koegel and Robert, 1980), "The influence of child-preferred activities on autistic child's social behavior" (Koegel, Dryer and Bell, 1987) and "*Response reinforcer relationships and improved learning in autistic children*" (William Koegel and Egel, 1981). These ground-breaking discoveries led to research on the development of the powerful

motivational package that would eventually be named as PRT. The goal of the earliest study “*A Natural Language Paradigm for teaching non- verbal autistic children*” (Koegel, O’Dell and Koegel,1987) was to show that the DTT could show some powerful success if specific motivational variables would be incorporated such as child choice of stimulus materials and use of natural reinforcers. This was the first attempt to teaching in naturalized environment thus the name Natural Language Paradigm (NLP) was the inception of Pivotal Response Treatment (PRT).

Essentially, NLP attempted to improve upon traditional discrete trial methodology for teaching language, and specifically attempted to address concerns with generalization and maintenance of treatment gains while simultaneously improving spontaneous speech. (Koegel, O’Dell and Koegel,1987). Later, since this approach positively affected many areas of beyond speech, the name Natural Language Paradigm was changed to Pivotal response Treatment (Koegel and Koegel, 2006). Along with the emergence of positive behaviors such as children’s happiness, enthusiasm, and interests. by adding motivational strategies, the researchers also started noticing a decrease in disruptive behaviors (Koegel, Koegel and Surratt, 1992; Vismara and Lyons, 2007; Schreibman, Kaneko and Koegel, 1991).

Another critical pivotal area of development researched by early studies was social initiations and question asking. The theory behind this was that if children with Autism could be taught “self-initiate” by asking questions it would open the world to them. A study by Koegel, Camarata, Koegel, Ben-Tall and Smith in 1998 showed that children with Autism could be taught

to ask questions which led to subsequent teaching interaction from others in the natural environment. This extended to a study in which questions were specifically targeted to verbs (Koegel, Carter and Koegel 2003) and prepositions (Koegel, Koegel, Green-Hopkins and Branes 2010). Therefore, with the comprehensive application of PRT, it was found that when self-initiation occurred as a pivotal skill in children with Autism, they were observed to have a much better life s young adult. (Koegel, Koegel, Shoshan and McNerney, 1999). In another successful study it was observed that with self- initiation, students with severe autistic disabilities could learn to use a self-management treatment package to reduce their stereotypic behavior. (Koegel and Koegel, 1990).

The scientific research solidly shows that acquisition of pivotal skills is essential for accelerating the learning curve for children with Autism. The Koegel foundation has published studies ranging from single-subject design to group statistical designs to qualitative designs and clinical replications have been conducted from the early inception of PRT till date to validate the science behind PRT. One novel component that PRT has embodied is the intensive involvement of parents in the treatment process. From the early days of PRT to date educating parents to implement PRT at home with children has been a priority. Laski, Charlop and Schreibman, (1988) used the principles of PRT (then called NLP) to train parents to successfully increase child's speech. A recent study has been done by Coolican, Smith and Byrson, (2010) to parents of preschool children to check treatment fidelity of the PRT procedures implemented by parents. Another aspect that PRT has always advocated as being vital for early language and social development

of prosocial behaviors and social competence through increasing social skills play skills and peer interaction. (Pierce and Schreibman, 1995).

The researchers behind PRT have been always been rigorously trying to modify with critical analysis to deliver a model that embodies the best practices in ABA. Some recent implications regarding generality of PRT as an intervention to widespread population of Autism have been addressed by two large scale studies which showed that it was feasible to implement PRT throughout the entire province of Nova Scotia Canada (Bryson et. al, 2007; Smith et. al, 2010). The data showed once trained, treatment providers could teach parents and other interventionists in a “trainer of trainer” model with a fidelity of implementation over time. Furthermore, this study also showed that PRT is an effective model to be delivered over telehealth services, to many children who lived in very remote areas without access to clinics and centers. Another, recent studies by Lei and Ventola, (2017) focuses on the recent emerging neuroimaging evidences supporting PRT, offering current perspectives on the importance of interdisciplinary research to help clinicians better understand how PRT works and predict who will respond to PRT.

PHILOSOPHICAL FOUNDATIONS OF PIVOTAL RESPONSE TREATMENT WITH APPLIED BEHAVIOR ANALYSIS

“Applied Behavior Analysis is a science in which tactics derived from the principles of behavior are applied systematically to improve socially significant behavior and experimentation is used to identify the variables

responsible for behavior change” (Cooper, Heron, Heward, 2018 p. 40). Pivotal Response Training (PRT) is a method of applying the scientific principles of applied ABA to teach learners with autism spectrum disorders (Koegel, O’Dell, Koegel, 1987). PRT relies on operant teaching principles and has been used to target a wide range of deficits, including social skills and communication (Handleman & Harris, 2001). PRT embodies the philosophy of Behavior in many important aspects. First, it gives the conceptual framework which means that the principles of PRT align with that of Operant conditioning (Skinner, 1953). Secondly, PRT embodies the 7 Dimensions of ABA as proposed by Bear, Wolf and Risley in their seminal paper “*Some dimensions of Applied Behavior Analysis*” (Bear, Wolf and Risley, 1966), offering an effective intervention package for behaviors that are socially significant and pivotal for human development. Moreover, PRT is also indebted to applied behavior analysis for its foundations from the law of effect (Thorndike, 1927), the concept of three-term contingency; stimulus-response-reinforcing consequence (Skinner, 1969), the concept of establishing operations (Michael, 1982) and the notions of generalization and maintenance (Barton, 1979).

The foundations of Pivotal Response Treatment come from philosophical roots of ABA which is the “law of effect” coined by Thorndike, 1927; the law of effect states that behavior is a consequence of its function. Simply stated that the occurrence of a behavior is directly related to the consequence that follows it. Thorndike suggested that responses closely followed by satisfaction will become firmly attached to the situation and, therefore, more likely to reoccur when the situation is repeated.

Conversely, if the situation is followed by discomfort, the connections to the situation will become weaker, and the behavior of response is less likely to occur when the situation is repeated. Likewise, Skinner's three-term contingency, also an extension of Thorndike's law of Effect reflects in the foundations of pivotal response treatment. The three-term contingency – also referred to as the ABCs of behavior (antecedent-behavior-consequence) illustrates how behavior is elicited by the environment and how the consequences of behavior can affect its future occurrence. In the PRT model, the therapist provides a prompt, waits for a child to respond and then gives the consequence. Since PRT is based on a motivational package, the reinforcers used are natural and directly related to the target behavior which produces faster and more generalized learning. (Skinner 1954, 1986 in PRT Pocket guide).

An important criterion for judging the adequacy of research and practice in applied behavior analysis is by aligning it with Bear Wolf and Risley's 7 dimensions of Applied Behavior Analysis published in 1968. (Cooper page 36). Bear, Wolf, and Risley in their seminal paper, "Some Current Dimensions of Behavior Analysis" laid out "seven self-conscious guides to behavior analytic conduct" that stand functional and current (Bear et. al. 1987, p. 319). These interconnected dimensions are, applied, behavioral, analytic, technological, conceptually systematic, effective and generality. It is incumbent to assess any researched based intervention procedure such as Pivotal Response Treatment to be aligned strongly with the 7 dimensions of Applied Behavior Analysis.

Bear et. al state that a study to be "Behavioral", it must measure observable behavior that needs improvement as

well as takes into count the behaviors of all the individuals that are part of the study. PRT embodies this dimension effectively in a way that it targets behaviors pivotal for development as well as observable and measurable. Koegels write in their book “The PRT Pocket Guide” that the first step towards making data collection easy is to identify specific target goals, for example, for increasing communication the measurable and observable target goal would be, increase the correct use of past tense, increase ability to accurately recall personal past events and increase the ability to maintain eye contact during social conversation. (p 167).

The second dimension as proposed by Bear et. al is that research must be “Applied” by making efficiency improvements in people’s lives by targeting behaviors that are socially significant for a change. PRT’s foundation is based on targeting pivotal skills that are essential for growth in all areas of development. PRT is based on targeting pivotal areas of motivation, self-initiation, self-management and response to multiple cues which leads to large collateral changes in other untargeted areas of learning that improve the quality of life. (Koegel et. al. 1995)

A study in ABA is considered “analytic” when the experimenter has demonstrated functional control between the dependent variable and the independent variable (Bear et.al. 1968). Simple stated, the change in behavior is caused by manipulating antecedents or consequences. The studies done in PRT are based on increasing child’s motivation to learn by manipulating response- reinforcer connection thus demonstrate functional control. PRT also suggests that along with reinforcing correct responses, a child should also be

reinforced (comparatively less) for attempts to learn a task so that the motivation to learn is also reinforced.

Perhaps the one dimension of ABA as proposed by Bear Wolf and Risley that aligns strongly with the components of PRT package is “Generality”. A behavior change has generality if it can be observed in environments and people other than it was implemented and contributes to other behaviors not directly targeted. One of the foundational components of PRT is that the treatment is done in a naturalized everyday setting as a result of which the behaviors learned are effectively transferred and generalized to other environments, with other people and to other behaviors.

Bear, Wolf and Risley strongly proposed that the procedures used in an ABA study should be “conceptually systematic” meaning that the procedures for changing behaviors should be derived from the principles of science of behavior. They provided a strong rationale for this saying if research has a solid theoretical base, it will be more effective for consumers to derive other similar procedures. This also impacts dissemination of ABA being meaningful and empirical rather than just a bag of tricks. PRT presents itself as being conceptually systematic as the intervention procedures are based on operant conditioning principles. The procedures established by PRT studies are rooted with three-term-contingency where the target behavior is strengthened by the contingency that follows it.

For a research to be “Effective”, the behavior change must produce meaningful change in subject’s life to a practical degree. Bear et. al also revisited the dimension of effectiveness in their later paper establishing that not only the behavior targeted should bring noticeable

changes for the reasons the behaviors were selected but must also contribute to an overall change towards other important skills. For example, a goal to teach a child to request should contribute towards overall communication. The Autism Speaks website states that more than 20 studies suggest that PRT improves communication skills in many (though not all) children who have autism. Also, a 2017 review of brain imaging studies showed evidence that PRT improves brain activity associated with sociability and communication (Lei and Ventola, 2017).

Lastly, the seventh dimension by Bear, Wolf and Risley is that a study in ABA should be “technological” in description such that it can easily be replicated by any other behavior change agent. Although, PRT studies offer operationally defined target behaviors, however, in some cases when the behaviors are more relative for example initiation or motivation it is challenging to provide technologically solid definition of target behaviors which are easily replicated by therapists and parents. Koegels address this challenge in their book, “PRT pocket guide” in the section of making data collection easy, stating that fidelity of treatment should be measured periodically by behavior change agents.

When aligning the philosophical foundation of ABA with Pivotal Response Treatment it is essential to relate the two with Jack Michael’s behavioral account of “Motivation” in his seminal paper “Motivating Operation” (MO) (Michael, 1993) which was derived from the Skinner’s notion of drive Skinner, 1938. In his paper Michael proposed 4 four term contingency- adding a motivational component prior to the discriminative stimuli which alters the value of the reinforcer which

as a result alters the frequency of the behavior. He characterized MO into two conditions; Establishing Operation (EO) which increases the effectiveness of a reinforcer and AO which decreases the effectiveness of the reinforcer. PRT therapies are based on applying the concept of MO to motivate the child. For example, if the goal is to increase expressive language, PRT therapist would use lunch time or snack time when the child has the MO to ask for help or request for a food item. Once the child is done eating, there is an AO which means he will probably not engage in verbal response for a food item therefore the PRT therapist would follow the child's lead and use another natural reinforcer for example, a toy that is turned off or the pieces that go with it are not available to the child so that he has the MO to request for them. Since PRT package is based on Motivation, the treatment is done with natural reinforcers which are directly and functionally related to the task.

APPLICATION OF PIVOTAL RESPONSE TREATMENT COMPONENTS IN EARLY INTERVENTION

Pivotal Response treatment is listed by the National Research Council as one of the ten recommended programs for autism and one of three scientifically researched interventions proven to be effective for Autism Spectrum Disorder. (Simpson, 2005). Over the past 30 years, the Koegels, their graduate students, and their colleagues have published over 200 research articles in peer-reviewed journals and over 30 books and manuals that support the effectiveness of PRT. The published research has not only provided robust evidence for the

effectiveness of focusing on Pivotal Skills, but also validates the critical features of service delivery. Specific research-based strategies include child choice, task variation, interspersing maintenance and acquisition tasks, rewarding attempts, and the use of direct natural reinforcers. In addition to the strategies, PRT emphasizes on treatment to be implemented in natural environments of the child (e.g., home, community, and school) and emphasizes parent education to empower family members to become agents of intervention, so that learning can be embedded across daily routines. The focus of the current chapter is to empirically validate the critical features of service delivery procedures and the motivational package that targets pivotal areas represented by Pivotal Response Treatment.

EVIDENCE OF EFFECTIVENESS OF FOCUSING ON PIVOTAL AREAS:

The theoretical underpinning of Pivotal Response Treatment lays on the foundation of focusing on pivotal areas of functioning which, once targeted, lead to collateral changes in numerous other areas of development. This concept is described in the literature as response covariation by Kazdin (1982), who reviewed the evidence in relation to treatment. Kazdin suggested that research has shown, for given individual, that several behaviors tend to be correlated to form clusters of responses and therapeutic changes in one response in a particular cluster are likely to affect other, unrelated response. Likewise, numerous studies have been replicated on various dependent variables that have provided empirical evidence that acquisition of pivotal

skills is essential for accelerating the learning curve for children with Autism. The pioneer study (Koegel and Egel, 1987) that presented PRT as a package was done on 2 non-verbal children diagnosed with Autism, in which the behavior targeted was imitative and spontaneous child utterances. In multiple baseline designs, the researchers applied traditional analog clinical format where the therapist presented instructions, prompts, and reinforcers for correct responses for baseline condition. Then, these variables were manipulated in the PRT condition in which the motivational package was applied such that stimulus items were functional and varied, natural reinforcers were employed, communicative attempts were also reinforced, and trials were conducted within a natural interchange. Treatment and generalization data demonstrated that manipulation of these variables resulted in broadly generalized treatment gains. This was the first study done by Koegels that validated the application of PRT as a package.

Numerous studies have replicated and validated the benefits of PRT as a package for early learners for whom joint attention and social initiation is a pivotal developmental skill. A study done by Vismara et.al (2007) used a single-subject reversal design with alternating treatments to examine whether joint attention initiations for social sharing would occur as a collateral effect of applying the motivational techniques of PRT in conjunction with highly preferred reinforcers for three young nonverbal children with autism. Results indicated an immediate increase in joint attention initiations when highly preferred stimuli were incorporated within the motivational techniques of PRT. Additional findings included collateral increases in joint attention initiations

toward less preferred interests, as well as improvements in the quality of interaction between the children and caregivers. A similar study has been replicated by Koegels in which modified PRT was used to assess the feasibility of rapidly increasing infant motivation to engage in social interaction. The research was done on three infants ages 4, 7, and 9 months in multiple baseline designs. Baseline data showed low and erratic levels of social behavior (avoidance of eye contact, low effect and low rate of response to name) which after applying PRT package, resulted in an immediate increase and stability of social engagement that also persisted in the follow-up visits.

Another area of development relevant to early learners diagnosed with autism is a lack of play skills. Acquisition of play repertoire is pivotal for children with autism as this important development opens doors for gains in social and communication skills. A study was done by Stahmer (1995) in which PRT was applied to teach symbolic play skills in multiple baselines across participant design. The researchers examined symbolic play, the complexity of play behavior, and creativity of play which after training improved in all participants who learned to perform complex and creative symbolic play actions at levels like that of language-matched typical peers. In most cases, the children generalized their play to new toys, environments, and play partners and continued to engage in symbolic play behavior after a 3-month follow-up period.

Recent advancements in science have made it possible to validate the positive effects of PRT on pivotal skills like communication, behavior, and social skills in young children with autism. A recent study done by Voos et. al (2012) used functional magnetic resonance imaging to

identify the neural correlates of successful response to PRT in two young children with ASD. Both children showed striking gains on behavioral measures and also showed increased activation to social stimuli in brain regions utilized by typically developing children. These results suggest that neural systems supporting social perception can be acquired through the implementation of PRT.

CHILD CHOICE

Child Choice refers to incorporating stimulus materials, toys and topics in learning that are influenced by child's preference that is purposefully identified by the instructor by following child's lead (R.L Koegel et. al 2001). Numerous researches have established the effectiveness of this antecedent intervention; Shogren et. al (2004) examined the efficacy of the use of choice-making as an intervention for reducing problem behavior through a meta-analysis of single-subject research studies and concluded that allowing learners to choose their preferred activities is particularly important when teaching new skills.

Koegel et al (1998) identified choice making as a fundamental variable for the application of Pivotal Response Treatment by incorporating natural stimuli in learning the task. Using stimuli (activities and toys) that learners with Autism prefer increases their motivation to participate and thus the likelihood of acquiring target skills. To assess learner choice the teacher should observe the learner in a free operant environment and identify what they are engaging with. For example, if a child is observed to be playing with cars, balls, and playdoh, the

teacher should include these preferred materials in learning tasks and activities. Koegel also identified that child choice results in rapid learning when learners are offered to choose from a variety of stimulus which is varied frequently according to the child's interest (Koegel 1995). This is important because the teacher should consider that the preferences of the child could change fairly frequently. Therefore, it is important to follow the child's lead constantly and capitalize on their motivation to participate during learning experience (Koegel et al 1998).

In a seminal study published by the Koegels about language acquisition, it was established that allowing the child to choose from the preferred stimulus was one of the fundamental components of natural teaching condition that resulted in initial word acquisition (Koegel et.al 1987)¹. The research was conducted in multiple baselines across participants design in which 2 treatment condition were compared; analog condition, which was traditional instruction followed by reinforcers or prompts and PRT condition. In the PRT condition, one of the first variable manipulated was that the instructor presented a stimulus according to the child's selection of a preferred item from a pool of items instead of arbitrarily selecting item themselves. The result of the study was a huge success since the children had much higher rates of imitative utterances during the PRT condition. The researchers concluded that the high rate of language utterances along with successful generalization of language occurred which was due to the fact that the instructional strategy utilized a pool of items that the child was offered to the child to choose from and made accessible too.

Another study in the same year (Koegel et.al 1987) studied the results of manipulation of task variables that may influence the severe social unresponsiveness of children diagnosed with Autism. The study was conducted as a correlational analysis of three participants in a reversal design. The researchers analyzed the behavior of social avoidance and social responsiveness by manipulating child preferred items versus arbitrary activities. Results revealed a negative correlation between appropriate child-preferred activities and social avoidance behavior. Additional analyses also revealed that social avoidance behaviors would predictably decrease when the children were prompted to initiate appropriate child-preferred activities. The procedure was also pragmatic to be used in community settings to teach children to initiate child-preferred activities and also resulted in reductions in social avoidance responses even after the therapist's prompts were completely removed.

The importance of following child's lead was validated in a study done by Koegel et. al (2009) which compared two intervention conditions; a Naturalistic approach (which incorporated motivational variables) vs. an Analog (more traditional, structured) approach. The target behavior was correct and intelligible production of speech sounds assessed in ABA design. The result indicated that although both methods effectively increased correct production of the target sounds under some conditions, functional use of the target sounds in conversation occurred only when the naturalistic procedures were used during the intervention. One variable that was assessed as a component analysis was Choice and No Choice condition. Higher levels of disruptive behaviors occurred in the No Choice

conditions, without exception that in the Choice conditions. Furthermore, No Choice phase was forced to be discontinued due to repeated requests to leave the session and task across four continuous sessions; did not occur during the choice condition sessions.

TASK VARIATION, INTERSPERSING MAINTENANCE AND ACQUISITION TASKS

A fundamental motivational variable that is used in the service delivery of Pivotal Response Treatment is task variation. Task variation can be in two ways; interspersing previously learned task (maintenance trials) with acquisition trails (Dunlap et.al. 1984) and varying stimulus items and reinforcers during learning interaction (Dunlap, 1980). Task Variation has been empirically validated to show improve correct responding and increase positive affect during teaching interaction (Koegel et. al 1986).

Varying maintenance and acquisition trail is an essential tool that builds a wide behavioral repertoire and enhances learner engagement and motivation. The learner experiences a high rate of success due to successful responding on maintenance trails which also increases the rate of success for acquisition trials. Literature has described this concept as Behavior Momentum (Singer et.al 1987). With this strategy, the learner is presented with at least 3 short commands that are easy and mastered in the learner's repertoire followed by a difficult request. By preceding with a task that has a high rate of success the learner builds momentum for the difficult task through repeated reinforcement. This also leads to decreased in escape-maintained behavior

and an increase in positive responsiveness for difficult tasks (Singer et.al 1987).

A study done by Dunlap in 1984 evaluated and validated the role of antecedent variables that affect learning in context with which tasks are sequenced within an instructional session. The research was done in an alternating treatment design which evaluated the effect and rate of task acquisition under three experimental conditions in participants diagnosed with Autism. The three conditions alternated were a constant task condition in which only one acquisition task was presented per session, a varied-acquisition-task condition, in which 10 acquisition tasks were randomly interspersed throughout each session and a varied-with-maintenance-task condition, which randomly interspersed 5 acquisition tasks and 5 which had been previously acquired. The results showed significantly more efficient learning under the varied-maintenance condition, with no consistent differences separating the other two conditions. In addition, observers' ratings of the children's effect showed that the most positive judgments were produced by the varied-maintenance condition. The varied-acquisition condition was next while the constant task condition always produced the least favorable ratings.

Varying stimuli in learning aids in the generalization of the skill since the responses are not tied to specific stimuli. This also enhances learner's motivation since varied tasks are presented as opposed to a single task being presented in a drill-practice format. A study done by Dunlap and Koegel in 1980 evaluated the differential effectiveness of two methods of presenting discrimination task to children with autism. The study

was conducted in a within-subject, multiple baselines across participants design in which varied tasks were alternated with constant tasks to evaluate a number of correct unprompted responses to questions. The study also evaluated participants enthusiasm, happiness and motivation to learn. In a constant task condition, the common method of presenting a single task throughout a session was used. In a varied task condition, the same task was interspersed with a variety of other tasks from learner's education plan. Results showed declining trends incorrect responding during the constant task condition, with substantially improved and stable responding during the varied task conditions. In addition, naive observers judged the children to be more enthusiastic, interested, happier, and better behaved during the varied task sessions. These results suggest that "boredom" may be a particularly important variable to control in the treatment of autistic children, and that particular care may be necessary when defining criteria for task acquisition.

REWARDING ATTEMPTS

Reinforcing attempts have also been suggested to be an important motivational variable in Pivotal Response Treatment (Koegel et.al 1988). Research has established that reinforcing attempts for successful task completion exposes the learner with response-reinforcer contingency thus eliminating a state of learned helplessness (Koegel et.al 1979). The phenomena of learned helplessness was studied by Seligman, (1972) who suggested that learned helplessness results when there is a delay between the reinforcer and response or when

the learner gets excessive help without making response attempts. Since children diagnosed with autism struggle with low motivation the learned helplessness also contributes to extinguishing the initiation of later response since the previous response was either not reinforced promptly or the learner was not given a chance to respond. The concept of learned helplessness is very important particularly for early intervention since typically developing children show an understanding of response-reinforcer contingency as early as 9 months.

Early intervention gives children exposure to the response-reinforcer contingency by precisely reinforcing attempts to appropriate behavior and extinguishing maladaptive behavior associated with learned helplessness. (Seligman et. al 1968) For example, a nonverbal 18-month old who is starting to make verbal communicative intent reaches for a book and says, "Ooo!". Although this is not the targeted response, such as, "book", the adult immediately reinforces the attempt by saying "book!" while handing the book to the toddler. This naturally reinforces the attempted vocalization and re-models the target response by using loose shape criterion. Reinforcing attempts is very effective when child's goal-directed responses ("oo" to request book) that are as good or better than the previous ones are reinforced by an adult which results in increase responsiveness, initiation and motivation during learning interaction.

In a seminal study about motivation by Koegel and Egall (1979) demonstrated that when children with autism repeatedly responded incorrectly to tasks their enthusiasm responsivity decreased to extremely low levels. The study was conducted in a reversal design on

three participants diagnosed with Autism to investigate the influence of correct vs incorrect task completion on children's motivation. The researchers found out that when children worked on tasks that were typically incorrect, their motivation for those tasks decreased to extremely low levels. However, designing treatment procedures to prompt the children to keep responding until they completed the tasks correctly served to increase their motivation to respond to those tasks. The research was concluded by stating that when children do not contact reinforcement for attempted response their motivation to learn decreases. The study also concluded that delayed reinforcement may result in coincidental reinforcement for perseverance.

A ground-breaking study was done by the advocates of Pivotal Response Treatment that validated the motivational variable of reinforcing attempts was done by Koegel, O' Dell, and Dunlap in 1988. The researchers measured improvement in speech production and also affect of the participants by comparing them under two different reinforcement conditions; one in which successive motor approximations of speech sounds were reinforced; and a "motivation" condition in which attempts to produce speech sounds were reinforced, without any motor shaping of speech. The results, replicated within a repeated reversal design, indicated that considerably more rapid and consistent progress occurred when the children were reinforced within the framework of a speech attempts contingently rather than solely on the basis of their correct speech production. The result also showed considerable improvement in children's effect in terms of interest, enthusiasm,

happiness, and general behavior during the condition when speech attempt was reinforced.

USE OF DIRECT NATURAL REINFORCERS

A major motivational variable that encompasses Pivotal Response Treatment and impacts the response-reinforcer relationship is the use of direct- natural reinforcers in learning interactions. Natural reinforcers are directly and functionally related to the task (i.e. one that are within the chain of behaviors required to produce the reinforcer) so that when children emit the target response, they naturally obtain the reward. As stated by Skinner (1954) rewards that are directly related to the behavior that is taught, produce faster and more generalized learning. Researchers of PRT also concluded through empirical studies that learners with Autism are much likely to acquire skills rapidly when reinforcers are directly related to the given task (Koegel et. al 1980). For example, the therapist could use a clear lid box that has learner's favorite toy or edible to work on verbal request goal. When the learner uses gestures, sign or words (depending on the target), to request help to open, the therapist would give access to the reinforcer inside the box thus reinforcing the child with a natural reinforcer. Similarly, another example could be while working on social engagement with a toddler, the therapist would stop in between a sensory social routine to motivate the learner to give eye contact or use gestures to request for more. Kazdin (1977) speculated that using a natural, direct reinforcer is an effective strategy to build a strong response-reinforcer relationship because the response occurs in very close temporal and physical proximity to

the reinforcer. When using an arbitrary reinforcer, the child gets a reinforcer contingently, but the reward is not functionally related to the response. For example, the therapist gives the learner an M&M along with verbal praise when the learner emits a correct response.

Koegel and Willian (1980) demonstrated a simple example of a direct reinforcer relationship for children with Autism in a study that experimented the percentage of correct responses. The study was done in a multiple baselines across 3 participants which evaluated 2 different response-reinforcer relationships; first, target behavior was part of the response chain required to obtain reinforcer (e.g., opening the lid of a container to obtain a food reward inside the container), and second, where the target behavior was an indirect part of the chain leading to the reinforcer (e.g., the therapist handing the child a food reward after the child had opened the lid of an empty container). The results showed rapid acquisition only when the target behavior was a direct part of the chain leading to the reinforcer.

Another study that looked at the functional relationship of the reinforcer with the response was done by Willian, Koegel, and Egel in 1981 by comparing 2 conditions of delivery of reinforcement in multiple baselines across 3 participants. The study looked at the rate of children with autism learned by targeting a percentage of correct unprompted responses. The researchers manipulating two conditions while holding target behaviors constant. In the first condition the reinforcer was delivered as a direct chain of the response (reinforcer in hand if target behavior involved hand movement) and for the second condition the reinforcer was delivered arbitrarily (reinforcer in hand if target

behavior involved mouth movement). The results showed that arranging functional response-reinforcer relationships produced immediate improvement in the children's learning and resulted in the rapid acquisition of criterion level responding. The study also showed that high levels of correct responding initially produced by functional response-reinforcer relationships were continued even when previously ineffective arbitrary response-reinforcer conditions were reinstated.

Social Engagement, eye contact, low social effect, and joint attention are very fundamental skill deficits in young children with autism. A study by Koegel Vernon and Koegel looked at improving social initiations of young children with autism by embedding reinforcers in social interactions. Using an ABAB research design with three children with autism, this study assessed whether embedding social interactions into reinforcers, delivered during language intervention, would lead to increased levels of child-initiated social behaviors. This condition was compared with a language intervention condition that did not embed social interactions into the reinforcers. Results indicated that embedding social interactions into the reinforcers resulted in increases in child-initiated social engagement during communication, improved nonverbal dyadic orienting, and improvements in general child effect.

PARENT EDUCATION

Families are an integral focus of the application process of Pivotal Response Treatment. In the PRT model, parents are viewed as a critical agent of delivery of their child's behavioral intervention. Research has established

that parent education is an important element of a child's developmental goals (Baker, 1989). Earlier work in the parent education field was done by Wolf, Risley, and Mees (1964) who began working with parents of children in the residential settings aiming to generalize successful training programs at home. A follow-up study was done by Lovaas, Koegel, Simmons, and Long (1973) concluded that children whose parents were trained continued to show treatment gains versus those children who were discharged to institutions who did not employ behavior programs. Subsequently, parents were viewed as "co-therapists"; primary therapy agents in child's development therapy program (Shopler et al 1971).

For parent education to work effectively, it is important that the service delivery is within the context of the ecocultural theory (Bernheimer et.al. 1990), which means that the intervention is planned around family's culture, value system, and daily routine. Since the PRT model is based on naturalistic teaching (Hart et. al 1975), parents are trained in the natural setting and within family routine such that they can implement the procedures in their everyday routine and find teaching opportunities during natural parent-child interactions. In addition to the child's developmental gains, research has also shown collateral effects on parents as a result of positive family interactions (Koegel et.al 1996) and the positive effect of parents towards children (Schreibman et.al 1991).

Training parents to conduct child's training programs at home, in a natural environment, throughout a child's waking hours relates from "transactional model of development" (Sameroff, 1975). According to this model, a child's development is understood as a transaction

process between a child's behavior, the caregiver response to the behavior and the environmental context where the interplay occurs. This transaction influences significant treatment gains in the child's social, communication and language development (Wetherby et. al 2000). The PRT model embraces this strategy by addressing the child's development in natural context; parents are trained to implement the motivational package thereby moving the child toward a more typical developmental trajectory.

Among numerous empirical studies that validated the efficacy of parent's education in the context of the PRT, the model is a study done by Koegel, Bimbela, and Schreibman (1996). The researchers assessed the collateral effects of two very different parent training models during unstructured dinnertime interactions in the family setting. One program focused on teaching individual target behaviors (ITB) to one group of family, and the other focused on applying the PRT model which comprised of the motivational package. Pretraining and post-parent-training videotapes of dinnertime interactions were scored in a random order across four interactional scales (level of happiness, interest, stress, and style of communication). Results showed no significant influence on the interactions from pretraining to post-training in the families who received ITB training. However, the PRT parent training paradigm resulted in the families showing positive interactions on all four scales, with the parent-child interactions rated as happier, the parents more interested in the interaction, the interaction less stressful, and the communication style as more positive. Another study (Schreibman et. al 1991) that focused on parent affect while conducting PRT

model versus the Discrete Trial model also concluded the parents implementing the pivotal response training procedure were rated as exhibiting significantly more positive effect than those parents implementing the discrete-trial procedure

Parent training in the PRT model is ideally suggested to be conducted in a 25-hour program (Kasari, 2002), which could sometimes be challenging in regard to a long waiting list and timely access to intervention. A study was done by Coolican, Smith, and Bryson (2010) suggested that less intensive parent training program may also be effective. The study was conducted to evaluate the efficacy of brief parent training program on parents of preschool children with autism who were awaiting, or unable to access more comprehensive treatment. The research was conducted in nonconcurrent multiple baselines across participants design, in which parents were seen individually for three 2-hour training sessions on PRT. Child and parent outcomes were assessed before, immediately after, and 2 to 4 months following training using standardized tests, questionnaires and behavior coded directly from video recordings. The results were spectacular; children's communication skills, namely functional utterances increased following training. Parents' fidelity in implementing PRT techniques also improved after training, and generally, these changes were maintained at follow-up. A moderate to a strong relationship was found between parents' increased ability to implement PRT techniques and improvement in the children's communication skills. This study validated that brief parent training in PRT provides an immediate, cost-effective intervention that could be adopted widely.

Since the Pivotal Response Training model has been

widely applied in the early intervention setting, one study that targeted parent training to infant at-risk is done by Steiner, Gengoux, Klin, and Chawarska (2013). The research applied a developmental adaptation of PRT through a brief parent training model with three infants at-risk for autism. Utilizing multiple baseline designs, the data suggest that the introduction of PRT resulted in increases in the infants' frequency of functional communication and parents' fidelity of implementation of PRT procedures. This study validates the support for the feasibility and utility of PRT for very young children at-risk for autism. Another study was done by Laski, Charlop, and Schreibman (1988) on parents of four nonverbal and four echolalic autistic children who were trained to increase their children's speech by using the PRT model conducted in a play environment with a variety of toys. Parents were initially trained to use PRT procedures in a clinic setting, with subsequent parent-child speech sessions occurring at home. The results indicated that following training, parents increased the frequency with which they required their children to speak (i.e., modeled words and phrases, prompted answers to questions). Correspondingly, all children increased the frequency of their verbalizations in three non-training settings. Thus, the PRT was validated again to be an efficacious program for parents to learn and use in the home to increase their children's speech.

PROFESSIONAL AND ETHICAL COMPLIANCE CODE AND PIVOTAL RESPONSE TREATMENT

The Professional and Ethical Compliance Code for Behavior Analysts established by the Behavior Analyst

Certification Board sets forth the principles for ethical conduct for all behavior analysts and behavior technicians. These codes provide guidelines about the kinds of actions by the professionals and interactions between professionals and clients that are ethical and lays out clear guidelines for those principles that are not ethical as suggested by the BACB. Ethical considerations are integral to professionals who provide early intervention services as they are faced with difficult choices regarding service and support for children and families. Van Houten et.al in their seminal article, “Right to Effective Treatment” advocate for rights of individuals who receive behavior analytic services under which behavior change agents have a responsibility to provide the most effective treatment by a competent behavior analyst. They also have the right to receive services in a therapeutic environment with programs that teach functional skills, behavioral assessment and ongoing evaluation, and services that have a prevailing goal of personal welfare. This chapter will discuss how Pivotal Response Treatment adheres in regard to the PECC and the ethical dilemmas that encompass challenges when making the right choice in service delivery for young children with disabilities.

One of the hallmark characteristics of Applied Behavior Analysis is its reliance on scientifically validated treatments. Behavior therapists who apply Pivotal Response Treatment must maintain their adherence to the values of scientifically validated treatments. The Guidelines for Responsible Conduct developed by the Behavior Analyst Certification Board contain several relevant directives; Section 1.01 (Reliance on Scientific Knowledge) from Responsible Conduct of a Behavior

Analyst states that “behavior analysts rely on scientifically and professionally derived knowledge when making scientific or professional judgments in human service provision, or when engaging in scholarly or professional endeavors.” PRT embodies this code by applying the scientific principles of Applied Behavior Analysis (Koegel et.al. 1987). The foundation of PRT is based on operant teaching principles and four-term contingency (Michael, 1993) to motivate the learner. PRT also aligns with the 7 dimensions of ABA as suggested by Bear, Wolf and Risley (1968) in their seminal paper, “Some Current Dimensions of Behavior Analysis”. Thus, the foundation of PRT principles are conceptually systematic and align with PECC code 4.02 which states that “Behavior Analyst design behavior change programs that are conceptually systematic”.

Another important area that Behavior analysts have an ethical obligation is their responsibility to clients which is laid out in detail in code 2.0. Behavior analysts value the provision of effective services from the onset; from accepting clients to responsibility towards all the parties involved in the behavior change process, behavior analyst utilizes procedures that have been validated to be effective having both long-term and short-term benefit to the client and society. PRT model proposes for an effective treatment that is coordinated by all relevant stakeholders (Carr et.al 2002) so that a consistent intervention is implemented across people settings and environments. Therefore, pivotal response treatment model not only aligns with the PECC code for treatment efficacy but also meets the rights of individuals as advocated by Van Houten et.al (1988).

Behavior analysts struggle to work collaboratively with

consumers and other professionals while maintaining their adherence to the values of scientifically validated treatment and implementation of an effective intervention. Code 2.03 (consultation) states that behavior analysts have a responsibility to collaborate with other professionals on the team keeping client best interest as a priority. Since PRT is applied in the naturalistic environment, the therapists have to work with other team members such as occupational therapist and speech therapist with a collaborative goal. Such dilution of services often leads to reduced effectiveness especially when components of PRT are not applied and there is less time allocated to work towards the pivotal areas of development. In addition, there may be inconsistencies between approaches or interactions between treatments with differing philosophies and methods. It is often difficult for behavior analysts to discern how they should conduct themselves in these contexts. One good resource to analyze the efficacy of treatment by other professionals is given by Broadhead (2015); he suggests a decision-making model that could help BCBA's to assess new behavioral treatments while maintaining an ethical balance between professional relationships and well-being of the client.

Since parent education is an integral part of Pivotal Response Treatment, one code of ethics that PRT therapists often seem to encounter is third-party involvement in services (Code 2.04). To be an effective treatment model, PRT is suggested to be carried at home as a lifestyle change (Sameroff and Chandler, 1975) which makes parent training a fundamental component of the treatment. This component brings a challenge for the behavior therapists who are training parents to

generalize the strategies at home regarding treatment fidelity. Stocco and Thompson (2015) reviewed the evidence supporting child behavior as controlling antecedents and consequences for parent behavior. PRT therapists often encounter a lack of treatment follow up at home due to various reasons reported by parents such as the child being sick or schedule changes. Under such conditions behavior analyst also find themselves in a situation where they have to analyze violating code 2.09 (b) which states that behavior analysts have a responsibility to provide and oversight services that are required to meet the goal of the behavior change program.

Another challenge that is unique to early intervention is assent; learners agreement to participate in learning. Kohl (1991) stated that for effective learning to take place it is very important for students to be motivated to participate in learning and it is imperative that teachers respect this right to either refuse or agree to participate before learning can take place. The BACB addresses this by having behavior analysts abide by code 4.02 which states that behavior analysts involve the client in the planning of and consent for behavior change programs. Code 4.04 states about having client's consent before making changes to program and Code 4.05 about explaining the objectives of the program and environmental conditions that interfere with implementation (4.07). Since early intervention deals with young learners who lack the appropriate skills to express their consent and advocate for their consent withdrawal, it makes it harder for educators to create environments that result in consented learning. Code 9.03 states clearly that behavior analyst has a

responsibility to acquire informed consent from clients in any way that helps the clients to understand their right to participate and withdraw from treatment. Fabrizio (2012) reported that assent withdrawal can be demonstrated by low task participation, performance or avoidance. The learner begins to exhibit behaviors such as avoiding the educators, avoiding tasks by exhibiting aberrant behaviors, participating far below their ability, leaving or trying to leave tasks and refusing to follow instructions. Since the foundation of PRT is based on a motivational package (Koegel, O Dell and Koegel, 1987) that comprises of specific variables (child choice, use of natural reinforcer, reinforcing attempts and task variation) that have been empirically validated to contribute to reduction in disruptive behaviors and overall child's positive behavior and enthusiasm to learn (Vismara and Lyons, 2007). Thus, the behavior change program in PRT is designed around learners' consent and motivation to learn.

Since PRT basis its foundation on the motivational variables, it embodies the PECC codes that pertain to using positive reinforcement procedures (4.08), in a natural environment (4.09), using natural reinforcers (4.10). These codes restrict behavior analysts to design behavior change programs that recommend reinforcement rather than punishment in the least restrictive environment, avoiding harmful reinforcers. This, however, comes as a challenge to behavior therapists who apply PRT strategies. For one, there are skills that may be hard to teach using a child-directed approach for example skills that the child may need to learn but does not find particularly motivating. This puts the behavior analyst in dilemma to use reinforcers that

are contrived but must be balanced such that they are not harmful to the learner. Using natural reinforcers also come with a challenge of the learner being satiated especially edibles. Secondly, some children do not do well in an unstructured setting and require a more structured format for learning, such as Discrete Trial Training and that families going through difficult times or with high levels of stress may have more trouble with PRT than others (McClelland, 2016).

LIMITATIONS OF PIVOTAL RESPONSE TREATMENT:

Since its conceptualization, PRT has received much empirical support for promoting therapeutic gains in functional, social and communication skills in individuals with ASD. Although the theoretical and empirical support for PRT as an effective strategy is documented, there are limitations to the extent to which the outcomes from this research can be generalized. For instance, until recently most research had come from the same region of the country, either in connection with the research teams at the University of California in San Diego or the University of California in Santa Barbara. This makes it imperative for third-party evaluators to analyze PRT by itself and compared other evidence-based treatments on research guidelines for ASD.

The critics of PRT base their argument against its effectiveness on the grounds of treatment integrity which is an important indicator of intervention quality and student outcomes. A study done by Stahmer et. al (2014) examined 3 different evidence-based practices (Pivotal Response Treatment (PRT), Discrete Trial Training (DTT)

and Functional Routines (FR)) for ASD in terms of treatment fidelity. The results suggested therapists had in general, significantly greater difficulty implementing PRT with fidelity than either DTT or FR. Both average and best fidelity scores across teachers are lower for PRT than either DTT or FR. The researchers suggest that teachers might have difficulty with specific components of PRT that are not well-suited to the classroom environment. Other research also validates this finding indicating that PRT can be difficult to implement as the sole program in a classroom setting (Suhrheinrich et al., 2013) and that families going through difficult times or with high levels of stress may have more trouble with PRT than others. Recent data indicate that teachers may consistently leave out some components of PRT, which would reduce overall implementation fidelity of the comprehensive model (Suhrheinrich et al., 2013).

A recent publication, Bozkus-Genc and Yucesoy-Ozcan. (2016), conducted a meta-analysis of PRT studies and concluded only half of the studies looked at PRT's ability to generalize to other settings and less than half of the studies measured treatment integrity, maintenance, and social validity. Another study done by Cadogan & McCrimmon (2015) evaluated 17 PRT research studies to standards of ASD research quality and found substantial limitations in adherence to treatment fidelity standards; the research concluded distinct patterns of variation regarding adherence to treatment fidelity. Five studies made no reference to treatment fidelity measures, two studies followed the recommended treatment fidelity standard by requiring the therapist to implement strategies correctly, 80% of the time prior to entering the treatment stage.

PRT has also been criticized in terms of being ineffective for children who do not do well in such an unstructured setting and require a more structured format for learning, such as DTT. Critics of PRT also advocate that some skills are hard to teach using such a child-directed approach including skills that the child may need to learn but does not find particularly appealing (Downs, Conley-Downs, Fossum, and Rau, 2008). Peggy Hammond a PRT certified, Licensed Behavior Analyst, expressed her views about PRT as an effective strategy for early intervention. However, she expressed the challenges that come with the application of PRT in terms of training parents and therapist to implement intervention with fidelity. She also expressed the limitation of PRT as a “one size fits all approach” and not able to provide individualized treatment plans for children with Autism. Sherer and Schreibman (2005) identified participant characteristics associated with different outcomes for PRT intervention. They identified distinct behavioral profiles to identify 6 children, (3 predicted responders and 3 predicted non-responders) who received PRT. Children with pretreatment responder profiles evidenced positive changes on a range of outcome variables as compared to children with pretreatment non-responder profiles who did not exhibit improvements. The results of this study validate the need for the development of individualized treatment protocols for children with autism.

FUTURE DIRECTIONS:

Pivotal Response Treatment has proved itself to be an effective intervention for children diagnosed with

Autism. However, like other behavioral interventions, research has documented variable outcomes for children receiving PRT (Olley, Robbins, and Morelli-Robbins, 1993). Therefore, it is important that future implications emphasize predicting eventual treatment outcomes from children's developmental trajectories from the start of the intervention. Some work in this area has been established by Koegel, Koegel, Shoshan, and McNERney (1999), who demonstrated that child's initiation at program entry predicted high favorable treatment outcome. Another important study was done by Sherer and Schreibman (2005) that evaluated responder/non-responder profiles of children receiving PRT in terms of social behaviors and play skills. The study resulted in identifying the children as "responders" to PRT who had higher toy contact, social skills and play skills from the start of the intervention.

Recent advancement in the field of science has integrated neuroimaging techniques and behavioral science to help identify objective biomarkers of treatment (Lie and Ventola, 2017). The authors in their review of current perspectives on Pivotal Response Treatment established the need for tracking brain activities of children receiving PRT. This would facilitate future clinicians and therapists to compare the similar profile of behavioral changes observed over PRT and identify who will benefit from the intervention thus resulting in individualized interventions and maximum treatment gains for each learner. A recent, pilot study published by Hegarty et. al (2019) investigated language regions in the brain of children who received PRT to target language deficits. Results suggested similarities at baseline in regions of the brains of children who responded to the

language therapy using Pivotal Response Intervention. Although preliminary, using neuroimaging to help identify which children are most likely to benefit from specific language treatments would facilitate precision medicine for children with ASD.

Using a motivational package that targets pivotal skills has been very successful especially in the area of acquiring verbal communication, however, there is a subpopulation of nonverbal children who have not yet responded to PRT successfully (Koegel, Koegel, and Brookman, 2003). With a growing number of non-verbal children with Autism acquiring speech effectively when being exposed to evidence-based treatments, it is critical to further assess variables that would also be effective for children who are currently considered to be non-responders (Koegel and Koegel, 2006). Future implications of PRT research should examine motivational strategies that would also be effective for non-verbal children (Koegel and Koegel, 2006).

Another implication of PRT arises from the need to disseminate comprehensive service delivery models such that Pivotal Response Treatment can be implemented on a larger scale with fidelity. One mechanism could be training teachers and paraprofessionals to integrate PRT strategies in the preschool curriculum to effect a large number of children from a young age. Two studies have outlined procedures for training parent implementers to provide PRT for large-scale community-based training; Baker-Ericzen, Stahmer and Burns, 2007 and Bryson et.al (2007). Baker and colleagues (2007) implemented training to 158 parents of children with ASD for a total of 12 hours over the course of 12 weeks. Although child improvement gains were noted by comparing pre and

post measures on the Vineland Adaptive Behavior Scales, the fidelity of implementation by parents was not monitored. The authors stressed the importance of greater adherence to treatment fidelity in future research.

Bryson et.al (2007) trained teams of parents and intervention providers to implement PRT as part of a province-wide dissemination project in Nova Scotia, Canada. The researchers Bryson et. outlined procedures that were employed in a train-the-trainer model to build capacity for early childhood services through parents and educators in Nova Scotia. This has been the only study to date to include practitioners as agents of change. Initially, in-vivo training was provided to train the trainers using Behavior Skills Training (Parsons, Rollyson, and Reid, 2012). Once trained, the new trainers provided instruction to parents and educators in a group format utilizing the skills they had been taught. Preliminary data indicates the promising potential for implementing a train-the-trainer model to build the capacity of services for children with ASD.

Finally, another way for increasing PRT implementation is for more research to be conducted in schools and particularly in inclusive general education classrooms. While early intervention is targeted mostly in inclusive school settings as much as possible, a few studies have evaluated PRT interventions either in the classroom (Koegel, Koegel, Frea, Green-Hopkins, 2003) or with academic tasks (Koegel, Singh, & Koegel, 2010); most of the research supporting PRT has been conducted in home, clinical, and community settings. Since PRT is applied in natural environments, it makes imperative to conduct future research on how to best to train teachers

to correctly implement PRT in inclusive, general education classrooms.

CONCLUSION

Literature supports early intervention is crucial to the development and successful prognosis of young children diagnosed with Autism (Lovaas, 1987; Elder, Kreider, Brasher, and Ansell, 2017). PRT is an empirically supported intervention based on principles of Applied Behavior Analysis that focuses on incorporating motivational variables to target pivotal areas of learning. These variables include child choice (Koegel, Dyer, & Bell, 1987), task variation (Dunlap, 1984), reinforcing attempts (Koegel, O'Dell, & Dunlap, 1988), and using direct natural consequences (Koegel & Williams, 1980; Williams, Koegel, & Egel 1981). As a package, these variables have been shown to be extremely effective, when compared to structured ABA approaches. Overall, PRT is a viable and empirically supported intervention for children with ASD. It embodies a naturalistic teaching approach and promotes parents as active agents of change in children's lives. PRT strategies have been exceptionally validated to be successful in enriching social/communication abilities across all ages in children diagnosed with ASD. Although research has supported the use of PRT as an effective form of early intervention, the quality of PRT research has yet to be addressed especially in the area of fidelity of implementation.; there is a paucity of research available that supports fidelity of PRT to be maintained and generalized after training. A future implication of PRT research needs to be done on determining the profiles of

learners who will benefit from PRT intervention as well as towards fidelity of implementation.

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CHAPTER 4.

BEHAVIOR ANALYSIS AND TRAINING METHODS: ESSENTIAL ASPECTS OF EFFICACIOUS AND ETHICAL TRAINING



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A person's behavior is formed by genetic inheritance, their experiential learning history, and their environment. To effect learning, we cannot change a person's genetic inheritance or their past experiences, but we can change their environment. The science of behavior analysis systematically changes environmental variables to create behavior change that is replicable. Therefore, it is a perfect science for teaching and training.

Training staff and personnel is a key aspect of all organizations that consist of more than one person. Poor performance creates risks for financial solvency, safety,

quality, reputation, and more in any organization. A variety of training and teaching methods exist, but they are often not evidence-based. The science of behavior analysis allows for effective and evidence-based behavior change and is therefore perfectly suited for training, whether for individuals new to expectations or for individuals who display poor performance in a position long-held.

The focus of this paper is performance skills, rather than knowledge skills; being able to verbally answer correctly when presented with a question about how to do something or what to do does not mean a person can perform those skills at the time they are needed, it only shows a person has knowledge about those skills. It is the ability to perform skill(s) after being trained on them that is the concern herein addressed.

A wide variety of training methods for staff and personnel exist, and many organizations follow certain formulas. However, despite evidence that many types of training are ineffective, their use persists (Gardner, 1972; Shapiro & Kazemi, 2017). Some training methods appear to be more effective than others, and some training methods are effective as standalone procedures where others are only effective in certain combinations. Feedback, for instance, appears to be an effective training method by itself and can enhance the effectiveness of other methods (Kelley & Gravina, 2018, Shapiro & Kazemi, 2017, Johnson, 2015). However, its timing and association with consequences may be underrealized and necessary for effectiveness (Bucklin, McGee & Dickinson 2004; Kang, Oah & Dickinson 2005; Aljadeff-Abergel, Peterson, Wiskirchen, Hagen & Cole 2017). Furthermore, it appears that feedback may only be effective if it is

paired with or serves as a discriminative stimulus for positive reinforcement (Daniels & Bailey, 2014).

Computer-based instruction (CBI) is effective on its own when there is interaction where the learner takes an active role in advancing through the training (Johnson & Rubin, 2011). Reading material or being lectured by another person as a training method is poor on its own, but if the reading contains clear diagrams or pictures it is more likely to be effective (Shapiro & Kazemi, 2017). As an overarching methodology, behavior skills training incorporates multiple methods including modeling and feedback, often in a particular sequence. These sequences may vary slightly based on various practitioner's outlines, but overall include the same key methods; written description, modeling, practice, and feedback (Parsons, Rollyson & Reid 2012). Interteaching is a method used in educational settings that has shown promise for training and teaching knowledge skills but may be ineffective in teaching performance skills. Throughout this paper, the author will examine various training methods and their relative efficacies as well as key components that allow for or deny efficacy.

THEORETICAL UNDERPINNINGS

Scientific knowledge is sourced from philosophies that when taken together form its basic foundations. Determinism is one of these key philosophies. The medical definition of the theory of determinism is that acts of the will, occurrences in nature, or social or psychological phenomena are causally determined by preceding events or natural laws (Merriam Webster,

2019). A belief in determinism is required for knowledge to be sought in a scientific manner. Only by believing there are cause and effect in the universe and that natural laws can be predicted from these occurrences can one proceed to discover and predict how one occurrence will affect other occurrences. The basis of science is discovering and describing a phenomenon, predicting how phenomenon will act, and then manipulating phenomenon to confirm or refute interactions.

This is an essential framework of behavior analysis; it is predicated on the concept that behavior is caused by an organism's environmental interactions. These interactions may be internal or external, sourced from experience or genetic disposition. Most interactions are some combination of these. On a species-wide level, phylogenic selectionism acts to select the survival of certain behavioral and morphological traits through organisms' interactions with the environment. On a group or community level, cultural selectionism acts to parse out patterns of behavior that interfere with group survival. On an individual level, ontogenic selectionism acts to shape the behavior patterns of an organism during its lifetime. All these forms of selection are caused by organisms' interactions with their environment. Only with acceptance of determinism can behavior be analyzed to discover the causes of its occurrence and nonoccurrence and predict it based on patterns.

Empiricism is the theory that states that it is through observation and our sensory perceptions that knowledge is discovered; scientific knowledge is learned through direct experience. It is from directly observing nature and reality and performing experiments to confirm perceptions through repetition that we learn what causes

and natural laws are. This is the action that allows for behavior analysis; objective observation and measurement are required so that causes can be understood. Further, experimentation requires objective observation to confirm or refute what has been understood through observation.

More is required to further the progression of science. A basic tenet of science is parsimony. Understanding happenings in the universe have preceding causes and follow natural laws, and that through direct observation and experimentation we can discover and understand those causes and laws, there is no need to elaborate on the whys and hows of the universe. Parsimony reminds the scientific observer to accept simple and apparent explanations unless there is a reason to seek a more complex explanation.

It is through these three theories that humanity could see beyond traditional beliefs and superstitions sufficiently to discover natural laws including those governing the behavior of living things. These theoretical underpinnings allowed for a science of behavior to develop. It is this science of behavior, behavior analysis, that seeks behavior change through learning, that allows for a uniquely accurate assessment of training methods.

HISTORY

Training (teaching another person how to do a job) predates written civilization, and its origin cannot be dated. Since at least prehistoric times, people trained other people on how to create objects needed for survival. This evidenced by the complexity of the objects found

over widespread areas and the groupings of objects in the archeological record that display cultural consistency in a given area, such as bone and projectile points used to kill game (Frison & Ziemens, 1980). Training and teaching is a part of human survival at its most basic level; with our complex civilizations, it has expanded to include a wide variety of behaviors that are taught from person to person and generation to generation. In capitalist culture, training is particularly concerned with “worth.” Survival may or may not create value or provide reinforcement. Worth is determined by others valuation in a token economy or in exchanges. For this reason, training and teaching practices have been shaped by what is perceived as the best value and subject to patterns of demand.

Prior to the 1900s in the United States, training practices in large organizations and institutions were not driven by safety concerns, and therefore training quality was poor even when it caused risk to life and limb. Workers’ compensation laws did not exist in the United States and were still preliminary in much of Europe (Boggs, 2015). In 1911, Wisconsin passed the first workers compensation law, leading to mandated workers’ compensation insurance for many employers as laws continued to follow this precedent state to state. This change resulted in a clear monetary advantage to provide proper training for individuals in hazardous employment, at least to the extent that it reduced injuries and deaths that could result in litigation and higher insurance premiums or loss of funds in self-insured accounts in states where such options are allowed. By the 1990s, approximately 80% of employers were required to carry workers’ compensation insurance in the form of a purchased insurance plan or a self-insurer account,

resulting in the majority of employers having a direct potential correlation between the efficacy of training procedures and monetary reward (Guyton, 1999).

In the United States, the advent of World War II created a demand for a skilled labor force in a short amount of time. This surge caused the government to collaborate with private industry to create training programs throughout the United States, many of which continued after the war or served as models that continued to disseminate (Torraco, 2016). In the 1960s, recognition of the power of people's knowledge and skills to impact their own earnings and the earnings of organizations they worked for crystallized in the form of Human Capital Theory (Nafukho, Hairston & Brooks, 2004). This theory recognizes the value of teaching skills to individuals because it also creates value for the organizations they are part of, justifying the investment organizations may make in training and development. Unions in the 1960s and beyond furthered aspects of Human Capital Theory and advocated for training for union members both before and during employment (Kochan & Litwin, 2011). Economic pressures from unions, workers' compensation, and competition in employment have all influenced training methods and practices, and in some instances contributed to a natural selection of sorts for effective training methods. However, common training practices still often include ineffective methods and procedures. A presentation of those methods follows.

METHODS

A wide variety of training modalities and combinations exist in the literature. It is not uncommon for research for

a given modality to contain direct contradictions, with some researchers finding an aspect significant or beneficial, and others finding it insignificant or detrimental. Combining training methods into packages is standard in research and in practice. Some of these combinations in research are examined with lesser experimental control than would typically be expected for a treatment/intervention package because the researchers often omit component analyses.

Some combination methodologies have become standardized so far as to be named (Behavior Skills Training, Pyramidal Training, for instance) and are typically examined as a whole procedure rather than separate parts. This complicates a cohesive summation and analysis of discrete methods. However, for the purposes of this paper, common package modalities and individual techniques will be addressed each in turn, as this is the reality in the current research and in what can be expected for practical application methods. It is important to note that when training packages are presented, the discrete components of each package should also be considered as separate entities with essential aspects for efficacy to be gleaned from research in their own right.

FEEDBACK

Feedback as a training method is certainly present in the research literature as an exemplar of some direct contradictions in research findings. What is widely accepted is the general beneficial nature of feedback; learners perform better when they receive it compared to when they do not (Alavosius & Sulzer-Azaroff, 1990;

Higbee, Aporta, Resende, Nogueira, Goyos, & Pollard, 2016; O'Neill, O'Neill, Weed, Hartman, Spence & Lewinski, 2018; Shapiro & Kaxemi, 2017; Yeung, Meeks, Edelson, Gao, Soar & Perkins, 2009).

For example, for both healthcare providers and lay responders, CPR training is more effective when a device that provides feedback is used compared to one that does not (Yeung et. al, 2009). Yeung et. al reviewed thirty-three relevant studies and found that CPR feedback devices not only improve skill acquisition, the improvement also carries over into skill retention. This is particularly important for a potentially life-saving skill, but direct assessment of carryover of the presence or lack of feedback on actual patient outcomes was not possible. Future research including this aspect, the ultimate goal of CPR training, would bolster these findings.

In an additional example, O'Neill et. al (2018) compared training methods for police trainees at three police academies in the United States. The typical initial training sessions that all three academies provided did not include planned performance feedback and were not enough to teach skills to an extent that a group could be considered as having mastered the skills in question. Performance feedback at the third police academy improved skill performance so that mastery levels were achieved. Unfortunately, skills taught in the police academy were not reliably maintained after graduation even when performance feedback was provided, indicating that multiple training deficits in police academy training methods likely need to be addressed, and performance feedback may enhance training methods but needs to be considered as one part of

effective training methodologies and not a standalone method.

The most effective timing and frequency of feedback is controversial; some research indicates feedback is best directly after a performance (Luke & Alavosius, 2011; Tosti & Jackson, 1981); some research indicates feedback is best directly before the next opportunity to perform that skill (Aljadef-Abergel, et. al, 2017, Higbee et. al, 2016). Furthermore, some researchers have found that immediate feedback is necessary, and others have found that delayed feedback is no less effective than immediate feedback. Some research indicates that delayed feedback is superior to immediate, at least in certain applications.

In a 2011 study using a multiple baseline design across subjects, Luke and Alavosius found that immediate feedback delivered after skill performance not only improved healthcare workers' hand hygiene for all participants to mastery levels, it also resulted in the skill being maintained months after the intervention was withdrawn. As early as 1974, Van Houten et. al, using a multiple baseline design, found that immediate feedback after task completion doubled the rate of words produced by young writers while the quality of their overall work remained high. However, neither of these studies included a direct comparison with delayed feedback.

When feedback is given directly after a performance, for skills that involve memorization of stimuli at least, a very brief delay makes feedback more effective. For example, Carpenter and Vul (2011) found a delay of three seconds, during which nothing else is presented that may distract the learner, makes feedback more effective than when it is presented immediately.

It may be that delayed feedback is effective when it

serves as an antecedent just prior to skill performance, as Aljadeff-Abergel et. al suggest. In 2017, Aljadeff-Abergel et. al compared the effects of feedback given immediately after skill performance with feedback given just before the next opportunity to perform the skill and found that providing feedback before the opportunity for skill performance was the superior method.

However, feedback may draw its power from its relation to differential consequences; feedback and differential reinforcement may have interrelated effects (Bucklin et al, 2004, Kang et al, 2005). This relation to differential consequences may be integral to the effects found by Aljadeff-Abergel et. al above; feedback just prior to skill performance may be a motivating operation affecting behavior that typically results in feedback or a discriminative stimulus for reinforcement during a performance of a skill. By extrapolation, feedback without any differential consequences may be ineffective, and the type or schedule of differential consequences used may be an underestimated variable that could enhance or even negate the efficacy of feedback.

For example, the study by Bucklin et. al (2004) found that incentive-based pay enhanced the effects of feedback where hourly pay did not. Similar results were obtained by Kang et, al (2005); Kang and colleagues used four experimental conditions to evaluate the effects of feedback when combined with hourly and incentive pay while also comparing the effects of continuous versus intermittent feedback. Continuous feedback increased performance in comparison to feedback delivered intermittently, every fourth session, but only when combined with incentive pay, not when

combined with hourly pay. It may be that incentive-based pay enhances feedback as a discriminative stimulus for positive reinforcement in the form of access to money, so learners are more likely to attend to and respond to feedback when incentive-pay systems are used.

Feedback can enhance the effectiveness of other interventions. Bucklin, McGee and Dickinson (2004) found that monetary incentives alone were less effective for producing high performance than monetary incentives combined with feedback. After feedback was withdrawn and monetary incentives alone resumed, performance was maintained. While this may be viewed as a failure of experimental control subsequent to reversal, it may also be evidence that feedback can increase performance and then be withdrawn and the differential reinforcement in place will maintain the gains created by feedback. If this is true, it makes feedback an even more valuable tool for organizations because it is efficient; it may be used until skill levels are achieved for a particular skill and then withdrawn, allowing the resources devoted to providing feedback for that skill to be devoted to another skill or another aspect of the organization.

While evidence is present that immediate and delayed feedback can both be beneficial, what also must be considered is the schedule of feedback provided. Much evidence exists to support that when teaching new skills, a continuous schedule of reinforcement is best. In consideration of reinforcement schedules in relation to feedback, it is necessary to recognize that this includes a presumption that feedback would need to serve as reinforcement in a given scenario, and that rather than

being presumed, this should be assessed. If feedback does function as reinforcement, a continuous schedule would seem to be best when teaching new performance skills. However, in typical scenarios continuous schedules are challenging if not impossible, and some evidence suggests that continuous schedules are not indicated for certain types of skills.

Specifically, if creativity is sought when teaching a skill, a variable ratio of feedback is likely a better choice rather than a continuous schedule of feedback (Eckerman & Vreeland, 1973). Eckerman and Vreeland found that when subjects were transferred from a continuous reinforcement schedule to a variable schedule where responses were arbitrary (because the variable schedule had been predetermined for the purposes of the study), variability in the responses increased. The subjects were apparently seeking reinforcement by modifying the topography of their response and continued to modify it as the variable schedule continued. Once placed on extinction, where no responses received reinforcement, variability in the responses occurred but then did not continue to increase as it had on the variable schedule. This study indicates that variable reinforcement schedules encourage individuals to vary the topography of their behavior while attempting to emit the correct response. These results are of particular consideration for skills where creativity is likely to create value, such as in the production of art or music.

Other researchers have shown the superiority of a continuous feedback schedule versus an intermittent feedback schedule in order to acquire skills more rapidly. However, both continuous and intermittent schedules can result in performance being maintained equally well

(Alavosius & Sulzer-Azaroff, 1990). Alavosius and Sulzer-Azaroff used a multiple baseline design and concurrent reinforcement schedules across behaviors to illustrate that continuous feedback resulted in a faster performance increase in the percentage of correct steps for work skills for healthcare workers than an intermittent feedback schedule, while also illustrating that written instruction without feedback was not effective. It may be that continuous versus intermittent feedback affects the rapidity of skill acquisition in training but not the ultimate competency of the performer.

Feedback can be presented in a graphic form without concurrent direct interaction from the person providing the feedback; this is a common practice in many management scenarios where group or individual performances are posted. Graphics can be presented in a variety of forms, although some individuals may display marked preference for a graphic type even if it is less demonstrative of relevant results than an alternative. Preference is not apparently associated with understanding, as staff in Hardesty et. al understood both preferred and nonpreferred graph types (Hardesty, Orchowicz and Bowman, 2018). Austin, Weatherly and Gravina used a multiple baseline design across subject groups and a partial component analysis to assess the effects of a combination of task clarification, verbal feedback and graphic feedback for restaurant employees. When graphic feedback was added for one group, performance increased. However, task clarification and verbal feedback had already been provided as an initial intervention for that employee group, so sequence effects or the initial independent variable continuing to improve performance cannot be ruled out.

Another aspect affecting the efficacy of feedback is positive feedback versus corrective feedback, where positive is understood as acknowledging “good” performance and corrective feedback is understood as pointing out “bad” performance. The concern is what is better not only as one versus the other but in what combinations and orders. Some research suggests that while combining positive feedback with corrective feedback may be perceived as more pleasant to the learner and reduce adverse emotional responding, combining positive and corrective feedback together lessens the feedback’s improvement of performance (Choi, Johnson, Moon, & Oah, 2018). Choi et al. suggest that positive feedback should be combined with corrective feedback if the organization’s priority is the experiences of the individuals receiving the feedback, but positive and corrective feedback should be delivered separately if performance is the primary concern.

Feedback may include generic observations (e.g., “well done,”) or specific descriptive details related to the performance being trained. Johnson (2013) found that the most effective feedback included not only basic evaluation of the performance but also objective details about relative aspects of the performance.

COMPUTER-BASED INSTRUCTION

Human interaction during feedback is not required for effectiveness; CBI often has feedback provided by a computer, and it is effective for learning (Johnson & Rubin, 2011). CBI without feedback either embedded or added may not be effective for a majority of learners, however (Higbee et. al, 2016). For CBI to be an effective

method there needs to be interaction where the training does not advance until the learner demonstrates some aspect of or knowledge about the skill (Johnson & Rubin, 2011). It has been used effectively to train educators on antecedents and consequences surrounding behavior (Scott, Lerman & Luck, 2018). Within virtual reality applications, feedback in the form of simulations of interactions with a physical environment has been effective in training first responders (Jiang, Girotra, Cutkosky and Ulrich, 2005).

BEHAVIOR SKILLS TRAINING

Behavior skills training (BST) is a competency-based training method; in other words, training continues until the trainee displays mastery of the required skill(s). There is variability in procedures implemented; what makes a training procedure BST is inclusion of four things: instructions, modeling, practice (sometimes referred to as rehearsal) and feedback, with the last two recurring as needed until mastery of the skills in question is demonstrated. Instruction often includes verbal instruction and written instruction. Whether written, verbal or both, instruction includes specific description of the behaviors expected from the trainee to show skill mastery. Modeling is often accomplished via role play with individuals as actors and has been successful with video modeling (Sarakoff & Sturmey, 2004) as well as in person modeling (Beidas, Cross, and Dorsey, 2014).

BST has been used to train a variety of skills effectively, such as training on the use of teaching protocols and communication (Parsons & Rollyson, 2012). Parsons and Rollyson demonstrated the effectiveness of BST for

teaching two skills using a multiple baseline design across behaviors (each skill taught). Their results indicated the skills increased an average of over 40% and 65%, respectively, after BST was implemented for the participants. In a study by Nigro-Bruzzi and Sturmey (2010) a multiple baseline design across subjects design was used to assess the effectiveness of BST for training staff to provide mand training for children. All staff showed significant increases in performance over baseline when BST was implemented, and their consumers (the children) showed improvement as well.

PRACTICE, ROLE-PLAY, REHEARSAL

An essential aspect of BST according to its 4-part package is practice, also known as rehearsal or role-play. Practice, as the author will hereafter term it, allows for opportunities for feedback to be planned for and allocated, and is an effective method when part of the component package of BST and when combined with other methods. The challenge faced in many settings is the lack of opportunity or resources for feedback to occur in real-life opportunities for skill performance. This is where practice using actors can provide a solution. Multiple researchers have found that using trained actors can be effective to accomplish practice opportunities. For example, Beidas et al (2014) found that using trained actors for what they termed “behavioral rehearsal” was effective in teaching cognitive behavior therapy skills to therapists. A variety of cognitive behavior therapy skills were taught effectively using this method. Sarakoff and Sturmey (2004) also used actors effectively for practice during training for teachers and saw a significant

improvement in performance after the training package was implemented, with increases from the 40th percentiles in baseline to 90th percentiles after training for all three participants.

PYRAMIDAL TRAINING

Pyramidal training as initially described by Jones, Fremouw and Carples in 1977 includes training individuals who will be present in the working environment of future trainees so that a small number of individuals can be trained by the initial trainer and then go on to disseminate training to subsequent trainees. This is a method that allows for initial trainers to spend less time and resources on training, as may be particularly important in consultative and outsourced roles, especially in terms of cost reduction. The group initially trained can also presumably provide feedback regularly to their trainees since they will be working in the same environment.

In a classic example of pyramidal training well known in behavior analysis, Page, Iwata and Reid (1982) expanded upon this practicality by performing initial training for supervisors, who would already be overseeing their trainees on a regular basis and would already be expected to provide guidance and correction of performance. In this study of pyramidal training in an institutional setting, Page et. al found that pyramidal training was effective for supervisors and their frontline staff. One key aspect of this study to note is that supervisors were provided feedback on their supervisees performance after the supervisors had trained the supervisees; in reality, this means that the trainers

received ongoing training in the form of feedback even after training was completed on the original skills to be performed.

PERFORMANCE MANAGEMENT

Performance management (PM) is a technology based on the science of behavior analysis that improves the performance of individuals to create increased value for organizations (Daniels & Bailey, 2014). Performance management includes a variety of assessment techniques and uses behavior analytic methodologies to effect change. Part of the processes of performance management often includes training, if poor performance is caused by a skill deficit. Performance management training methods can include all the effective training methods listed above. It enhances these methods by typically including goal setting, clear definitions of behaviors to specify what skills are to be performed, and effective reinforcement strategies for desired skill performance. Performance management as a whole could only be addressed in a paper of this length devoted alone to its content; further guidance is suggested via Daniels & Bailey and other seminal works.

INEFFECTIVE TRAINING METHODS

Some modalities are agreed upon in the research literature to be ineffective. For instance, despite lecture still being an overwhelmingly common “teaching” method, research indicates that by itself it does not produce effective learning (Gardner, 1972; Yeung, et. al, 2009) Only when used in combination with other

methods known to be effective is it effective as part of a training package.

Self-study is not an effective standalone training method either, although it can be better when enhanced with relevant visuals (Shapiro & Kazemi, 2017). While providing written materials for trainees to learn may be enhanced with visuals, it should still not be considered an efficacious training method. When a decision is to be made on how to train performance skills, time should be allocated to active learning (such as rehearsal) rather than these methods so commonly used (Beidas, Cross & Dorsey, 2014). Unfortunately, there is an evident cultural consensus of acceptance of inefficient and ineffective teaching methods in Western society, as self-study, lecture and simple presentation of written materials for review by trainees are standalone training methods widely used by workplaces, educational institutions, and other organizations.

While interteaching is a promising method used in education settings to teach knowledge skills, there is insufficient research at this time to indicate efficacy in regards to performance skills.

ETHICS

Behavior analysts have a professional and ethical obligation to provide and advocate for effective training, as evidenced by the behavior analyst certification board's guidelines for training and teaching. As outlined by Henley & Reed (2015),

Guideline 5.0 The Behavior Analyst as Teacher and/or Supervisor specifies the delivery of training

and teaching. This particular guideline does not detail particular training practices and content but establishes an ethical obligation to design training programs that entail proper supervised experiences, competently designed training and supervisory activities, and training programs that meet their goals (Bailey and Burch [2011](#)). Moreover, Guideline 1.0 Responsible Conduct of a Behavior Analyst requires behavior analysts to “rely on scientifically and professionally derived knowledge” in one’s professional activities, which may be interpreted to mean behavior analysts involved in staff training or supervision rely on empirically supported or evidence-based training and performance management practices.

According to the behavior analyst certification board, behavior analysts have an expectation of providing training that is backed by research supporting its effectiveness. Based on the evidence presented, many training practices in common use have questionable effectiveness or have no empirical evidence of being effective at all. This is a deficit that cannot ethically be ignored, and certainly should not be enacted by behavior analysts in any supervisory or consultative roles.

The ethical concerns of providing ineffective training vary in severity depending on the field and services provided; obviously poor training in the field of emergency medicine has greater potential ethical concerns than poor training in performance art, for example. However, behavior analysts have an ethical adherence to provide evidence-based services, so any behavior analyst providing training or consultative services that include training recommendations should

provide research backed, evidence-based practical training. With that acknowledgement, it is arguable that behavior analysts, who have a responsibility to disseminate information (BACB, 2019) about the field responsibly, may have an ethical obligation to advocate for better training methods if they simply encounter substandard training methods while performing in a professional role in situations where health or safety is at stake.

FUTURE DIRECTIONS

Research indicates some types of training enhance the effects of others and that training packages are reliably superior to trainings that only include one component. It is evident that all training should include some form of feedback. However, more research is needed to analyze feedback and its effects. Many questions remained unanswered, including some in relation to rate of feedback, timing of feedback, and how these relate to the nature of the skill that needs to be performed. For example, further research on the rate of feedback is necessary to determine the break points of rate since rate has been rarely examined in comparison to timing (e.g., immediate or delayed). Also, for some performance skills initially based on memorization, a delay of a few seconds is more effective than immediate feedback. However, in other instances immediate feedback is the best method. In yet other instances, delay in feedback does not appear important as long as feedback is delivered. In addition, the type of feedback given and what aspects of performance it contains has been explored as by Johnson

(2013), who found that the most effective feedback included both evaluation of the performance itself and objective details about the performance. However, analyses like these that look for essential aspects of feedback that determine or enhance effectiveness are too few for a comprehensive scientific understanding to be had, and further research is warranted.

Feedback delivered directly before the next opportunity to perform a skill may be the most effective way to improve skill performance in some situations and when given immediately after a skill in others. It is most likely that rather than a significant portion of the body of research on the timing of feedback being altogether incorrect, science lacks a finer understanding of what feedback is best in what situations. More specifically, feedback timing may have a direct relation to the type of skill being learned, and additional research should examine this potential link while also accounting for the consideration of differential reinforcement in association with feedback.

What can be gathered regarding training is the following: feedback should be provided to improve skill performance, regardless of the skill being taught. Immediate feedback during and just after a performance is suggested for skill improvement. Feedback should also be provided just before the next opportunity to perform the skill in question. Feedback should include specific aspects of the skill being performed, rather than just generic statements of approval or disapproval. Positive feedback (i.e., praise or description of what was done well) should be provided. As long as emotional reactivity is not a primary concern, positive feedback should not be provided at the same time corrective feedback is

provided. If emotional reactivity is a concern, positive and corrective feedback may be combined with the understanding that the learning experience is likely to be more aversive (i.e., less pleasant) for the learner but skill performance may improve more rapidly. Special consideration should be given to the future relationship between the trainer and the trainee in these instances; if there is to be an ongoing interaction trainers would be prudent to consider the potential trade-off in avoiding pairing themselves with aversive conditions and having a learner take longer to master a skill than the opposite.

Feedback may be provided using electronic devices or persons, but if electronic devices are used feedback and interaction with the device should be a prerequisite for moving on to the next aspect of the skill. Behavior skills training offers a summative approach that can be used to train a wide variety of skills in a wide variety of environments, and is a good option for providing behavior analytic training methods to non-behavior analysts as it is standardized, methodical and easy for trainers to understand as a method without needing to understand the underlying science. Future research may lead to the discovery of what rate, frequency and order of BST components are most effective to determine the line between efficacy and efficiency.

Where cost and time are of particular concern selection of training methods can be used as mitigating factors. Pyramidal training can provide more cost-effective and efficient training for organizations, but if the training of the initial point person(s) does not include the essential aspects of training for efficacy, it is not truly a practical method. Additionally, pyramidal training should always include the original trainer(s) monitoring performance of

secondary trainees and providing feedback to primary trainees regarding the secondary trainees' performance for a time. CBI may be a less expensive alternative than using personnel to provide training, and it is effective when used with embedded feedback and requiring demonstration of a skill before presenting the next skill to be trained. An area for further research may be whether feedback has better efficacy when coming from a person rather than an electronic device or computer and what parameters influence this variance if it does exist.

Future research is needed to create standardized and feasible training practices that can be used in a variety of environments and occupations. For example, in the medical field performance skills are highly dependent on knowledge skills; that is, memorization of terms, chemical interactions, numeric levels associated with abnormal functioning, symptoms characteristic of different maladies, etc. are required to perform skills to address medical concerns that cannot wait for research. Therefore, the immediacy of feedback should likely be specified as delayed for some skill aspects and immediate in others, with clear guidelines delineated. Similarly, BST where skills are practiced as many times as needed so mastery can be obtained would decrease the likelihood of errors, especially in cases that are presentations of rare medical conditions where lack of practice is likely to cause lack of skill retention or loss of skills. This is also true for the law enforcement field, where trainees are likely to fail to perform a skill correctly during follow-up probes despite displaying them correctly during and immediately before graduating from training. In both instances, the safety, wellbeing and lives of individuals are at risk; failing to provide effective training is an ethical

failure to do right by one another in the most basic of ways.

It is prudent to acknowledge that advocating for effective and research backed training practices is likely to be difficult. Effective training often requires significant resources and is likely to be more costly on the front end. Continuous reinforcement makes individuals learn faster; in positions where individuals will already be responsible for important duties (healthcare for example) before they are fully trained, continuous reinforcement schedules are best. However, they require someone with expertise to provide monitoring at all or close to all opportunities for reinforcement. In the same vein, to provide immediate feedback, someone with expertise needs to be available to observe performance of essential aspects of a skill and to take the time to provide feedback. To provide continuous and immediate feedback, an individual or program has to be designed whose sole primary purpose is training.

There are ways to streamline these processes, such as to have individuals respond remotely, or to use electronic devices in the place of people, that can reduce investment of time and funds. However, even when streamlined and well-practiced, these procedures are not easy. It is easy to give a person something to read and expect them to then perform the skills described. It is easy to lecture individuals on expectations and skill descriptions and consider training complete.

As often happens, tradition, low response effort and systemic entropy are poised against what is right and best. Simple acknowledgement of what is right and best is not enough. Providing evidence via sound research of what is right and best is a necessary step that must be

expanded upon, but it is also not enough. To expect real change, advocates must also be prepared to convince organizations that effective training is not only right and best from a moral and ethical perspective, it is what is right and best for the organization itself and any stakeholders. Research must include what happens when effective training is not in place; the costs of staff or volunteer turnover; the costs of legal difficulties caused by mistakes in service to consumers or injuries or death to personnel; the loss of revenue from cultural perceptions that make interactions with an organization aversive to outsiders; and so on.

Behavior analysis allows for scientific determination of what training methods are the most effective, and what aspects of each method enhance effectiveness or are so key to effectiveness that they should be considered as necessarily inherent in the method. Behavior analysis also offers clear ethical guidelines regarding the importance of using evidence-based training methods that are backed by current and comprehensive research. As a final caveat, behavior analysis self-identifies its responsibility to disseminate information to those outside the field. Therefore, behavior analysis is inextricably linked to effective training methods and has an intrinsic responsibility to continue to research what works, what doesn't work, and why. The foundations have been laid, but the work will be ongoing, bounded only by the limits of our technology and our research questions. Our technology is ever evolving, so our research questions should only promulgate further from the humble synthesis offered in these pages.

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CHAPTER 5.

ACCEPTANCE, COMMITMENT AND TRAINING: USING ACT PRINCIPLES TO ADDRESS INTIMATE PARTNER VIOLENCE IN THE LGBTQIA COMMUNITY

Acceptance and Commitment Training (ACT) is focused on teaching individuals how to be psychologically flexible by accepting their thoughts, feelings, and experiences, connect with their values, and take effective action toward those values. The six principles of ACT are: acceptance; defusion; contact with the present moment; committed action; self-as-perspective; and values. The purpose of this paper is to give an overview of each principle and to argue whether applying those principles could aide in



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serving victims of intimate partner violence (IPV). An overview of theoretical underpinnings and a history review will provide the required background needed to determine if these principles could be effective for the intended populations. Then we will review the current literature for treatments with those populations. Next will be determining if there are any gaps in the research that need filling in order to determine effective methods for serving the intended populations of offenders and victims of IPV, specifically those who are a part of the LGBTQIA community. Finally, we will determine if ACT is behavior analytic in nature, what ethics apply to the use of ACT and what are the feasible next steps to appropriately serve victims of intimate partner violence and the LGBTQIA community.

THEORETICAL UNDERPINNINGS

ACT, according to Psychology Today on April 10, 2019, is an action-based approach to psychopathology (Acceptance and Commitment Therapy, n.d.). Psychotherapy is generally described as a way to aide individuals with various types of mental illnesses and difficulties with emotions such as anxiety, depression, PTSD and others. Most people might describe psychotherapy as laying on a sofa talking about your feelings to some therapist. One can also view psychotherapy as way to talk about and identify how your feelings and thoughts might be affecting your behaviors and then make effective changes to your behavior to live a more valued life. According to a podcast called *ACT in Context: The History and Development of ACT with Steven Hayes* (2011), Hayes gives credit to Sigmund Freud for

bringing psychotherapy to the mainstream and setting the stage for culture to become more interested in psychological principles. Freud is most commonly known as the founder of psychoanalysis, a way to treat those with mental illness by “making the unconscious conscious”, and for his theories that explain human behavior. Steven Hayes, the founder of ACT, acknowledges Freud’s contribution as being able to describe “the life within and the role of the unconscious” (Dehlin, Plumb, & Hayes, 2011).

Although Hayes acknowledges the great contributions Freud made to the field, he goes on to say Freud had radical and controversial ideas and, “the way he went about theorizing and collecting data made it hard to disprove any of his findings” (Dehlin, Plumb, & Hayes, 2011). An in-depth discussion of the method Freud used would be beneficial but is beyond the scope of this paper. However, it is appropriate to state that Freud’s methods were not based in all 6 principles of science: determinism; experimentation, empiricism, replication, parsimony and philosophical doubt. In the same podcast, Hayes continued to say that B.F. Skinner, Ivan Pavlov, and other early behavior analysts were attempting to “use behavior therapy to link empirical and analytic precision of lab-based learning to psychology to a systematic effort to develop and evaluate methods to alleviate human suffering and behavioral problems” (Dehlin, Plumb, & Hayes, 2011). In short, these pillars of the field were using scientific methods like measurement of observable behaviors and replication to create meaningful and effective treatments in the area of alleviating human pain and suffering. Hayes goes on to say that he entered the field with an interest in a naturalistic, functional and

contextual perspective in which he wondered how our behavior could move us from one state of affairs to another (Dehlin, Plumb, & Hayes, 2011).

In the late 1970s, clinicians were becoming increasingly frustrated with not having an adequate approach to human language and cognition. Hayes comments, “I knew we needed a new approach to understanding how people think, reason, talk about, analyze and interpret their problem and solutions to those problems” (Dehlin, Plumb, & Hayes, 2011). Hayes discusses the 3 waves of psychotherapy in this podcast, as well. The first wave, he explains, is centered around the rise of behavior therapy where there is a rebellion of psycho-analysis and the humanistic psychology of Carl Rogers (Dehlin, Plumb, & Hayes, 2011). The second wave was described by Hayes as “bringing clinical theories of cognition forward and freeing up the clinicians to pursue what people think, feel and remember as a target” (Dehlin, Plumb, & Hayes, 2011). John Dehlin, from ACT in Context, rephrases this as letting scientists dive into thoughts, cognition and feelings without the encumberment of difficult language of behaviorism (Dehlin, Plumb, & Hayes, 2011). Hayes summarizes that the second wave proposed that “people’s emotions and behavior were caused by cognition and as such, maladaptive behaviors and emotions were caused by maladaptive cognition; this was a revolutionary theory at the time because people weren’t used to catching, recording, categorizing and analyzing their thinking” (Dehlin, Plumb, & Hayes, 2011). The second wave is very align with the ideology behind CBT.

He states that he came into the field knowing that “progress would require principles that were robust,

precise, that have broad scope and that the learning labs of animal research had failed in the area of human language and cognition... Skinner and cognitive behavioral therapy (CBT) principles and ideas were both right and both wrong. Both were making mistakes, and both had a point and we have to find a way to get the best of both” (Dehlin, Plumb, & Hayes, 2011). The third wave of psychotherapy was then described by Hayes as the idea that “your relationship to your own thoughts is determinative of how behavior and emotions congeal” (Dehlin, Plumb, & Hayes, 2011). These waves are all essential in the making of what is now known as ACT.

ACT argues that “challenging thoughts or controlling them is not beneficial to changing behavior but changing your relationships to the thoughts might be more helpful” (Dehlin & Plumb, 2011). In order to create an effective method for alleviating human suffering as it relates to language and cognition, one first needs to have a basic understanding of human language and cognition. That is exactly where the research began and in the 1980s by taking a bottom up approach to language and cognition. That bottom up approach to language and cognition is now commonly known as relational frame theory (RFT).

According to Jonathon Tarbox, ACT is an orientation to psychotherapy based on pragmatic functional contextualism and RFT (Cicoria & Tarbox, 2018). Functional contextualism is a modern term for radical behaviorism and helps to better convey in what way the philosophy of science relates to other modern approaches. Relational frame theory can be described as learning through derived relations. The term radical behaviorism was first used by Calkins in 1921 in an issue of *Psychological Review* (Calkins, 1921). Watson thought of

behavior and consciousness as mutually exclusive ideas but he himself did not use the phrase radical behaviorism (Schneider & Morris, 1987). However, radical or “extreme” was a common term used during his time to describe behaviorism as a science. The use of the term radical behaviorism to describe a science that denied or ignored consciousness as a part of its science, continued until Skinner’s first use of the term in 1945 (Schneider & Morris, 1987). Skinner separated behaviorism into two distinct categories, methodological and radical, where methodological behaviorism was described as distinguishing between events available to be observed by the public, and private events unavailable to the public and therefore, untreatable (Schneider & Morris, 1987). In Skinner’s autobiography (1979) he states, “I preferred the position of radical behaviorism, in which the existence of subjective entities is denied. I propose to regard subjective terms ‘as verbal constructs, as grammatical traps into which the human race in the development of language has fallen”” (p. 117). The second time Skinner used the phrase radical behaviorism was in his 1974 book *About Behaviorism*, “The question, then is this: What is inside the skin, and how do we know about it? That answer is, I believe, the heart of radical behaviorism” (p. 233).

In order to understand and influence behavior, behavior must be understood in relation to the setting or context and can only be understood through knowing its function. As Jonathon Tarbox states in an episode of the Behavioral Observations podcast, “there is something going on in the brain, but in addition to that, there is something going on in the environment and *that* is where we can make a difference” (Cicoria & Tarbox, 2018). He

even argues that human language and cognition is a specific kind of learned behavior. Tarbox talks about RFT and says, “the core of human language and cognition is that the learned and contextually controlled ability to arbitrarily relate events mutually and in combination with and to change the functions of specific events based on their relations to others” (Cicoria & Tarbox, 2018). Tarbox is referring to derived relations, which encompasses understanding that certain contexts will often contribute to how relationships are formed and that the context and relations formed can often alter the function of a behavior.

Toʻrneke (2010) described derived relations as “relations between stimuli that appear without having been learned or trained specifically” (p. 60). This process may seem natural to us because it is universal among humans. Toʻrneke (2010) has a great quote that establishes some social validity for this concept of derived relations:

If altering stimulus functions is dependent for operant and respondent conditioning, each and every connection must be trained directly or be established through generalization. But derived relations seem to establish stimulus functions without any such contingencies between stimuli. (p. 72)

For example, if an individual is trained that $A=B$, then they can produce the derived relation that $B=A$ even without training that new relationship. This process is called mutual entailment (M. Dixon, personal communication, March 8, 2019). Mutual entailment can be taught by using a common behavioral analysis principle called matching to sample. By training that the

written stimulus 'apple' goes with the picture of an apple, we can also create the derived relation that a picture of an apple goes with the written stimulus 'apple'. This also applies to greater than and less than relationships (M. Dixon, personal communication, March 8, 2019). For instance, if an individual is trained that $A < B$, they can produce the derived relation that $B > A$.

This, however, is only one step in a derived relationship. Derived relations can extend to tens of relations just by training a few of them. An example would be, if an individual is trained that $A = B$ and $B = C$, a derived relation of $A = C$ can be formed. This process is called combinatorial entailment (M. Dixon, personal communication, March 8, 2019). An example would be if someone is trained that the verbal stimulus 'a square' is paired with the verbal stimulus, 'has four sides', and the verbal stimulus 'a square' is paired with a picture of a square, then a derived relation of the verbal stimulus 'a square' is equivalent to a picture of a square. This process applies to greater than and less than relationship as well (M. Dixon, personal communication, March 8, 2019). For instance, if an individual is trained that $A < B$ and $B < C$, a derived relation of $A < C$ and/or $C > A$ can be formed.

This process of derived relations is very important when it comes to assessing and treating cognition and problematic behaviors that are believed to be occurring due to cognitions (M. Dixon, personal communication, March 8, 2019). When these derived relationships are made and they begin to change the behaviors of an organism, the phrase derived relational responding is used. To understand this concept fully, it must be put into context. This means, an actual stimulus must be used instead of replacing it with arbitrary letters. For example,

to say that an individual's learning history produced the relationships of a fear response in relation to stimuli C based on teaching that $A < B$ and $B < C$, doesn't quite bring to fruition the implications of such relationships. However, when real life stimuli are assigned instead of arbitrary letters, the connection and contextual impact begins to make more sense. Take the same scenario and replace A, B, and C with real life stimuli. A potent example could be, if an individual that has already developed a fear response to dogs and is then taught that dogs are less harmful/dangerous than snakes, and then taught that snakes are less harmful/dangerous than scorpions, a picture of a scorpion might begin to elicit a larger fear response than a picture of a dog (M. Dixon, personal communication, March 8, 2019).

This can be extended to things other than pictures. For instance, if someone were to shout at the individual who just learned that scorpions are more dangerous than dogs, "Watch out for that scorpion!", a fear response might occur. These derived relations occur in everyday life and can help explain why some individuals might avoid seemingly neutral events or experiences. Derived relations can be responsible for some factors in anxiety disorders, phobia disorders, depressive disorders, PTSD, and other mental health concerns (S.C. Hayes, personal communication, March 8, 2019).

RFT proposes several different categories of derived relational responding; equivalence, distinction, spatial relations, temporal relations, casual relations, hierarchical relations, and relations of perspective (Toˆrneke, 2010, p. 80). Equivalence relations refer to "same as" relationships (M. Dixon, personal communication, March 8, 2019). This would mean

teaching the concept that big and large mean the same thing (Tõrneke, 2010, p. 80). Equivalence is often taught using a behavioral analysis principle called matching to sample. Distinction relations are referencing differences in stimuli (M. Dixon, personal communication, March 8, 2019). This could be the relationship between big and small, teaching that they are opposites (Tõrneke, 2010, p. 80). Spatial relations refer to relationships such as behind or in front of, above or below, to the left or to the right, over and under, on top of or underneath and others (Tõrneke, 2010, p. 80). Temporal relations encompass the before and after relationships (M. Dixon, personal communication, March 8, 2019). Causal relations are in reference to the if-then scenarios (Tõrneke, 2010, p. 80). These relationships are something the field of behavior analysis is extremely familiar with, similar to the if-then statements used when incorporating the Premack principle into an intervention program. Hierarchical relations include relationships that teach when things are “part of” something else (Tõrneke, 2010, p. 80). An example of this could be kitten, cat, stray cat, wild cat, tiger, and lions; each of these are part of the overarching category of felines (M. Dixon, personal communication, March 8, 2019). Relations of perspective include those relationships that refer to “I and you” or “here and there” (Tõrneke, 2010, p. 80).

The behavior analysis community generally rejects events that are not directly observable and able to be agreed upon by more than one individual. However, as Niklas Tõrneke (2010) states, “Skinner rejected this position, maintaining that just because an observation is jointly agreed upon does not necessarily make it scientific and, further, that a scientifically valid observation can

be made by a single individual... the scientific validity of a statement is determined by whatever controls the statement” (p. 10). Torneke (2010) goes on to say that, “there is an intrinsic tension within behavior analysis between its affirmation of the validity of private events, on one hand, and the tendency to disregard them in practice, on the other” (p. 10). Another source, Wilson and Hayes (2018), state, “Behaviorists did not object to the study of thinking and reasoning per se. Skinner explicitly rejected the idea that behavioral psychology needed to limit itself to overt behavior (Skinner, 1945), and it is not generally known that even classical behaviorism developed creative methods for the study of such topics as problem solving and reasoning” (2018, p. 4).

A post-Skinnerian term that is synonymous with radical behaviorism is functional contextualism. Functional contextualism is associated with theoretical movements like RFT. The functional contextualism theory requires analysts to identify dependent measures that are operational and can then be used to assess truths behind scientific claims (Ruiz & Roche, 2007). A pragmatic stance on truth is adopted in contextualism with a root metaphor of act in context (Ruiz & Roche, 2007). As stated by Pepper (1942), acts have a satisfaction in their completion and this satisfaction applies equally to the observer and the observed.

While a more in-depth discussion of functional contextualism and RFT would be beneficial, it is beyond the scope of this paper. However, Russ Harris (2009) argues that one does not need to fully understand RFT to be able to apply ACT principles. He states in his book, *ACT made Simple*, “If ACT is like driving your car, RFT is like knowing how the engine works”. He goes on to argue

the ACT is a behavioral therapy because at its core, it is about taking action (Harris, 2009).

HISTORICAL OVERVIEW:

ACT is focused on using six core principles to create psychological flexibility in individuals so they can lead rich and valuable lives: acceptance; defusion; contact with the present moment; committed action; self-as-perspective; and values. Psychological flexibility can be defined as “a broader, more flexible pattern of activities” (Wilson, Borieri, Flynn, Lucas, & Slater, in press, p. 282). Another source describes psychological flexibility as, “the ability to fully contact private experiences in the present moment in order to pursue values-based actions” (Hayes, Strosahl, & Wilson, 1999). Although public trainings in ACT started as early as 1982, the first book on ACT was published in 1999 (Dehlin, Plumb, & Hayes, 2011). Starting in the 2000’s a surge in research related to ACT principles took place. Now, one can find dozens of textbooks and self-help books related to learning and applying ACT principles in their own life or with clients.

ACT has some roots in CBT, which closely follows the second wave of psychotherapy, that describes faulty thoughts and feelings are caused by faulty cognitions and that treatment should focus on changing or modifying those faulty cognitions. This differs substantially from ACT theory, which states that the more time and energy you spend focusing on and “fusing” with those thoughts and cognitions, the less progress you make. ACT supports that these faulty thoughts and emotions do not have to negatively impact our everyday lives and the principles

they apply help individuals accept and defuse from them, as well as helps identify individual values and ways to take committed actions to move closer to leading a valued life. An in-depth discussion of CBT would be valuable but is beyond the scope of this paper. Eifert, Craske, Vilaradaga, Davies, Arch, & Rose (2012) compared ACT and CBT principles to patients diagnosed with anxiety disorders. Their research found that ACT, over the long term, was more effective in reducing the severity of principal anxiety disorder. A 12-month follow up also showed the those who received ACT displayed more psychological flexibility that those who received CBT treatment (Eifert et al., 2012).

The six core principles of ACT are acceptance, defusion, contact with the present moment, committed action, self as perspective, and values. Acceptance, according to Bach and Moran (2012) from *ACT in Practice*, can be defined as a “willingness to experience fully and without defense” (p. 8). The opposite of acceptance would be experiential avoidance. Experiential avoidance can be described as the general unwillingness to experience the negative or problematic thoughts and feelings or faulty cognitions. Some activities that teach and help foster acceptance practices are: putting the statement “I’m having the thought that...” before each thought you have; to sing the thoughts you have in a silly voice; to repeat the thought you are having as quickly as you can for thirty seconds (S.C. Hayes, personal communication, March 7, 2019). All of these activities can be implemented across settings, cultures and abilities. Acceptance is normally targeted when escape or experiential avoidance tendencies have become a barrier to individuals taking

important actions in their life (S.C. Hayes, personal, communication, March 7, 2019).

Russ Harris (2008) describes defusion as “relating to your thoughts in a new way, so they have much less impact and influence over you” in his book *Happiness Trap* (p. 33). The opposite of defusion is cognitive fusion. This can be described as when an individual believes and therefore acts in accordance with the thoughts and feelings they have (Törneke, 2010). This can become problematic when the thoughts and feelings are all negative and cause you to take action that leads one farther away from living a valued life. “Dropping the rope” is a good exercise that can be used to teach and foster defusion with individuals. This activity encompasses individuals actually engaging in a tug of war, with a rope (S.C. Hayes, personal communication, March 7, 2019). The rope is said to symbolize the fault cognitions or negative thoughts and feelings the individual has been experiencing or trying to avoid experiencing (S.C. Hayes, personal communication, March 7, 2019). This activity is aimed at teaching individual that the constant struggle to hold the rope or gain control over the rope is not necessary (S.C. Hayes, personal communication, March 7, 2019). Dropping the rope and allowing those things to just be there, is an option and likely an option that will lead individuals closer to living their valued lives. Defusion is normally targeted when private or internal events begin functioning as a barrier and affect the actions taken by individuals (S.C. Hayes, personal communication, March 7, 2019).

Bach and Moran (2012) describe contact with the present moment and being fully aware and attending to

your current situation and surroundings (p. 8). Contact with the present moment has also been referred to as flexible attention to the now, flexible attention to the present moment, contact with the present moment and be here now. The opposite of this would be rigid attentional processes, or “Dominance of the Conceptualized Past and Future; Limiting Self-Knowledge” (Harris, 2009, p. 27). Several practices can be helpful for teaching and fostering present moment awareness with individuals. Some of the practices and activities include, following the patterns of breathing, giving emotions and thoughts a bodily form by contorting the body to look how it feels, and asking individuals to conduct a scan of their body and say/write down some things they are noticing in the moment (S.C. Hayes, personal communication, March 7, 2019). Contact with the present moment allows individuals the flexibility to not perseverate on their faulty cognitions or negative thoughts and emotions. Present moment awareness can be targeted when an individual appears scattered, unaware, or is inflexibly moving toward a past or future self (S.C. Hayes, personal communication, March 7, 2019).

The self-as-perspective has been described as viewing oneself as the observer (Ahles and Jenkins, n.d., p. 4). Self-as-perspective has also been described as “flexible perspective-taking of yourself as others see you. Being able to see yourself as a place in which stuff happens and not as a thing to make judgements on. It is verbal behavior directed toward the self and others, as well as the relations between those two” (Cicoria & Tarbox, 2018). Another way to refer to this process is, perspective taking sense of self. The opposite would be a

conceptualized self. Conceptualized self would be an individual identifying so much with personal traits of characteristics that they don't take actions that lead them to a valuable life. For example, "I can't try out for the sports team because I'm a girl," or, "I can't have a healthy relationship because I have attachment and/or abandonment issues," or "I can't play basketball because I'm short". While these statements about the self may be factual or true, it does not always prevent us from taking actions that lead toward living a more valued life. A valuable exercise can be to ask individuals to move across person, place and time and try to describe themselves as someone else sees them, who they are in a different environment or around new people, and how they were/are in a different time (S.C. Hayes, personal communication, March 7, 2019). Self as perspective is also targeted when an individual appears scattered or is overidentifying with their conceptualized self and appears afraid to explore the world in new ways (S.C. Hayes, personal communication, March 7, 2019).

Values, which are different from goals, are explained as verbally construed global outcomes or chosen life directions that are always lived in the present moment, not to be attained (Bach & Moran, 2012, p. 10). Values are often things like honesty, professional growth, inclusivity, and the likes. Values never have an end, they are categorized as a way of being or living, the personal qualities one wants to portray across time, space, people and environments (S.C. Hayes, personal communication, March 7, 2019). The opposite of a value would be a goal or an outcome. An outcome has an end date and can be "accomplished" whereas, values are something one wants to continue doing or a way one wants to continue being.

A good activity to try with individuals would be to have them identify a scenario that made them really angry or upset, and once they can pinpoint that, ask them why and this leads to a discussion about things they value (S.C. Hayes, personal communication, March 7, 2019). Values is targeted when there appears to be an issue related to motivation or lack of general direction in an individual's life (S.C. Hayes, personal communication, March 7, 2019).

Committed action is arguably the most clinically relevant of the six principles of ACT. It involves the actions taken to bring one closer to their values (Bach & Moran, 2012, p. 8). Committed action has also been referred to as workable action. The opposite of this is sometimes called unworkable action. Committed action is just action that is taken to take individuals closer to contacting living their valued lives. This is where most of the behavioral and observable pieces of the model come into play. Committed action is getting out into the world and behaving to take oneself closer to a desired place. This could be closer to a goal or outcome or closer to a value. For instance, a committed action for a value of professional development would be attending conferences, reading new publications and collaborating with others in the field. Committed action is only targeted once a sense of psychological flexibility has been observed in an individual, it is targeted when the person displays ability to do work in the real world that could take them closer to their values or desired outcomes (S.C. Hayes, personal communication, March 7, 2019).

ACT has been applied in areas such as insect phobias, anxiety disorders, eating disorders, PTSD, depression, panic disorders, substance abuse, obsessive compulsive disorder (OCD), IPV, gender and sexuality issues and

much more (Jones & Friman, 2006; Eifert et al. 2012; Matteucci, Timko, Butryn, Forman, Shaw, Lowe, & Juarascio, 2013; Twohig, M. P., 2009; Bohlmeijer, Fledderus, Rokx, & Pieterse, 2011; Zettle, Rains, & Hayes, 2011; Hayes, Wilson, Gifford, Byrd & Gregg, 2004; Twohig, Hayes, Plumb, Pruitt, Collins, Hazlett-Stevens, & Wordneck, 2010). There are also several self-help books that help individuals begin to apply these principles in their own lives. The books covering areas such as parenting, relationships, social anxiety, depression, anxiety disorders, trauma, and more (Coyne & Murrell, 2009; Walser & Westrup, 2009; Flowers, 2009; Robinson & Strosahl, 2008; Forsyth & Eifert, 2008; Follette & Pistorello, 2007).

Treatment for sexual offenders in the 1970s had three main focuses: modifying sexual preferences, broadening of cognitive processes so that it would incorporate cognitive processes, and a focus on creating a more comprehensive approach to treatment (Marshall & Laws, 2003). Marshall and Laws (2003) state that the 1980s was when an initial attempt to formulate social learning theories of sexual offending started to appear as well as the beginnings of relapse prevention models. They go on to review the 1990s, where two journals dedicated to sexual offender work and other research publications that helped treatment programs multiply (Marshall & Laws, 2003). The 1990s also featured developments of risk prediction instruments (Marshall & Laws, 2003). At the end of their history review on the treatment of sexual offenders, Marshall and Laws (2003) state, "It is evident from this review of the history of sexual offender treatment that cognitive behavioral procedures have

developed into a comprehensive approach that is widely shared and appears to be effective” (p. 110).

However, IPV entails more than just sexual violence. IPV includes physical, sexual or emotional/psychological abuse of a romantic partner. Some common treatments for individual who have been arrested or convicted of IPV include the Duluth model and CBT model of batterer intervention plan. Babcock, Green, & Robie (2004) state that “implementation of mandatory arrest policies and court-mandated counseling, batterers’ interventions became a fusion between punishment and rehabilitation” (p. 1024). Babcock et al. (2004) goes on to say that recidivism rates do not increase significantly with the implementation of a batterer intervention programs (BIPs). In fact, some research even suggest that it may put the victims in even more danger by giving them false sense of security (Holtzworth-Munroe, Beatty, & Anglin, 1995).

The Duluth model is said to take a “feminist psychoeducational approach” that views domestic violence as a “patriarchal ideology and the implicit or explicit societal sanctioning of men’s use of power and control over women” (Babcock et al., 2004, p. 1026). This model has been the most common according to Babcock et al. (2004). The model uses something called a “Power and Control Wheel” and “Egalitarian Wheel” to help them change from using behaviors that results in authoritarian relationships to behaviors that lead to egalitarian relationships (Babcock et al., 2004).

In contrast, the CBT model makes violence the primary focus of treatment, claiming that violence is a learned behavior and can therefore be unlearned (Babcock et al., 2004). The model believes that violent behaviors occur

because it serves a function, a theory that the field of behavioral analysis can generally agree with. However, the treatments used in the CBT model are not so behavioral as they focus more on the emotional components behind violent behaviors. By focusing on or targeting more of the emotional or cognitive aspect of violent behaviors, the treatment is less focused on changing the behavioral patterns.

Representative samples in a study found that between 25%-40% of lesbian women have experienced IPV in their total lifetime and 10% reported that they have experienced IPV within the last year (Brown & Herman, 2015, p. 8). The same study also found that there was a higher prevalence of IPV reported among bisexual women than their heterosexual counterparts, with bisexual women being 2.6 times more likely to report having experienced intimate partner sexual violence (IPSV) in their lifetime (Brown & Herman, p. 2). In regard to sexual minority men, a representative sample estimated 26.9% of gay men reported to have experienced IPV in their lifetime, with 12% having experience in within the last year (Brown & Herman, p. 2). Brown & Herman (2015) also provide statistics among the transgender population, with 31% having experience IPV compared to 20% of the cisgender population (p. 3). This review of existing research about IPV among the LGBTQIA community provides social validity for why looking at treatment and intervention for this specific population is of importance. Several studies even claim that the prevalence of IPV and intimate partner sexual violence (IPSV) is as high or even higher among the LGBTQIA population than that of the general population

(Stotzer, 2009; Rothman, Exner, & Baughman, 2011; Edwards, Sylaska, & Neal, 2015).

Brown and Herman (2015) go on to review some barriers to treatment/seeking help and the quality of help received by the LGBTQIA community in regard to IPV. In fact, 46% of bisexual women reported that they experienced PTSD symptoms following an experience of IPV. Some barriers to seeking help and gaining treatment are: negative physical and emotional effects; money; risk of rejection and isolation from family, friends, and society; dependence of social networks; risk of retaliation; risk of outing self or partner; lack of understanding of what constitutes IPV; and lack of LGBTQIA friendly providers (Brown & Herman, 2015, p. 16-18).

CURRENT APPLICATIONS:

According to Casseillo-Robins and Barlow (2016) and Fernandez and Johnson (2016), anger has been linked to aggression and interpersonal problems. Anger is seen as problematic when it is expressed as aggression. Aggression can be defined as behaviors, physical or verbal, aimed at others that cause physical or emotional distress (Berkout, Tinsley, & Flynn, 2019). Although, CBT was the most widely used approach to treating problematic anger or aggression, the psychological flexibility model found in ACT serves as a promising alternative (Lee & DiGuseppe, 2018).

The psychological flexibility model has been applied with a variety of problematic behaviors, and as such, can be applied to address anger and aggression. Greco, Lambert, and Baer, (2008) describe one of the six

processes, cognitive fusion, as when an individual believes the literal meaning of their thoughts instead of viewing their thoughts as transient internal states. Greco, Lambert, and Baer (2008) give an example of cognitive fusion as when someone's thoughts of "I am hopeless" are equivalent to the psychological experience of hopelessness. Another example of cognitive fusion could be not completing a homework assignment or presenting professional work at a conference due to thoughts of "I am not good enough, smart enough or competent enough in this area." Fusing or becoming one with those thoughts, has made a change in behavior and could be leading one away from leading a valued life. For example, if the value is professional development or professional dissemination, then refraining from completing or presenting the work could be causing one to be led away from their values. Similarly, cognitive fusion can happen in partner relationships when thoughts like, "I am not masculine enough" occur and these faulty cognitions can lead partners to engage in behaviors that are sometimes socially categorized as masculine traits, like aggression.

Hayes, Strosahl, and Wilson (2012) propose that thoughts and cognitive fusion itself is not problematic, but rather when it is coupled with the avoidance of the thought (experiential avoidance), does it become problematic. Bardeen and Fergus, (2016) support this hypothesis that cognitive fusion by itself is not maladaptive or problematic but that it can become problematic when there are no alternatives to fusion that can be or are flexibly applied by individuals (p. 4). Cognitive fusion has been measured using a 7-item self-report questionnaire titled Cognitive Fusion Questionnaire (CFQ) (Gillanders, Bolderston, Bond,

Dempster, Flaxman, Campbell, Kerr, Tansey, Noel, Ferenbach, Masley, Roach, Lloyd, May, Clarke, & Remington, 2014). The CFQ is self-report style questionnaire that is seven questions long that asks participants to rate if they agreed with each question using a Likert scale. The scale ranges from 1 (never true) to 7 (always true). Some examples of the questions or statements on the CFQ are: I struggle with my thoughts; I get so caught up in my thoughts that I am unable to do the things that I most want to do.

Experiential avoidance is the general unwillingness to experience unwanted inner experiences such as thoughts, feelings, memories and bodily sensations (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). Experiential avoidance can also be described as “the struggle to avoid or eliminate thoughts and feelings related to fear, guilt, shame, rejection, anger, anxiety, and so on by controlling their attention or behavior in certain ways” (Skinta & Curtin, 2016, p. 40). Skinta and Curtin (2016) state that you can look at combined patterns after filling out the Matrix, a tool used in ACT, to see what form an individual’s experiential avoidance might take and possibly even determine its function (p. 40). For example, someone who experiences anxiety might observe a rise in heart rate, shallow breathing, sweating, etc., when around large groups of people and therefore may choose not to attend events where there will be large crowds of people, even when the event features something they would otherwise enjoy. The avoidance of the large groups of people, even if the event adds value to their life, could qualify that situation as experiential avoidance, especially if similar avoidant strategies occur often in those similar situations. Gardner and Moore (2008) describe their

Anger Avoidance Model and propose that aggression may serve as a way to avoid feeling threatened and vulnerable which is consistent with the idea of experiential avoidance.

Experiential avoidance has been found to be a primary coping mechanism for individuals that have lived and survived through trauma (Tull, Gratz, Salters, & Roemer, 2004). This established some social validity for populations of individuals that are victims or survivors of IPV and/or have PTSD symptoms. Experiential avoidance has been measured using a 7-item self-report questionnaire that uses a Likert rating scale titled Acceptance and Action Questionnaire – II (AAQ-II) (Bond, Hayes, Baer, Carpenter, Quenlow, Orcutt, & Zettle, 2011). The measurement tool called AAQ-II was “designed to assess a specific model of psychopathology that emphasizes psychological inflexibility” (Bond et al., 2011, p. 22). Bond et al. (2011) give some examples of questions on the AAQ-II, “the final scale contained items on negative evaluations of feelings (e.g., “anxiety is bad”), avoidance of thoughts and feelings (e.g., “I try to suppress thoughts and feelings that I don’t like by just not thinking about them”), distinguishing a thought from its referent (e.g., “when I evaluate something negatively, I usually recognize that this is just a reaction, not an objective fact”), and behavioral adjustment in the presence of difficult thoughts or feelings (e.g., “I am able to take action on a problem even if I am uncertain what is the right thing to do” (p. 4.) The AAQ-II is said to predict a variety of life quality outcomes such as depression, anxiety, work attendance, job satisfaction and general mental health conditions (Bond et al., 2011).

Several studies have linked experiential avoidance to

aggressive behavior and even relationship violence (Bell, & Higgins, 2015; Reddy, Meis, Erbes, Polusny, & Compton, 2011; Shorey, Elmquist, Zucosky, Febres, Brasfield, & Stuart, 2014). IPV has been defined as, “physical violence, sexual violence, threats of physical/sexual violence, and psychological/emotional abuse perpetrated by a current or former spouse, common-law spouse, non-marital dating partner, or boyfriend/girlfriend of the same or opposite sex” (Breiding, Basile, Smith, Black, & Mahendra, 2015). Shorey et al. (2014) also suggest that psychological inflexibility and dating violence are linked. There have been some batterer intervention programs (BIPs) for men that have been charged with assault against an intimate partner. Many of these BIPs are based on the Duluth model and possess some patriarchal theories where male-to-female violence is conceptualized to be a societal sanctioning of men’s power and control over women (Pence & Paymar, 1993). An easily derived relation that can be formed here by those facing gender identity issues that desire to be more masculine, is that gaining more power and control over their partner is an acceptable way to appear more masculine. Most of these BIPs also include a CBT approach, where focus is centered around changing or modifying faulty cognitions to prevent future violent behavior.

However, many studies have reported that these Duluth and/or CBT based programs only produced limited reduction in recidivism. Recidivism can be defined as the tendency that a convicted criminal will reoffend. One study showed that someone who was arrested and sanctioned to complete a Duluth/CBT based BIP was only 5% less likely to reoffend than someone who

was arrested and sanctioned but did not have to complete a BIP (Babcock, Green, & Robie, 2004). A new model, Achieving Change through Values-Based Behavior (ACTV) focuses on using ACT principles in their BIP. By focusing on ACT principles, ACTV aims to teach offenders to choose a behavior that is consistent with their values even when those faulty cognitions appear (Zarling, Bannon, & Berta, 2017).

ACTV was designed as 24-weekly session that lasted 1.5-2 hours each. Participants were required to pay for each session and could not be considered to complete the program until all payments were made. This program was divided into 5 modules: Big Picture/Core skills; Emotion Regulation Skills; Cognitive Skills; Behavioral Sills; and Barriers to Change (Zarling & Berta, 2017). Facilitators of this program were required to complete a 4-day training where ACT models were introduced and demonstrated, then the trainees were able to practice during some role play and feedback scenarios with their trainers. Then they moved on to implementing the 24-week ACTV sessions while being directly observed by a trainer to ensure treatment validity. Zarling & Berta (2017) wanted to compare the effectiveness on recidivism when Duluth/CBT models were provided versus the ACTV model. Their results found that in a 12-month follow-up ACTV participants were less likely to be arrested for any charge, including domestic assault charges, or any violent charges than their Duluth/CBT counter-participants (Zarling & Berta, 2017). These results suggest that an ACT model may be a promising alternative to BIPs for intimate partner violence offenders.

The first module of Zarling & Berta (2017), Big Picture/Core Skills, introduced mindfulness practices so that

individuals can learn to notice their own behaviors and whether they are values-driven or if they can be categorized as experiential avoidance (p. 96). This part of the intervention might include discussion surrounding the participants' beliefs about "how people should behave (including gender roles), childhood experiences, personality and stress/coping styles" (Zarling & Berta, 2017). This is also where the Matrix tool comes into play. The Matrix is an image that contains four quadrants. The top and bottom portion of the image helps to separate sensory experiences like observable actions that can be displayed or observed by the five senses (top two quadrants), from mental experiences like thoughts, feelings and memories (bottom two quadrants). The left and right portion of the image helps to separate decision that lead to moving away from living a valued life (left two quadrants) from decisions that lead to moving toward living a valued life (right two quadrants). The use of the Matrix is to help participants' grasp the key concept of the module, which is, individuals can behave independently of their thoughts and emotions.

The second module, Emotion Regulation Skills, explores the functions of emotions and introduces acceptance practices to teach participants how to make space for those emotions without trying to alter them (Zarling & Berta, 2017, p. 96). This module spends time on how experiential avoidance can lead one away from living a valued life and helps participants differentiate between workable behavior (leading closer to values) and unworkable behavior (leading away from values) (Zarling & Berta, 2017, p. 98). The third module, Cognitive Skills, introduces defusion and identification of troublesome or problematic mental experiences and aides' participants

in accessing tools that allow them to gain some distance from those troubling mental experiences (Zarling & Berta, 2017, p. 98).

The fourth module, Behavioral Skills, teaches and requires the practice of communication skills such as reflective and active listening, assertiveness, boundary setting and conflict resolution (Zarling & Berta, 2017, p. 98). Role play is part of this module to allow for practice with effectively managing any emotional responding that occurs when engaging in these types of conversations (Zarling & Berta, 2017, p. 98). The fifth and final module, Barriers to Change, facilitates discussion around identifying barriers or potential barriers to participants engaging in values-based action and offer strategies and resource to combat those barriers (Zarling & Berta, 2017, p. 98).

The ACTV model is different from other BIPs in several ways. First, the model does not assume that aggression or partner violence is always an attempt for masculine figures to assert their power over feminine figures like the Duluth Model or the circular reasoning that aggressive behaviors are a result of angry thoughts like the CBT model (Zarling & Berta, 2017, p. 99). This is one reason that the ACTV model is being used with both male and female offenders in the state of Iowa (Zarling & Berta, 2017, p. 102). Zarling & Berta, (2017) state that the ACTV philosophizes that increased awareness of contributing factors to aggressive behaviors, which is promoted by the ACT concept of contact with the present moment, allows greater ability to alter that behavioral pattern (p. 99). This is consistent with ACT's concept of psychological flexibility, that individuals are in control of their behavior and do not have to allow their behaviors to

be governed by faulty cognitions. Second, ACTV doesn't focus on changing faulty cognitions, like CBT models, but rather focuses on changing one's relationship with and their responses to those faulty cognitions (Zarling & Berta, 2017, p. 100). Third, the ACTV model is experientially focused, requiring active participation and rehearsal of newly learned skills. Fourth, it is very values-based and places participants' personal values at the center of all sessions. Fifth and finally, the facilitators of the model seek to not only be sympathetic and empathetic, but rather strive to adopt the ACT principles themselves by being psychologically present, open and effective while they engage in providing treatment (Zarling et al., 2017, p. 100).

While combating partner violence on the offenders' side are taking steps in the right direction, treatments for survivors are also in huge demand. A study shows that many women who suffer from distress related to being a victim of IPV, do not seek treatment and that approximately a fifth of individuals who are enrolled in some type of trauma-related therapies drop out of their treatments (Fugate, Landis, Riordan, Naureckas, & Engle, 2005). At the same time, nearly one third of women who have experienced IPV meet the criteria for PTSD (Golding, 1999). Polusny & Follette (1995) state that some problematic behaviors that may arise after being exposed to traumatic events, such as IPV, involve experiential avoidance and the domination of trauma-related cognitions. Furthermore, experiential avoidance and other factors related to psychological inflexibility have been linked to a higher risk in re-victimization in survivors of IPV (Fiorillo, Papa, & Follette, 2013). This establishes a great need for treatment of survivors and

Fiorillo, McLean, Pistorello, Hayes, & Follette (2017) believed that a web-based ACT program could be helpful in reducing some of the barriers to treatment that survivors faced.

The web-based model was adapted from the self-help book, *Finding Life Beyond Trauma*. The web model consisted of six sessions, each an hour long that covered areas such as: introduction and psychoeducation on interpersonal trauma and ACT, willingness and acceptance, mindfulness, defusion and self-as-context, clarifying values, and committed action consistent with values (Fiorillo et al., 2017). The sessions were comprised of video narration, text, exercises and worksheets. The researchers assessed acceptability, feasibility and efficacy of the web-based intervention and psychological flexibility after surviving IPV. Results from the study showed that there were statistically significant decreases in scores on depression, anxiety, and psychological inflexibility (Fiorillo et al., 2017). Fiorillo et al. (2017) found that there was a significant decrease in psychological flexibility scores, measured by the use of the AAQ-II, between pre-treatment and post-treatment (p. 108). These results are evidence that a web-based treatment model can be effective in combating psychological symptoms that arise in individuals who have suffered IPV.

Burrows (2013) conducted a case study on an adult that had survived a sexual assault. Burrows used measurements such as the AAQ-II, White Bear Suppression Inventory (WBSI), Trauma Symptom Checklist (TSC-40), and Valued Living Questionnaire (VLQ). All of these measures are self-reported and many of them use a Likert rating scale. The WBSI was designed

to measure tendencies to suppress unwanted thoughts, similar to experiential avoidance using 15 questions. The TSC-40 aims to measure symptomology of individuals who have experienced a traumatic event. TSC-40 aims to measure this by the use of 40 questions that cover topics such as anxiety, depression, dissociation, sexual abuse trauma index, sexual problems, and sleep disturbances (Burrows et al., 2013). The VLQ aims to assess the extent to which the individual who takes the two-part questionnaire lives consistently within their values (Burrows, 2013). The first part uses a Likert scale grading system that is said to cover ten common life domains (Burrows et al., 2013). The second part of the VLQ asks individuals to rate their consistency with living in align with their values (Burrows, 2013).

Burrows et al. (2013) treatment intervention consisted of eighteen sessions that lasted fifty minutes long over a period of ten months. The treatment occurred in three phases. The first phase focused on present moment awareness, values clarification and defusion. The second phase focused on replacing experiential avoidance with acceptance practices and self-as-context. The third and final phase focused on the idea of workability or taking committed action. A powerful statement made by the individual in the case study was, “found it helpful to replace the word ‘but’ with the word ‘and’ when describing situations (e.g., ‘I want to go to work and I’m feeling anxious’) to remind herself that she had control over her actions, even in the face of internal experiences” (Burrows et al., 2013). Symptom reduction was not an explicit goal of this intervention model, however, reductions in both experiential avoidance and trauma symptoms were listed as progress for being a part of

treatment (Burrows et al., 2013). The results from this case study showed improvement across all four measurement systems; AAQ-II, WBSI, TSC-40, VLQ (Burrows et al., 2013). Eight months after treatment ceased, a follow-up was conducted and it was determined that increased psychological flexibility that was said to be a result of the treatment, had been maintained when assessed at follow-up. The follow-up also showed further decreases in trauma symptomatology and a marginal decrease in the scores on the VLQ.

ETHICS

One of the biggest concerns in the field of behavioral analysis is that all things we attempt to measure and areas we try to make changes in, must be directly observable. There is much debate surrounding the topic of whether ACT serves as a behavioral therapy and if it belongs in the category of applied behavior analysis. Much of the evidence offered is from the use of self-report questionnaires, usually with the use of a Likert rating scale. However, that begs the question of if we cannot see these internal of cognitive processes and the individual themselves are the only ones who can witness them, why should we then consider this an invalid method of measurement? More so, in the field of behavioral analysis, one might hear the phrase, “work yourself out of a job”. This often includes teaching an individual how to recognize, record, and manage their own behavioral patterns using self-management strategies that we then teach to them.

As a field, behavior analysts are already using methods and relying on self-report for accurate measuring. The

same argument can be made when a behavior analyst asks or requires parents or guardians of a client to observe and take data on targeted behaviors. This measurement is not the most reliable method either, considering that parents can sometimes collect inaccurate or unreliable data. However, in circumstances where one cannot control all variables or be available to directly measure something, one must often settle for either permanent products (like bruises) or self-report. Even so, when teaching individuals self-management strategies, it is essentially teaching individuals to notice and record their own behaviors and experiences. Therefore, when no other acceptable alternative can reasonably be met, self-report can be used to measure behaviors (likely internal) that occur for the individual.

Many advocates for ACT will reference RFT to justify why ACT should be considered a behavioral science. Language is a learned skill, and without language, many faulty cognitions that contribute to problematic behavioral patterns, could cause treatment to fall short. RFT proposes several different categories of derived relationships; equivalence, distinction, spatial relations, temporal relations, casual relations, hierarchical relations, and relations of perspective (Torrence, 2010, p. 80). Although changing cognitions is not the aim of ACT, ignoring or not acknowledging the role language and cognition plays in an individual's behavioral repertoire, is problematic.

While self-report may be a sufficient and acceptable measurement for internal behaviors like cognitions, thoughts and emotions, it will not suffice and constitute as strong empirical evidence for changes in behavior. However, this can be easily applied when we begin

measuring the component of committed action and things like recidivism. We can also measure some aspects of internal behaviors or cognition once they become overt behaviors, such as negative self-statements.

A good way to make self-reporting more reliable would be to use behaviorally anchored rating scales (BARs) in place of the standard Likert scale. “The BARs format consists of the title and definition of a dimension, including descriptions of low, medium, and high amounts of the dimension and a vertical scale anchored with behavioral examples of the dimension” (Dickinson & Zellinger, 1980, p. 147). This means that each available rating has a clear objective definition which helps with reliability. Some benefits other greater interrater reliability of a behaviorally anchored rating scale would be that it is shorter and therefore less time consuming. BARS was developed in the 1960s and became popular in the 1970s (Ohland, Loughry, Woehr, Bullard, Finelli, Layton, Pomeranz, & Schmucker, 2012, p. 613). An example of a BARs would be having a question and a scale to rate that question, but each number or available rating has a definition attached to it. For example: 1 – Occurs less than once per week; 2 – Occurs two to four times per week; 3 – Occurs five or more times per week. The BARs method could be used for questionnaires that are commonly used in ACT practice, like the AAQ-II.

The next critique of ACT is on the abundance of and efficacy of self-help literature using the techniques. Self-help has four different variations: self-administered; predominantly self-help; minimal contact; and predominantly therapist-administered, with evidence supporting higher efficacy when more clinician input is incorporated (French, Golijani-Moghaddam, &

Schoenfelder, 2017). French et al. (2017) completed a systematic review that investigated efficacy of self-help ACT programs on depression, anxiety and psychological flexibility. Their results found the self-help formats of ACT were less effective than face-to-face formats of ACT. However, the analysis did show that increases in psychological flexibility were associated with reductions in both anxiety and depression (French et al., 2017). The study also suggests that the format or delivery of ACT has a low impact on outcomes with the exception of more clinician input resulting in greater outcomes. This can be concerning considering the huge interest in ACT and in self-help books around the globe currently. While self-help options may be beneficial for an introduction into the ACT world, and could even be effective for making changes in personal behaviors, it should not be allowed to qualify an individual to be competent and qualified to provide services with those newly acquired skills.

When taking the Professional and Ethical Compliance Code (PECC) for Behavior Analysts into consideration, there are a few concerns that arise. The following codes could be in danger of being violated if not addressed properly: 1.01, Reliance of Scientific Knowledge; 1.02, Boundaries of Competence; 1.04, Integrity; 2.09, Treatment/Intervention Efficacy; and 3.01, Behavior Analytic Assessment (Behavior Analysis Certification Board, 2014). 1.01, Reliance on Scientific Knowledge is at risk dependent upon which measurement systems are chosen and whether or not the individual providing ACT services has been properly trained in providing such services. Measurement is very important here, as self-reports are not the most scientific standards of measurement and should always be taken with a grain of

salt. For example, if an individual finds session aversive but knows that lying on their self-reports will gain negative reinforcement in the form of needing less sessions, that could be valuable motivation for providing false self-reports.

Another concern is that ACT currently has no certification process and so standards of care/treatment fidelity are not there. Until a true standard measurement of whether an individual has enough knowledge and competency in ACT and even RFT principles, this also puts individuals at risk for violating code 1.02, Boundaries of Competence. An individual might think that after reading one self-help book or attending one 2-day bootcamp on ACT would be sufficient enough training but that does not make the individual competent in that skill set. If a certification process would be developed and implemented, then a clear line between who is implementing ACT procedures and who is just attempting to address cognitions while in a session could be clearly drawn and this would determine when someone would be violating the boundaries of competence code from the PECC.

Creating a standard certification process would also help eliminate the risk of violating code 1.04, Integrity. This would prevent someone from being able to claim they read a book, took a seminar or attended a conference in order to gain competency in that skill. This would require a display of competency in the skills they claim and then integrity would not be of question. This could be a simply administered exam that could be approved by the Behavior Analysis Certification Board (BACB) to qualify someone to have a certification in the specific skill set of ACT principles. This could also be separated

into two subsets of exams, one for being certified to implement an ACT intervention that has been developed and written by someone else and another exam for being competent enough to develop and write an intervention plan that utilizes ACT principles.

Code 2.09, Treatment/Intervention Efficacy could be violated in many ways, especially if using self-report or not relying on scientific knowledge, as well as if boundaries of competency are not upheld. In order for a treatment or intervention to be considered effective in the field of behavior analysis, first the target behavior must be operationally defined. Being operationally defined means that the target must be observable and measurable. Without this feature, true effectiveness and experimental control cannot be determined or confirmed. Efficacy is also a factor in relation to ACT studies because many results are reported as group statistics and the field of behavioral analysis is very focus on single subject design.

Another code, 3.01, Behavior Analytic Assessment, is at risk of being broken if operational definitions are not provided. The PECC states that all individuals have a right to a functional assessment, and without a clear operational definition of a target behavior, conducting a functional assessment could be very difficult. Without identifying the function of a target behavior, one can design and implement a slew of ineffective, risky and time/resource consuming interventions. Since the PECC also states that individuals have the right to effective treatment as discussed in code 2.09, this is a risky situation for practitioners to be in.

Although there is room for improvement before ACT will be widely accepted in the field of behavior analysis,

the concerns are able to be addressed and fix. Aside from these few concerns, there are a number of ethical codes that ACT principles closely align with a follow or could, once standardized, be closely aligned with: 4.02, Involving Clients in Planning and Consent; 4.03, Individualized Behavior-Change Programs; 4.07, Environmental Conditions that Interfere with Implementation; 6.02, Disseminating Behavior Analysis (BACB, 2014). ACT principles actively involve each individual receiving treatment, meaning consent is essential and inherently individualized to that person. Since the interventions are so individualized and clients are so involved and active in the processes, environmental conditions are built into the discussion. Even in the ACTV model used to address recidivism rates of individual arrested or convicted of IPV or IPSV, the sessions that address barriers to change incorporate some environmental conditions that might be affecting behavior.

As far as disseminating behavior analysis, ACT aligns with this ethical code by acknowledging that language and cognition is an essential part of the human condition and that in order to fully and comprehensively provide the most effective services to individuals, the field cannot ignore language and cognition. By disregarding language and cognition and the role it plays in human behavior, it would be hindering the ethical obligation to disseminate the practice of behavior analysis. By incorporating some cognitive practices, it also opens the door for more collaboration with other professionals which in turn would aide in disseminating the practice as well.

Other ethical considerations, specifically related to treatment options for victims and survivors of IPV, are

the ethics of confidentiality when one is a mandated reporter. An ethical consideration for treatment related to the LGBTQIA community could be the risk of outing an individual or their partner and the general lack of a support system, especially if their partner was their sole support system.

FUTURE SUGGESTIONS/DIRECTIONS

Some considerations for treatment of victims would include media campaigning, the use of video modeling and an ACT treatment intervention that has a major focus on the self-as-context and present-moment-awareness processes. Other considerations could be incorporating ACT methods in the form of support groups, specifically led by an individual who is a survivor of IPV. For treatment and behavior change systems for the offenders, an adaptation of the ACTV model that incorporates features from the Program for the Education and Enrichment of Relational Skills, (PEERS®) model, could be beneficial. Of course, the most obvious form of treatment to address the concerns of intimate partner violence, would be to have better sex education programs provided in school systems. Although IPV does not only include sexual violence, proper sex education programs should have a general relationships component built into the curriculum.

Media campaigning can be beneficial resources for reaching victims of IPV if they are placed in public spaces such as bus stops and YouTube video ads that are not able to be skipped. This ensures that the individual will not be put at risk for being blamed by their partner or at risk for being confronted for reaching out or seeking

help. Video modeling has been shown to be an effective method for teaching new skills to individuals. It can be relatively inexpensive and effective for teaching new skills to individuals. It is for this reason that one must consider the portrayal of intimate partner violence in the media, specifically within the LGBTQIA community. More research on this topic area needs to be done in order to take effective steps forward.

Some steps to completing this task would be to first gather participants from diverse backgrounds and cultures and administer a pretest. This test would be a knowledge check about examples and possible ramifications of intimate partner violence. The test should have generic questions as well, as to not signal to the individuals that they are being assessed on their knowledge on the topic of intimate partner violence. This is to avoid carry over effects. The next step would be to compile a list of movies and television shows that model intimate partner violence, particularly ones where that isn't the main theme, but is still very prevalent and able to be derived from the underlying theme. It is also important to include films and television series that model very subtle forms of IPV. Post-tests could then be given to that same individuals where they have to use a BARS system to answer questions on the film as it relates to IPV.

As far as treatment of victims or survivors of IPV in the more traditional sense, ACT could prove to be effective, especially if individuals are displaying PTSD symptoms. In this scenario, a focus on self-as-context and present moment awareness may be beneficial to the individuals. This is because often survivors of IPV identify strongly as survivors and many of their concepts about themselves,

their beliefs, their thoughts, their feelings and therefore their actions are all in align with that conceptualized understanding of being a survivor. Present moment awareness is a good focus because often times a survivor will display PTSD symptoms which can include flashbacks to the periods of abuse or extreme fears of future periods of abuse. By teaching and fostering skills that allow the individual to be and stay present in the current moment for longer and longer periods of time, one can see huge changes in behavioral patterns. Experiential avoidance is another key factor to pay close attention to when treating victims or survivors of IPV. ACT has several studies that show empirical evidence of effective treatment with individual that display experiential avoidance and for individuals with PTSD.

Another option to treatment of victims or survivors of IPV could be to adopt some of the methods used ACT into a support group style of treatment. An important note here would be that whoever leads the support group, should also been a victim and survivor of IPV. If the consulting therapist and/or Board Certified Behavior Analyst (BCBA) is not a victim or survivor themselves, then they should seek out and provide supervision to an individual who is a victim or survivor so they can create the needed foundations of openness, trust, mutual understanding and therapeutic relationship needed to create and foster an environment for behavior change and personal growth. Support groups provide access to a multitude of resources for individuals. Not only professional help resources, but personal support system resources, which can be an area lacking for individual that are victims or survivors of IPV. A factor to consider

here would be the use of an online model to provide access to individuals of a lower socioeconomic class.

The last suggestion, and likely the simplest suggestion, would be to advocate for and provide templates for an all inclusive and comprehensible sex education program to be offered to school aged individuals. It is true that IPV includes more than just sexual violence, but a truly comprehensive sex education program will incorporate all aspects of sex, which includes forming healthy lasting relationships. For example, proper sex education would start with clarification of personal values. This would quickly be followed by the ability to make decisions. Another aspect would be the incorporation of education on human anatomy of both the opposite and same sex. A truly comprehensive model would address common issues across all gender types, sexuality types, cultures, ethnicities, abilities, races and so on. This not only provides an educational aspect to individuals but fosters a place for inclusivity and acceptance of individuals different from oneself. The ability to accept someone that is different from oneself could play a big role in some forms of violent behavior.

The inclusive and comprehensive sex education program could use both ACT principles and be formatted similar to that of the social skills model PEERS®. This model has been empirically tested and shown to maintain treatment gains for up to five years after treatment has ended (Laugeson, Ellingsen, Sanderson, Tucci, & Bates, 2014, p. 2246). Some measurements used by the PEERS® model are: Social Responsiveness Scale (SRS); Social Skills Rating System (SSRS); Social Anxiety Scale (SAS); Friendship-Qualities Scale (FQS); Piers-Harris Self-

Concept Scale-Second Edition (PHS-2); and the Test of Adolescent Social Skills Knowledge (TASSK).

The model consists of daily session that last half and hour long and occur at least five times per week (Laugeson et al., 2014). The first step was didactic instruction which was followed up by role-play (Laugeson et al., 2014). New skills were then required to be rehearsed in the classroom (Laugeson et al., 2014). An important component to note is the psycho-educational portion provided to parents (Laugeson et al., 2014). Behavior analysts can easily create a train the trainer model to allow parents/guardians or other family/friends to provide skills and guidance in needed areas with their individuals. This is a very important step in the process because without a support system outside of the educational component, competency cannot fully be assessed and generalization nor maintenance will occur. By allowing parents/guardians and other family/friends to learn how to best support their individuals, it creates and more open and honest exchange between the parties which fosters that sense of community and support that is often lacking in some environments.

Daily fidelity checks are conducted by having data tracking sheets filled out (Laugeson et al., 2014). Some of the didactic skills that are included in the PEERS® model that may be beneficial to include the inclusive and comprehensive sex education program are: communication skills; verbal and nonverbal forms of communication; electronic communication; online safety; developing friendship networks; paying attention to feedback from others (traditionally related to humor); how to enter into a conversation; how to exit a conversation; how to organize successful gathering with

friends; strategies for handling teasing; handling physical bullying; long-term strategies for changing reputations; resolving arguments; and managing gossip (Laugeson et al., 2014). Laugeson et al. (2014) found that implementing PEERS in a school-based system for higher-functioning individuals was effective in improving the social functioning of those individuals (p. 2252).

The first step in an inclusive and comprehensive sex education program would be to use ACT principles to help individuals identify and clarify their values. This could look like having individuals identify the difference between values and goals or outcomes using examples and nonexamples of each. Then the individuals could complete a values sorting activity from least important to most important and sort their values into each category only once. The first module should also focus on the ability to make an important decision and provide steps to aide them in doing so. These modules should be written to be all inclusive, meaning that a script should be available to the person presenting the new information as well as options for responding and ways to prompt the individuals who are the intended audience.

The second module could touch base on the topic of how to enter and exit a conversation and should have a focus on verbal and nonverbal forms of communication because it is an essential part of both sex education and relationship education. Unless an individual can have a basic understanding of how to appropriately and effectively communicate with others in their lives, then values-based living can become a difficult task. The same module could cover online safety and electronic communication.

Once a basic knowledge of the different types of

communication have been reviewed, the modules could address how to develop friendship networks and the review of the different types of relationships in one's life. A review of how to make decisions and how to communicate with others based on what type of relationship they have with you is essential in this module.

The next module could be to teach paying attention to feedback received from others and provide strategies on handling teasing, cyber-bullying and physical bullying. Another topic that could be incorporated into this module would be strategies for coping with and managing gossip. These are important topics that can incorporate ACT principles such as defusion and self-as-context. This would allow individual to experience the feedback from others, make space between themselves and that feedback so that they do not become fused with it and provide them with tools and strategies to avoid conceptualizing that feedback to be a part of their identity.

Of course there will be several modules related to sexual education. An overview of such principles would be beneficial here but is beyond the scope of this paper. This will of course be inclusive and comprehensive of all genders, races, cultures, abilities and sexualities. To end the modules, it could address some strategies for resolving arguments, specifically related to sexual or romantic partners and what some long-term strategies for changing reputations could be.

This same model and approach should be used when adapting the ACTV model into a newer version of a BIP. This model will include direct scripts for trainers to use when presenting new information as well as a script that

includes prompts to give the individuals intended to be participating. The incorporation of values identification, present moment awareness, self-as-context, acceptance, defusion, committed action into this model as well as the strict guidelines for presentation should create a further reduction in recidivism of IPV offenders. A huge benefit of the ACTV model is the inclusion of the Barriers to Change sessions, and this portion of the BIP should be expanded upon and could establish a good way to create committed action towards values-based living in IPV offenders. By continuing to provide education and strategies surrounding personal values and action plans for how to realistically achieve those values, this method could be effective in further reducing recidivism rates of arrest and conviction in previous IPV or IPSV offenders.

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CHAPTER 6.

USE OF PREFERENCE ASSESSMENTS IN THE FIELD OF APPLIED BEHAVIOR ANALYSIS



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Stimulus preference assessments are a vital piece to the puzzle of figuring out what potential stimuli could be reinforcing for any given individual under a particular set of circumstances. (Cooper, Herron, & Heward 2007) There is a plethora of literature on the use of preference assessments regarding potential reinforcers. How can we know what assessment to use in each situation; and furthermore, how do we see the choice of preference concerning the

magnitude of reinforcement that it may produce for an individual client? Looking at the literature, we can surmise what is considered best practice and where the attitudes of our science concerning replication and growth of preference assessment knowledge have come.

Before 1985, practitioners would choose preferred stimuli for clients without first testing the reinforcing effects of the observed preferred choice, or would arbitrarily select a suspected reinforcer without study (Fisher, Piazza, & Roane, 2011). That all changed when a cornerstone article was released by Pace, Ivancic, Edwards, Iwata, and Page detailing a strategy that tested the reinforcer potential for some preferred stimuli chosen by persons with disabilities. This article examined the effect that a preferred item had on that specific stimulus's reinforcement properties. They found that several of the choices that were chosen as preferred during the preference assessment was not directly useful in increasing desired behavior when applied to reinforcing values. Conversely, they found that some of the non-preferred stimuli had a higher magnitude of reinforcer value compared to the preferred stimuli chosen. This led to the discussion of the arbitrary relation between preferred choice and direct reinforcer value. This article has since opened the door for many methods of evaluating both preference and reinforcer value independent and interdependent of one another. This speaks to the growth of our science and the use of the scientific method to choose best practice procedures when conducting analysis (Pace et al., 1985).

Pace and colleagues were not without their limitations in the single case stimulus preference design. Although they showed a need to assess both preference and

reinforcement value they only did so with a single stimulus approach. Mazaleski, Iwata, Volimer, Zarccone, & Smith conducted a study in 1993 where two of the three participants approached all the stimuli that were presented marking possible “reinforcers” for all items; this led to the idea of hierarchy for preference in assessing stimuli may be present. These findings shed more light on the need for the development of other strategies to efficiently produce stimuli that are genuinely preferred and eventually testing those stimuli for their reinforcing value when creating an effective treatment plan. False-positive stimuli is also a possible detractor from single presentation, in an article by Paclawskyj & Vollmer released in 1995 they found that environmental issues play a factor as well. Paclawskyj & Vollmer, (1995) tested preference assessments with participants that were disabled and some that were visually impaired. They concluded that preference assessments conducted on individuals with specific impairments such as blindness might report false-positives because of the participant approaching every tangible item that is presented to them giving the impression that they are in effect, preferred. These examples of limitations with single-stimulus preference assessments gave birth to the notion of exploring other avenues of preference assessments.

Philosophic doubt would dictate that there may be a better solution to the preference assessment approach other than a single-stimulus design. In the years that followed 1985, there have been at least four significant protocols developed to approach preference assessments, and each has variations. The four main types that are widely used are the paired-choice preference assessment, the multiple stimulus assessment, multiple stimulus

without replacement assessment, and the free-operant assessment (Fisher, Piazza, & Roane, 2011). An attitude of the scientific method is to use experimentation to further the practice of currently accepted theories and protocols. Fisher, Piazza, Bowman, Hagopian, Owens, & Slevin, (1992) compared the original single-stimulus preference assessment against an updated paired-choice stimulus preference assessment. Conducting both protocols showed that all stimuli were marked as preferred, but when the single-stimulus assessment was used the subject chose nearly every stimulus in a highly preferred manner, and the paired-choice assessment differentiated the level of preference among two concurrently approachable stimuli. In doing this, the article evaluated not only the preference of the stimuli, but it's inherent reinforcing value as well. The article went on to say that it may be beneficial to use the new paired-stimulus assessment over the single-stimulus because it showed more concurrent validity, but the single-stimulus assessment may still be preferred with subjects that are severely disabled due to its novel approach to assessing preference (Fisher et al.,1992). Just like most therapeutic approaches in the field of Applied Behavior Analysis, the more specific practices are advanced, the more the answers depend on the individual with which a behavior change agent is working. Fisher and associates gave the field a new approach to use that had more validity in some cases compared to the original, pure single-stimulus preference assessment. Even though advancements had been made, there were still limitations with the paired-choice assessment that led to new developments in the field of preference assessment.

According to The Handbook of Applied Behavior

Analysis, paired-preference assessments are not without their limitations. Paired-preference assessments are a noted improvement over single-stimulus preference assessment, but they are potentially limited in at least two areas. The administration of a paired-preference assessment may take longer to complete than that of other assessment tools. Also, unwanted behavioral side effects can come about because of repeated introduction and removal of preferred stimuli in some subjects (Fisher, Piazza, and Roane, 2011). Direct observation of these effects over time administering the paired-preference assessment has led to yet another protocol being developed.

Windsor, Piche, & Locke, (1994) saw the limitations of the paired-choice preference assessment and wanted to take it a bit farther. They presented multiple stimuli to determine preference for subjects that had severe disabilities. A therapist introduced six items one after another to a subject over five sessions, with each session holding ten trials. Each trial began with a novel stimulus of “which one do you want?” The therapist allowed for a twenty-second latency period and the subject gained twenty seconds of interaction with the item if they reached for it or grasped it. For those items that the subject did not choose to interact with observers would score “no response” and the trial would end, and they would move to the next trial. The results showed favorably that this method was very useful in helping choose a preference of items, but it did not test the reinforcement value of the items that were deemed preferable (Windsor, Piche, & Locke, 1994).

Although the multiple-stimulus assessment was shown to be an apparent growth over the single-stimulus

assessment, there was room to enhance it further. In 1996 Deleon and Iwata evaluated an extension of the multiple-stimulus assessment. In the original study, Windsor et al., (1994) replaced the chosen stimuli in each trial with a new stimulus in the next trial. This extension of the previous research is known as the Multiple Stimulus Without Replacement Assessment (MSWO). During their study, Deleon and Iwata did not replace a chosen stimulus in the following trial. Instead, they left the field the same during each trial and scored the preference choices based on a discrete hierarchy. As a result, the subjects showed increases in responding to the field of stimuli when the experimenter presented the preferred stimuli contingently (Deleon & Iwata, 1996). Not only did Deleon and Iwata further the research of the previous implementers, but they also compared the two assessments along three dimensions: rank order of preferred stimuli, the time required for administering the assessments, and the number of potential reinforcers identified. Four of the seven participants showed a top preference for the same stimulus in all three of the assessments; the remaining three showed a high correlation as well. The Multiple-Stimulus with Replacement (MSW) as outlined by Windsor et al., demonstrated to be the quickest to administer, followed by the MSWO and the paired-choice respectively. One drawback of the MSW is that it does not rank items into a hierarchy as the other two (paired-choice, MSWO) will. Another aspect that makes the MSWO so attractive to use is its generality to the general education setting (Fisher, Piazza, & Roane, 2011).

Building upon the previous research in preference assessment, Roane, Vollmer, Rihgdahl, & Marcus, (1998)

developed a “free-operant” preference assessment. In this assessment, participants had free and continuous access to an array of stimuli for five minutes. The participants were free to manipulate any of the stimuli in the room without replacement or withdraw. Roane et al., (2011), compared these findings with that of a paired-choice preference assessment and found that the mean time to administer the free-operant assessment was less than that of the paired-choice. Also, 84.6 percent of the participants engaged in higher levels of problematic behavior during the paired-choice assessment as compared to the free-operant assessment (Fisher, Piazza, & Roane, 2011). Other research has dictated that free-operant assessments even show less problematic behavior during implementation than MSWO (Fisher, Piazza, & Roane 2011).

Preference assessments have evolved since the early days of ABA, in doing, so there have been suggestions to adapt each of the significant assessments discussed here for individuals with other disabilities and needs. Fisher, Piazza, and Roane detail in many sub-sections the ideas of adaptation for these assessments in such areas as activity restriction, duration, vocal report, caregiver nomination, pictorial representation, concurrent chains and even group arrangements. With a multitude of research-based around preference assessments and the introduction of assessments such as MSWO and paired-choice that give us a preference hierarchy, the question then shifts from ideas of preference to the efficacy of reinforcement for the preferred items.

Research into the realm of reinforcer efficacy would state that not all preference assessments accurately depict levels of reinforcement. According to Fisher, Piazza, and

Roane, a preference assessment of four participants with severe behavioral problems was conducted by Piazza, Fisher, Hagopian, Bowman, and Toole in 1996 to differentiate high, medium, and low preference of stimuli. While their assessment was looking at the level of preference of stimuli, it was also concurrently assessing the level of reinforcer value for the choices in preference. The preference choices in this assessment predicted the reinforcer values by charting low-high preference. Although this was a great find the study of preference assessments, others such as DeLeon, Iwata, and Roscoe, (1997) and Taravella, Lerman, Contrucci, and Roane (2000) showed that in some circumstances, the lower-ranked preferred items could have some reinforcing value (Fisher, Piazza, & Roane 2011).

While there have been successful studies into the efficacy of reinforcement after preference has been chosen, there are methods for evaluating reinforcer effect that was born from these investigations. Most investigators use a free-operant approach to test the reinforcer value of preferred items. Fisher, Piazza, & Roane, (2011) suggest that most of the studies in reinforcer assessment choose free-operant procedures for several reasons. The goal of the assessment is to see if the stimulus in question acts as an appropriate reinforcer rather than teach a specific response; therefore, simple responses are ideal for these types of assessments. Because of this approach, the application of free-operant reinforcer assessments is easily generalized across a wide array of disabilities and participants (Fisher, Piazza, & Roane 2011). The use of a simple response is typically more time efficient, and it can display deficiencies in behavioral repertoires for more complex responses,

shedding light on areas of improvement. Conversely, using a simple response target can eliminate the possibility of a skills deficit if reinforcement values are absent, thus showing a motivational deficit directly related to reinforcement (Fisher, Piazza, & Roane 2011).

Evaluating the effectiveness of simple versus complex responses in reinforcer assessment proved to strengthen the validity of using simple responses for more precise results, which led to the development of comparing operants of reinforcement. Fisher et al., used a concurrent operant arrangement to evaluate the efficacy of reinforcement for preferred stimuli. The advantage here is that the magnitude of responding for each operant is a function of the magnitude of the reinforcement and the schedule that is in place and is not related to response competition or interference (Fisher, Piazza, & Roane 2011). The matching law is observed with the concurrent operant study because of the competing reinforcers that are being tested, in most natural environments this is a commonly occurring phenomenon due to the prevalence of potential reinforcers available in any given environment.

As the studies on preference and reinforcer efficacy grew, the idea of progressive schedules of reinforcement emerged. Fisher, Piazza, & Roane (2011) discuss how progressive ratio schedules were used in landmark fashion during a study in 2001 conducted by Roane, Lerman, and Vorndran. This study used progressive ratio schedules of reinforcement during one observation instead of across multiple sessions. The schedule would begin with a simple 1:1 ratio for a participant to access a preferred item and potential reinforcer. As the trial went on, the criteria to obtain reinforcement was increased

(from 1:1 then 2:1, 3:1., etc.), until a threshold was observed. The observers reported that the progressive ratio schedule assessment was more time conscious than other methods because of the need only to use one session to garner results. Also, they could see the difference in the effect of reinforcers based on changing criteria and a correlation to lower rates of problematic behavior. They used this input for treatment design because of the display of data on the magnitude of reinforcement concerning performance per subject and individual stimulus (Fisher, Piazza, & Roane 2011).

Research has come a long way since the mid-1980's. The scope of preference assessments has grown, the identification of reinforcer assessment need and the schedules of reinforcement in direct relation to the magnitude of reinforcement and treatment development have been major milestones. Along with those methods and procedures, evidence that other factors could be at play has also risen over the years. Fisher, Piazza, & Roane (2011) discuss a myriad of other factors that play into influence on reinforcement such as choice as reinforcement, schedules, and dimensions of reinforcement, changes in preference over time, and stimulus variation. Stimulus variation has proven, through study to be an effective way to enhance the effectiveness of reinforcement by placing a list of hierarchically chosen items on a varied rotation as not to cause satiation or deprivation for the reinforcer in relation to the participant and the accompanied behavioral effects (Fisher, Piazza, & Roane 2011).

When assessing environmental factors, research shows that simple things like availability of access to preferred items play a role in the effect of reinforcers. Consider

Gottschalk, Libby, & Graff (2000), and they compared the impact of deprivation (Establishing Operation) and satiation (Abolishing Operation) on reinforcer effects of preferred items for four individuals with developmental disabilities. They used a paired-choice assessment to determine preference and then would allow access to three different conditions for a period. 24 hours before the assessment in the study the participants were allowed access to their preferred edibles on a controlled timetable of small portions in the control condition. In the deprivation condition, participants were allowed access to three of the four preferred items for a 24-hour period and were deprived of the fourth for 48 hours. Finally, in the satiation condition, the participants were allowed access to the four preferred edible items in the same 24-hour structure as the control condition but then were allowed ten minutes of free-operant access to one of the highly preferred items. Four assessments were conducted under both satiation and deprivation and three under the control condition. Following these conditions, there was a directly observed correlation between satiation, deprivation, and choice. During satiation, the one item that was in free-operant access before the assessment was chosen less frequently than the other three, and the opposite effect was observed during the deprivation condition (Gottschalk, Libby, & Graff, 2000). Many factors play part in the choice and efficacy of reinforcers through preference assessments. As the field continues to grow, the question then becomes what the next addition to the research of preference assessments is?

With the increase of technology readily available and the reduced response effort to gain information, it seems video is being used at a faster pace in ABA than ever

before. Preference assessments are also evolving to use the benefits of video. Snyder, Higbee, and Dayton (2012) compared the correspondence between tangible stimuli and video representation of tangible stimuli for six participants. The results showed that the top-ranked item corresponded in the hierarchical assessments in five out of six participants and the high and low ranked items corresponded for four participants (Snyder, Higbee, & Dayton 2012). This study shed light on the use of video as it pertains to displaying particularly complex items in a social environment for participants and it showed that video could be a viable resource for preference selection. There were some limitations discussed, such as choice bias and lack of prerequisite skills to advocate for choice, but the discussion for future research is enthusiastic among the researchers.

Preference assessments have grown by leaps and bounds. The research shows that as our world changes, the approach to preference assessments adapts to it. Scientifically there has been a move from arbitrary and archaic choice methods for preference to advancements and refinements that now show reinforcer efficacy and treatment productivity. The science is even now breaking into the realm of video as a tool for reinforcer class identification. The future is bright for the study of preference assessments and the subsequent spill-over effect into the realm of ABA because of this science growing.

Preference assessments have become an integral part of the assessment and development process for effective treatment of behavioral issues in participants of ABA therapy. The science has grown leaps and bounds since the inception of preference assessments, along with the

scientific growth ABA practitioners are held to an ethical standard in the practice of these assessments and reinforcer methods. According to the BACB Professional and Ethical Compliance Code, the very first article regarding ethical practice is reliance on scientific knowledge. Scientific knowledge is the basis of all practice in the ABA world. According to Van Houten, Axelrod, Bailey, Favell, Fox, Iwata, and Lovaas 1988 those who give behavior analytic services are to have a grasp of the foundational knowledge that they are using to effect behavior change on the participants that are a part of their practice. This article analyzed the foundational beginnings of Applied Behavior Analysis as it relates to the rights and welfare of the individuals receiving services. It was observed that the early stages of the science were not rooted in a scientific foundation and therefore caused harm to the individuals that received services. As discussed earlier, the issues that occurred early in the application of ABA in Florida led to a formation of an ethics committee and governing board for the science and practice of ABA. Van Houten et al., said very poignantly:

Behavior analysts have a responsibility to ensure that their clients' rights are protected, that their specialized services are based on the most recent scientific and technological findings, that treatment is provided in a manner consistent with the highest standards of excellence, and that individuals who need service will not be denied access to the most effective treatment available. (Van Houten et al., p384)

This article was released in 1988 and was written by some of the foundational names in recent history within the field. This article states the need for services to be

evaluated under scientific scrutiny as well as professional care for the clients that are under the supervision of Certified Analysts. Practitioners not only have to make sure that their services are under the umbrella of scientific knowledge, they also must include the client in the process of creating treatment protocols. Each of the articles that were reviewed in relation to the preference assessment scope of practice was written after gaining consent from the parties involved and ensuring a safe environment not only for the practice of the study but moreover for the client themselves. With the history of abuse and neglect that had been reported to create the board of ethics, care is now the utmost priority when dealing with clients. These notions can be found in the second section of the BACB Professional and Ethical Compliance Code as they relate to the Behavior Analysts' responsibility to clients.

The Association for Behavior Analysis International has a set of guidelines for student development that was reviewed in 1990 available on their website. This is important to the study of ABA because not all instances of treatment will be done in a clinical setting. The student that learns in a typical classroom has the same rights as a client that is in a treatment facility receiving services. The PECC and guidelines set forth by the ABAI both address the needs of the client as imperative but through different lenses. The ABAI list includes six categories for student rights to adequate education, each of which is centered around the success and safety of the learner. The guidelines both presented by the ABAI and the PECC record that the student/client should be a part of the planning and implementation process to effect lasting and ethical practices for behavior change.

Outside of the ethical consideration of the scientific basis and the client involvement, the Behavior Analyst is also held responsible to the Behavior Analyst Certification Board. The BACB has a strict set of guidelines that one must follow to attain the title of BCBA. According to the BACB: BCBA Eligibility Option 1 applicants that wish to seek the credential of BCBA must have a master's degree in a related field to ABA. They must also follow through with coursework that is specifically tailored to the foundational knowledge of ABA and must complete a rigorous practicum whereby they are observed and supervised by BCBA's who hold the supervision accreditation (BCBA Option 1). If that was not enough, applicants must finish their coursework satisfactorily, submit their completed coursework and application to the BACB and then must pass the certification board exam to qualify for the title of BCBA.

With these safeguards in place, one would think that the field of ABA as it relates to certificants would be a slowly growing field, but current data suggests the opposite. According to the Behavior Analysis Certification Board, Board Certified Behavior Analysts alone have increased from a recorded 28 in 1999 to a staggering 26,879 as of 2017. This data suggests that as the science of ABA grows and the need for services increase, the response from caring individuals who seek to make a significant impact in the world of behaviorism are not slowly increasing but are growing at an alarming rate.

There are a lot of guidelines that are in place for one to become a BCBA. The reason for the guidelines in position is to ensure that all clients who receive behavior analytic services are done so under the watchful eye of

credentialed, vetted, and competent practitioners, as stated by Van Houten et al. relating all this back to the literature regarding the preference assessment scope of practice is simple. The articles that were submitted for publication were peer-reviewed and formatted for the design of discussion, implementation, and replication of results as it relates to the field of ABA and the science that governs the practice. The Journal of Applied Behavior Analysis is a journal that is overseen by BCBA's for BCBA's and the growth of the science of ABA. According to the author guidelines for the Journal of Applied Behavior Analysis, the purpose of the journal is to discuss socially appropriate functional relations in the field. Everything that is done in the current science of ABA has grown from the early groans and tragedies of the field into a reputable scientific field of study that is designed to help those who have socially significant behavioral needs receive treatment to enhance their independence in daily living.

ETHICS OF PREFERENCE ASSESSMENTS

One of the core tenets of applied behavior analysis is social validity. In everything that a practitioner does they have to make sure that what programs they are writing are socially valid for the client and team involved. According to an article by Montrose Wolf in 1978, social appropriateness is one of the forms of social validity that one must give attention. It sounds like a novel idea, but a good deal of the Ethics Code deals with client-centered practice because that is the root of what practitioners do, they care for a client's needs. This core principle does not skip over the topic of preference assessments.

When a BCBA conducts a preference assessment, there are several things that they will need to consider and gather before carrying out the process. One of the first things that a practitioner will need to do is talk to the client or his/her guardians directly. This will help narrow the field of potential preferred items that can be used during the assessment (Meller & Runyon, 2017). Having an idea of what may or may not be a preferred item may seem like a small feat, but it is crucial to pinpoint the most effective potential reinforcers available for the success of the client. Everything that a practitioner does regarding choosing a list of items to what type of assessment to conduct comes down to a collaboration of team members.

There is an adage “it takes a village to raise a child” this same principle can be applied to the services of a BCBA. A practitioner is not a “one-man” operation and certainly cannot do all things that are necessary by themselves. Without a collaborative team effort, it would be unethical for a practitioner to act in any realm of ABA, even conducting a preference assessment. According to the Professional and Ethical Compliance Code for Behavior Analysts section 2.0, every licensed practitioner has an obligation to the client first, including the use of third-party consults. Even more than just the third-party collaboration is the exploration of documents and other indirect assessments as well as direct assessments and interviews that are a part of the process of creating a competent treatment package. In creating a responsible treatment package, a preference assessment is a large part of figuring out what will be useful as a potential reinforcer for a client to build their behavioral repertoire in a socially significant manner.

A useful skill of any practitioner is the ability to collaborate with others. Inflated egos due to a wealth of knowledge hamper interpersonal skills. As a practitioner of ABA grows in competence and confidence, they must realize that working with other professionals is a necessity. This idea is rampant in the field of ABA; peer-reviewed journal articles are one of the back-bone informational pieces to the entire science. More than just working alongside other practitioners of various expertise, the practitioner must work even closer to the client and the nuclear family of caregivers around them. In the applied setting, the BCBA is unique because of the assessment protocol and way practitioners approach behavior-specific situations.

When working with a team of professionals from other fields with a focus on the same client, interpersonal skills are ever necessary. BCBA's are scientific minds that approach behavioral issues with an assessment first approach. In the field, BCBAs may work with other disciplines that do not share the same level of expertise or honed thoughtful approach. When a BCBA finds themselves in a position that a colleague from another discipline is offering a solution to a behavioral issue that the BCBA may not agree with or understand, they are confronted with an ethical dilemma. Brodhead, (2015) tells us that there are ways a BCBA can approach an unfamiliar situation analytically and still decide what is best practice while maintaining professional integrity with the colleague whom they may disagree. Brodhead proposed that the BCBA use a checklist of sorts to determine whether the issue at hand was worth concern or not, just because it is not familiar does not make it inherently wrong. The proposed checklist begins with

client safety and goes through a litany of other analytical protocols to determine if the BCBA should question the use of the non-behavioral tactic suggested by others.

The protocol observed by Brodhead would be useful in assessing ideas from other facilitators regarding preference assessments. Although a preference assessment is primarily a behavioral analytic tool, that does not mean that others may have suggestions on how one should apply that tool. Consider the free-operant preference assessment: if an analyst is new to a setting where the client has been receiving in-home services from a speech-path for months, it would not be unethical to collaborate with the speech-path to conduct a more naturalistic FOA based on the knowledge the speech therapist has of the client. In the field of ABA, practitioners must consider the relationships that their non-behavioral counterparts may have with clients and how to utilize them well. Citing the second section of the Compliance Code again, any behavioral practitioner under the watch of the BACB must do right by clients first that include the ethical responsibility to listen to non-behavioral colleagues.

The concept that the client comes first is nothing new. Around that client, there is a community of involved citizens both professional and civilian. The first thing to consider in the assessment of helping a client is a nuclear family. According to an article from simplypsychology.org written by McLeod, love, and belonging is the third tier of Maslow's Hierarchy of Needs and those include feelings of love and intimacy from family, friends and a sense of connection. Without considering the feelings of the client concerning the family and those around them, the efficacy of treatment

may be in question. BCBA's are trained to examine more than just behaviors; they are taught to consider environmental factors that may play upon the observed behavioral responses of clients. Tying together the information from Maslow and the directive of the BCBA to examine the environment, including the community both big and small in any assessment for the BCBA is crucial to the success of any critical plan of action. A big part of connecting with a client on a personal level is understanding their cultural heritage.

Culture is an essential element in constructing a treatment plan for a client. Different cultures interact in different ways, and there are expectations in some cultures that others do not have. When a BCBA is working with a perception that they are not familiar with, the BCBA should do the research required to understanding the different cultures. Liao, Dillenberger, and Buchanan, (2017) investigated the differences in the UK and China to see if there were any marked differences in the way that behavior analytic services were delivered. In short, they found that there were several cultural differences in culture and policy of the implementation of early intervention ABA principles in both countries. Understanding culture is important.

Working with a family in the field of ABA is a unique experience. One does not show up at a family's home and conduct assessments, write protocols, train staff and leave. When one is working in this field, there is a personal connection unique to the discipline regarding interaction with the client and their family. Each family that a practitioner works with has a unique culture all their own, and the practitioner becomes a part of that culture. What is unique to services like ABA is the

personal approach that a scientific process must take on. Due to the environment in which a practitioner is working personal interactions will increase over time and the culture of a client and their family takes center stage to the treatment and care that a practitioner is providing. This is true of the entire field and especially true to the use of preference assessments in the treatment protocol for any given client.

During a preference assessment, the culture of a client must be considered due to the variability of items and activities in which one can participate. Ignorance of a cultural difference could cause environmental stress if the practitioner were to implement something that was not first studied and observed, and this would be breaking the ethical obligation that a client comes first. Cultural responsiveness is a more significant concern for the BCBA than one may first think. Without the proper tools to guide a practitioner in the use of cultural infusion the practitioner may fail to be successful.

ABA is a field that is fundamentally based on scientific research. Regarding cultural significance and support, research must be applied in these areas as well, but how would one find the resources needed? Fong and Tanaka, 2013 offer a complete list of cultural guidelines that all ABA practitioners should adopt. They cited that over the next four decades the cultural diversity of the USA is going to change dramatically and as a result, the applied sciences are going to have to adapt to ensure the ability to work effectively with the new clientele that will be available.

Regarding the principle of parsimony, the most straightforward answer is the simplest. The most straightforward answer to the question of cultural

diversity is merely to ask questions! The danger of the applied sciences is moving away from the personal interactions in favor of the acquired knowledge. In other words, if a practitioner has questions about what to do with a cultural issue, alongside doing their research they should talk to the family directly. Being educated by the family is a part of the bonding experience and will only help with professional equity. As stated earlier, environmental factors are something that the BCBA must consider, and if the BCBA can be taught by the family to learn about their culture and use the knowledge to build their assessments, the compliance from the family should increase because of the attention is given from the therapist. In short, listen to people and consider their culture before making any significant changes.

Along with examining the communal aspect of behavior analysis, one must consider the functionality of the tools used in those communal settings. Regarding preference assessments, there are several tried and valid methods that already exist per literature. One of the more popular choices for preference assessments is the Multiple Stimulus-Without Replacement (MSWO). The MSWO has been designed and implemented in many settings, one of the most applicable settings is the classroom. One study evaluated the use of the MSWO concerning the general education population (Resetar & Noelle, 2008). In their research, Resetar & Noelle used the MSWO in conjunction with the teacher in the class choosing students that they observed and documented doing poorly in class work. The study used an MSWO with the typically developing children and a preference survey taken by a teacher that was not present in the study. The study was designed to see if teacher chosen

preferred items were comparable to the choices made by the child. The results showed that the child selected items and the teacher related decisions were no different. This demonstrated that the selection of preferred items either by the child or the teacher were both shown effective for the present study (Resetar and Noelle, 2008). Research like this is significant because it reaches outside of the special education classroom and generalizes into the general education setting. This is important because the scientific methodology that ABA uses is not solely to be confined to a specific group with specific needs. Anyone can benefit from ABA, and that is a vital role of the assessment process for the science, the method must be generalizable.

There are limitations to the use of preference assessments, however. According to Verridan and Roscoe, (2016) there are limitations to preference assessments concerning the inherent reinforcing value. They cited that during the MSWO and PS sessions of their research, they had a hierarchy of preferred vs. non-preferred items, but during the reinforcer assessment, the non-preferred items showed more reinforcing in some instances (Verridan & Roscoe, 2016). One of the significant limitations of any preference assessment is the inability to assess reinforcer value of the observed preferred item accurately. Although the preferred item may not have an inherent reinforcer value, there are reinforcer assessments that are designed to test the reinforcing aptitude of the preferred items, as previously noted.

Chazin and Ledford, (2016) have an excellent summary of the types of preference assessment that are used and do a great job explaining them in layman's terms. According to the literature from Chazin & Ledford, there are five

distinct preference assessments: Multiple Stimulus Without Replacement, Multiple Stimulus with Replacement, Free-Operant, Paired Stimulus, and Single Stimulus. Each one of these assessments has distinct variables and are adaptable to fit the need of each setting. The versatility of these tools is essential to the overall scope of ABA as a science. Regarding the client first approach as designated by the Compliance Code section 2, practitioners are to use the tools at their disposal to create treatment packages that will benefit everyone that they serve.

One of the ways that the preference assessments are evaluated is with the created hierarchy that the MSWO and the PS assessments provide (Cooper, Heron, & Heward, 2006). An issue in the measurement of the assessments used that is often overlooked is the rise of problematic behavior during these assessments. Kang, O'Reilly, Davis, Machalicek, Rispoli, and Chan, (2010) assessed the occurrence of problem behavior through three formats of the preference assessment (PS, FO, and MSWO). Their findings supported that problem behavior can occur in the settings of these assessment tools when the preferred items are related to the proposed function of behavior (Kang et al., 2010). They suggested that practitioners make sure that they have the resources needed to complete these assessments in a time-sensitive manner as not to attract unwanted behavioral issues concerning the duration of assessments. They also observed that if high-levels of problem behavior occur during an initial assessment, it may be beneficial to switch to a free-operant assessment to effectively see the preference assessment through without problematic behavior happening at high rates. The evidence that was

put forth by Kang et al., (2010) was focused on access to tangibles but the lesson that remains is generalizable to the rest of the research; make sure environmental factors are taken care of before starting any form of assessment.

Preference assessments are unique when it comes to the subject of experimental design because they are fluid depending on the client or situation. Each assessment can be utilized individually or together to help give a broader picture of the preferred items in question. Paramore and Higbee, (2005) conducted a brief MSWO assessment of three young boys using an alternating treatments design to show preference and reinforcer value of stimuli. Research using preference assessments has been demonstrated that depending on the type of assessment the graphic data will be displayed uniquely.

As discussed in Kang et al., (2010) some preference assessments can produce a hierarchy that can then be displayed graphically so that a therapist can visually inspect the information and decide on which preferred item may be reinforcing. Once a potential reinforcer is chosen, a reinforcer assessment can take place wherein that preferred item is applied to a treatment package or a contrived situation to show the overall effect it has on the desired behavioral outcome (Verridan & Roscoe, 2016). Preference assessments have a pivotal role in the assessment process overall. They are used to narrow the field of potential reinforcers and help shed light on areas that problem behavior can arise as noted by Kang et al., (2010). Overall, preference assessments are unique because of the ability to adapt them to every social setting, culture difference and client repertoire. Any treatment package that is quality will utilize a preference assessment

to help in the process of bringing about behavioral change in a socially valid way.

LEADERSHIP STANDARDS AND FUTURE DIRECTIONS

The research for preference assessments is relatively new, but the impact that it has for professionals in the field has been formidable. One of the pillars of science is the ability to replicate and expand upon current or past research, and this is no different with preference assessments. With the last few years seeing a boom in the certificants that are coming into the field there is more quality research as well (Behavior Analyst Certification Board). With more people coming into the field at such a rapid pace, however, there is the possibility of professional drift due to the increased demand. Every area of education should be using best practice procedures based on a culmination of current and past research in their approach; this is also very important in the realm of ABA.

According to the Missouri Leader Standards, the first thing that an educational leader must do is establish the mission, vision, and goals. This is incredibly similar to the best practice approach in Applied Behavior Analysis. The good news for the field is the strict code that professionals are held to practice effectively. Evidence-Based Practice is a common starting point for all interventions that are created in ABA. According to an article by Slocum et al., released in 2014, practitioners in Applied Behavior Analysis are not alone in understanding the need for evidence-based practice but are aware of it for the sake of quality interventions. One way that the

field of ABA can grow upon itself in confidence is following the literature that is available through resources like the Journal of Applied Behavior Analysis and other prominent resources that all undergo a peer-review process before an article can be accepted and ultimately published. This is important to note because of the need for a scientific basis for any decision that is made regarding intervention for clients. The ultimate goal of any programming is to help the client receiving services to get the best and most appropriate care for their needs, and this requires that the practitioner be current on best-practice intervention information.

Slocum et al., (2014), discussed how the problem of evidence-based interventions was not isolated to just the work of behavior analysis, but to similar fields as well. Through reviewing *Psychotherapy for Children and Adolescents: Directions for Research and Practice*, a 2000 publication written by Kazdin, there are a lot of difference between what is scientifically valid and what is widely accepted in the application of treatments. Slocum et al., (2014), pointed out that Kazdin, (2000) promotes 10 percent of all accepted therapeutic processes are evidenced based and therefore have scientific grounding for their usage. That is a staggering fact. However, it seems that more of the psychological principalities are moving away from the old guard and starting to adopt the Evidence-Based Practice model that begins with current scientific research to support interventions.

It is not enough to be able to state the mission, vision, and goals of any treatment plan, but the practitioner must demonstrate competence with the interventions that are in place as well. According to the Missouri Leadership Standards: Standard 1, Quality Indicator 2 an effective

leader must be able to “implement the mission, vision, and goals that they have created for effective teaching.” Likewise, a competent practitioner in the field of ABA must be aware and skilled in the knowledge necessary for implementing any treatment plan. That also begs the question, how does one efficiently go about implementing the mission, vision, and goals?

Thankfully for professionals in applied behavior analysis, there are governing agencies that pride themselves on the continual growth and guidance of the practice of ABA. From the board of Association for Behavior Analysis International comes a strategic plan for making sure the competence of practitioners is always growing in many areas, one of which is the practice of applied behavior analysis. From the Strategic Guide from ABAI, the objective under Practice is “to develop, improve, and disseminate best practices in the application of behavior analysis.” Groups like ABAI and the BACB are committed to making sure that certified professionals are equipped with accurate literature through avenues like the many peer-reviewed journals accessible to the field.

Out of that plethora of available information comes the call to best-practice procedures specific to each client. For example, a practitioner working with a student who is known to have high levels of self-aggression would most likely not use a Multiple Stimulus Without Replacement assessment due to the possible increase of problem behavior when preferred stimuli are removed (Chazin & Ledford, 2016). The knowledge that is available to practitioners is presented in such a way to make sure that the client’s safety is paramount in all areas of competency. Preference assessments can and should be

used to create a positive environment for everyone on the team involved in client care.

Point 6.02 of the Professional and Ethical Compliance Code for Behavior Analysis states that every practitioner is responsible for making knowledge about what they are doing and how they are doing it readily available to the public. Simply put, a practitioner is responsible for teaching the public about the ins and outs of ABA. This idea rings true for the use of preference assessments as well. If a family is new to the therapeutic approach of ABA and a practitioner is working with their child, that family should be taught the reason why a professional is using the techniques they choose for the client. Creating a favorable environment for the whole team and client (family included) is essential to the overall success of any treatment plan that is put in place.

Some significant resources have been allocated for professionals to introduce the topics that may be foreign to them in ABA. One of those great organizations is Autism Speaks. At the foundation's website, there are a plethora of resources available for professionals to take hold of and use for the families that they are working with (Tools for Professionals, 2012). Autism Speaks, a global organization that is dedicated to creating awareness to the issues that face families affected by autism and bring about lasting change in the world.

According to the Missouri Educational Leader Standards: Standard 2, Quality Indicator 2 a leader must be able to "provide an effective instructional program." What does that mean for the professional working in ABA? There is more to the field of ABA than working in homes with clients. A lot of the field is also constructive to the educational field, especially classroom

management. In St. Louis Missouri there is an organization that works with all schools in the greater St. Louis County are providing services for those with special needs called Special School District of St Louis (District Overview, 2017). According to the SSD “About Us” section of their website, they provide services to one-in-six students in the greater St. Louis County area (District Overview, 2017).

One of the ways that SSD supports its students is using Positive Behavior Interventions and Supports (PBIS: The Home-School Connection, 2017). PBIS is a tiered system of support that can be implemented in a wide variety of ways and applied to a range of students all at the same time. Each tier represents a deeper level of support depending on the needs of the student: tier 1 is a general support system designed to incorporate the needs of all students at the school, tier 2 is more personal for students who are more at risk for social-negative interactions, and tier 3 is for those students who still need additional support after being exposed to the other two tiers (What is SW-PBS?, 2018). The application of ABA fits directly into the scope of PBIS by merging the evidence-based practices with the support needed for every student. This is a way that the ABA practitioner can ensure a sufficient instructional program is being implemented by the school standards and still maintain the ethical obligation that the BACB has for the professional.

There are great support systems like PBIS that are implemented in the school setting, and there are ethical guidelines that make the private setting supportive as well, how does a practitioner efficiently teach a team of workers to implement programming in these supportive areas? One way that a practitioner teaches staff members

to be efficient and competent is the use of Competency Based Training. According to Parsons, Rollyson, and Reid, (2012), there are six distinct steps to using CBT effectively for staff to gain mastery of a topic. Teaching a preference assessment can be plugged directly into this setup. The first step is for the professional to describe the target skill to the staff member: explain what specific preference assessment technique is to be taught (Parsons, Rollyson, & Reid, 2012). Step 2 is to provide detailed written instructions: a step-by-step guide how to implement the specific assessment chosen (Parsons, Rollyson. & Reid, 2012). Step three is to demonstrate the particular preference assessment for the staff in detail (Parsons, Rollyson. & Reid, 2012). Next, the team is expected to practice the specific preference assessment, followed by direct feedback from the instructor (Parsons, Rollyson. & Reid, 2012). Finally, the instructor is to repeat the process of viewing the practice of and giving feedback to the staff member until mastery is attained for the specific preference assessment being taught (Parsons, Rollyson. & Reid, 2012). It may seem like an arduous task to explain something in so many steps, but as the literature states, this is an evidence-based practice that has a myriad of proven trials.

Teaching a skill to a staff member is essential, making sure the right motivation is employed is paramount. One of the big things discussed in the literature for training is the idea of “buy-in.” Buy in is the layman’s term for various establishing operations for staff to improve their repertoire and performance regarding the implementation of ABA procedures. One way that a practitioner could set up an establishing operation for the team to perform well is enriching the environment.

According to Parsons, Rollyson, and Reid, (2012) a practical use of on the job training is making sure the setting is appropriate for the training. Applying this concept to training preference assessments, a practitioner would include proper knowledge of the skill, resources for collecting data, an array of stimuli for the specified assessment and feedback from the practitioner, all of which are evidenced in the confines of competency-based training (Parsons, Rollyson. & Reid, 2012).

Supporting staff to optimize their role best is essential, but it is also necessary to gain buy-in from other stakeholders. According to an article published by the Behavioral Health Center of Excellence in 2016, caregiver involvement is a priority when considering the success of any behavioral program. The impact that a parent or guardian can have in the process is evident especially in the early stages of life (The Role of Caregiver Involvement in ABA Therapy, 2016).

Even though the buy-in from caregivers and parents is crucial, it is not without its obstacles. According to the article produced by the BHCOE in 2016 stress is one of the main reasons that caregivers and parents do not buy-in to the treatment programs. When looking at the whole treatment package, a practitioner should not only look for environmental issues for the staff but for the families that are involved as well. When a practitioner is consulting with a family, the means and reality of the situation must be considered for the efficacy of the treatment package. Going back to the evidence-based practices, one must create an environment that is best suited for the programming ahead. According to the Professional and Ethical Compliance Code for Behavior Analysis, standard 2.0 all treatment is to be in the client's

best interest. If there is an issue with the family environment that is not conducive to the treatment package that a practitioner employs, then it will not only be unethical, but ineffective. Caregiver involvement is as much a part of the process as competent and confident staff, and this applies to every area of ABA including preference assessments. A protocol and environment are only as effective as the ability of the practitioner implementing them.

A competent practitioner can breed a qualified staff, and a skilled team needs to be reinforced just like the clientele that receives analytic services. The topic of preference assessments is not only applied to the clients that receive services, but also to the staff that employs them. A good team is built on positive supports for one another, and a practitioner must understand what is reinforcing for the team and to employ it. According to Aubrey Daniels and Jon Bailey in their book *Performance Management: Changing Behavior that Drives Organizational Effectiveness* one of the most significant questions that managers often ask is how to choose effective reinforcers?

Finding effective reinforcers for a team is about understanding the team on a personal level. Just as in finding reinforcers for the clients, a practitioner should do an indirect assessment with the staff. Asking questions is a great way to get the process rolling of what is motivating for staff members. It may be seeing the effects of the client adapting to the programming or social positive praise from supervisors that drive the staff, the only way to honestly know is to ask the person. Daniels points out that one of the most significant mistakes that managers of any kind can make in choosing possible

reinforcers for staff is assuming that staff would want the same things management would want (Dainels & Bailey, 2014).

A competent team is a holistic team. A practitioner should be able to use the tools that are available to the field to teach and implement behavior change principles with staff efficiently. The guidelines and principles that are set out by the governing bodies of the field are done so in a way to protect first the client, and then the family and staff that are working alongside the practitioner for the whole experience. A correctly implemented protocol is not done by one individual, but it is made up of many parts to help ensure the client gets the best care that is available. A practitioner should make sure the environment in which they are working is suitable for the client and the whole team. The research that is available through avenues like ABAI, BHCOE, BACB, and others suggests that environmental supports are essential to any successful treatment plan. A preference assessment is just one part of the overall scope of successful intervention. Understanding the current research and environmental factors can help ensure best practice is being followed by all agents involved.

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CHAPTER 7.

INCREASING DESIRED STAFF BEHAVIORS



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When discussing methods that can be used to increase desired workplace behaviors, it is first important to understand reinforcement and punishment. Cooper, Heron, and Heward (2007) define reinforcement as having occurred when a stimulus change follows a response and leads to an increase in the future frequency of that type of behavior in similar conditions. An example of this would be: a child screams for candy

and his mom gives him candy. In the future, when he wants candy, he will be more likely to use this method to try to obtain it, since his learning history indicates that it

has been effective in the past. This concept can also be used to increase desired behaviors. An example of this would be: an employee cleans his work area before leaving and receives a compliment from his supervisor. Again, the principle of reinforcement indicates that he will be more likely to clean up his work area when presented with the same stimulus in the future due to this behavior having been reinforced in the past.

Punishment is defined as having occurred when a stimulus change follows a response and the response's future frequency is decreased under similar circumstances in the future. (Cooper, et al., 2007) Examples of this are numerous in our everyday lives. One such example is an individual being yelled at by a supervisor for using a phone on the job if, in the future, the individual is less likely to use their phone than they were before. The scolding had a punishing effect on their behavior of using their phone in the workplace.

As Daniels and Bailey (2014) indicate, behavior analysts do not prefer to think of punishment as being necessary in workplaces, in large part due to its side effects. Unfortunately, because punishment is so common in our natural environments, and is reinforcing to the person doing the punishing (results are often instantaneous), it is a lot of supervisors' preferred method of addressing poor or insufficient staff performance.

There are several side effects of punishment. Daniels and Bailey (2014) say that punishment can cause individuals to engage in escape and avoidance behaviors. This can take many forms, such as: blaming others, avoiding the supervisor, or even quitting their job. Punishment can also increase aggression, both verbal and physical due to its aversiveness to most people.

Additionally, since punishment does not teach or reinforce a replacement behavior, the undesired behavior is likely to return once the punishing agent/situation is removed. (Daniels & Bailey, 2014) These are among the reasons that behavior analysts prefer to focus on reinforcing desired behaviors rather than punishing those that are not desired.

When identifying possible reinforcers, it is important to remember that each person has a different learning history that will influence their preferences and behaviors. No two people will find all of the same things reinforcing. For example, many people may find vocal praise reinforcing, but for some it can be aversive, particularly if they do not like everyone looking at them. It is vital that available reinforcers are individualized to the degree that is possible. This applies in all situations, including the workplace.

There are several methods that can be used to determine things that could possibly serve as effective reinforcers. First, supervisors could ask the employees what they like. This could be done informally in conversation, or using a survey. Second, supervisors could observe the employees to see what they seem drawn to. This is also where supervisors could use the Premack Principle, in which the employee is told that once they finish a task, they get something they find reinforcing. The third method for finding potential reinforcers discussed by Daniels and Bailey (2014) is to simply test consequences using trial and error.

There are several types of preference assessments that are discussed by Cooper, Heron, and Heward (2007). The first is free operant observation, which involves observing the individual to see what he or she accesses

when no contingencies are in place. Within this type of assessment are the contrived and naturalistic free operant observations. The contrived observation includes providing access to predetermined stimuli and taking data on which items are chosen, whereas the naturalistic observation involves taking data on chosen items in the individual's natural environment.

A second type of preference assessment is the single stimulus methods. During this assessment, the individual's reaction to a stimulus is observed and reported upon. A strength of this type of assessment is that it can be useful for individuals who struggle to make choices (Cooper, Heron, & Heward, 2007).

A third type of preference assessment is a paired stimuli assessment, which is also known as a forced choice assessment. During this assessment, two items are presented and data is taken on which item is chosen. This is repeated multiple times and a hierarchy is created based upon choice patterns (Cooper, Heron, & Heward, 2007).

A fourth type of preference assessment is a multiple stimuli assessment. In this case, multiple stimuli are presented and the order in which they are chosen is noted. In a multiple stimuli without replacement (MSO) assessment, after a stimulus is chosen, another stimulus is not put in its place. It is simply a ranking of the items by order chosen. In a multiple stimuli with replacement (MSW) assessment, the chosen item remains available but the items that were not chosen are replaced with different items (Cooper, Heron, & Heward, 2007).

When considering reinforcement, it is important to also consider factors that alter the value of a reinforcer. These factors are referred to as motivating operations.

Cipani and Schock (2011) discuss the two types of motivating operations (MO). Establishing operations (EO) are factors that increase the value of a specific outcome. Conversely, abolishing operations (AO) are factors that decrease the value of a specific outcome. If a student hasn't eaten in a few hours, she will likely find the value of food to be increased due to the current state of deprivation. Therefore, she will be more likely to emit behaviors that have the potential to provide her access to food. An AO is the opposite. If a student just ate a huge lunch, she will be less likely to emit behaviors that provide access to food due to her state of satiation. It is essential to recognize and understand the MOs that are in play when designing a performance incentive plan.

Daniels and Bailey (2014) discuss several characteristics of effective reinforcers in the workplace, and provide an acronym (CARE) as a memory aid to keep these characteristics in mind. First, they state that an effective reinforcer must be controllable. This means that if a manager cannot follow through on providing a reinforcer, it should not be used. Before offering something as reinforcement, it is important to ensure that there is funding for it and that it is acceptable under company policy. Additionally, it is important to consider the effect the reinforcer's presentation to a staff member will have on other staff members, as well as the company as a whole. Will a new precedent be set? Is this opportunity going to be offered to everyone? If so, do resources exist to make it so? If not, why not?

The second characteristic of an effective reinforcer is that it needs to be available. It is important that reinforcement is provided as soon as possible after the desired behavior occurs. (Cooper et al., 2007) This means

that the reinforcer needs to be immediately (or at least quickly) available. Daniels and Bailey (2014) use the example of social praise and similar social behaviors as reinforcers that are always available. (It is important to note that social behaviors are not reinforcing for everyone, as indicated above.) They list tangibles as an example of a reinforcer that requires advance planning due to factors like budgetary approval and lag associated with procuring said reinforcement.

Another characteristic of effective reinforcers is that they must be repeatable. For example, promotions cannot be given every time a desired behavior is emitted, but social praise, or a small trinket, possibly can. If the reinforcer cannot be used more than once, the contingency between the desired behavior and its consequence may be broken, leading to a decrease in said behavior (Cipani & Schock, 2011).

Finally, an effective reinforcer must be efficient. This means that the reinforcer's value should match up well with the value of the behavior performed. A promotion need not be given because an employee showed up on time once. Social praise would be a better fit to use as reinforcement in this case, as it is sustainable for the organization. Now that reinforcement, motivating operations, and the characteristics of effective workplace reinforcers have been discussed, it is possible to discuss specific incentive programs, and what the research has shown about them (Cipani & Shock, 2011).

Performance-based pay is a form of positive reinforcement involving, as the name indicates, pay based upon predetermined performance criteria being met. Bucklin and Dickinson (2001) provide a comprehensive look at the different relationships that can exist between

performance and pay. They compiled data from existing research and the results indicated that financial incentives paired with feedback led to an increase in performance levels. Further, they discuss that the biggest factor in determining the success of a pay for performance program is the schedule of reinforcement, not the amount of financial reinforcement available. Basically, this means that the dollar amounts offered do not matter as much as establishing the contingency between a certain amount of work earning a certain amount of pay.

Research by Long, Wilder, Betz and Dutta (2012) examined the effectiveness of two types of payment systems on the rate of check processing and on-task behavior by the study's participants. In this study, participants received pay using either pay for time (PFT) or pay per performance (PFP). After data were taken regarding performance under each system, the participants were given a choice as to which system they wanted to work under for the final phase of the experiment. The results indicated that the PFP system led to higher rates of performance as well as more time on task than did PFT systems, which replicates previous research. Interestingly, although PFP resulted in higher levels of performance, and therefore greater levels of performance incentives, some participants chose to work under the PFT system. This led the authors to indicate that further research may be necessary to evaluate the relationship between PFP, PFT, employee choice, and job satisfaction.

An additional study on performance-based pay was done by Koffarnus, DeFulio, Sigurdson, and Silverman (2013). In this study, the effects on performance of hourly

pay and productivity-based pay were examined. The participants were individuals who were learning how to type as a step towards future employability. The study showed that not only did most participants indicate a preference for performance-based pay over hourly pay, but most participants' performance levels were higher under that condition as well.

Overall, the research indicates that pay for performance is more effective at producing higher rates of productivity than hourly pay. Unfortunately, hourly pay scales are still the norm in most companies possibly due to the need for predictable cash flows for payroll. Additionally, research shows the need for further studies relating to employee preference and its relationship to the different types of pay for performance systems.

There are many incentive programs in use aside from salary and pay for performance systems. Daniels (2009) discusses several common incentive programs, why they do not work, and offers replacement programs. He first discusses employee of the month programs, which he states are ineffective because only one person obtains reinforcement. The rest of the staff, no matter how highly-performing they are, does not receive reinforcement for their work. Daniels suggests that instead of an employee of the month program, a program is developed that recognizes all individuals that achieve the predetermined criteria. Johnson and Dickinson's (2010) research agrees with Daniels's assertions, showing that not only did employee of the month programs not lead to sustained performance improvement, but that they also may be detrimental to the performance of staff members who are not recognized for their work, and

breed unhealthy competition and bitterness among staff members.

Another type of staff incentive program is the point system. As Daniels and Bailey (2014) explain, point systems involve employees earning points for meeting predetermined criteria, and then trade those points for reinforcers. These can be things like, days off, gift cards, or other tangibles. The text states that for many individuals, simply having the points is reinforcing enough, and they may never actually spend them. This makes the arrangement reinforcing for the staff member, and inexpensive for the company. An example of this would be a checklist of cleaning tasks that are to be completed each day. The supervisor goes around at the end of the day and awards a point for each task successfully completed. The staff member is frequently notified of the number of points that have been earned, and has an opportunity to spend them or save them up for something they find even more reinforcing.

Aside from increasing desired employee behaviors, point systems provide valuable data to the organization that could be used to diagnose work flow issues, equipment problems, etc. (Daniels & Bailey, 2014) For example, if one task seems to be missed by multiple staff members, supervisors should consider looking at potential barriers to completion of the task.

Lotteries are another type of incentive program that is used to improve staff performance. (Reid, Parsons, & Green, 2012) In this case, staff members earn chances to be entered into a lottery in which they can win reinforcers. Examples of reinforcers are gift cards, time off, selecting their work schedules, a special parking spot, etc. (Reid, et al., 2012) In a study done by Iwata, Bailey,

Brown, Foshee, and Alpern (1976), lotteries were shown to be successful in increasing the target behaviors of staff members in a residential care facility. These authors also commented on the fact that in addition to being effective, it was a relatively inexpensive incentive due to only one person winning. They also suggest that this type of incentive program could be successful when used in organizations of any size. Notable disadvantages of a lottery system are that they can be perceived as gimmicky and insincere by employees, as well as the fact that very few people receive reinforcement. This could lead to performance decreases in the future as some individuals never receive reinforcement. (Reid, et al., 2012)

Reid, et al. (2012) also discuss phone calls received by staff at home. While phone calls at home from one's boss are usually aversive due to the possible indication of a punitive or emergency situation, the tables can be turned rapidly when the call received consists of praise. The authors caution that this method, while appreciated by many, still disrupts the lives of the employee and his/her family, and should be used sparingly due to this fact.

In a study involving the safety-related behavior of roofers, Austin, Kessler, Riccobono, and Bailey (1996) utilized both financial rewards and paid time off to increase desired behavior. In this study, both methods were effective in increasing desired responding. Using paid time off as a reinforcer can be an effective at impacting employee behavior, and it has the additional benefit of not being very expensive. Obviously, in some cases, full staffing is vital, or even legally required, and this method may be less desirable, but in cases wherein a staff member missing a day every now and then isn't

going to have a significant effect, this method of reinforcement may well be ideal.

According to Daniels and Bailey (2014), the least expensive and easiest method of reinforcement that can be given to employees is feedback. This can come in many forms, including vocal, written, formal, informal, group, individual, public, and private, but should always be provided using the following evidence-based protocols. This will help the feedback retain value as a reinforcer instead of becoming aversive. (Reid, et al., 2012) First, feedback should start with a positive statement, or one that shows empathy. Next, the staff member should be informed of things they did correctly. Then, they are informed of things they did incorrectly, followed by a description of what they need to do to correct this behavior. They should then be asked if they have any questions and informed of next steps regarding the target behavior. Finally, the feedback session should be ended with another positive or empathetic statement. The person that is providing feedback should be fluent in performing the task being discussed, as well as at providing feedback. (Reid, et al., 2012) Daniels and Bailey (2014) supply additional guidelines for providing effective feedback. First, feedback should include specific instructions and/or action steps that will provide the person with the tools needed to make the desired changes. Second, feedback should only be given relating to behaviors the person can control. If the staff member is unable to meet deadlines because the person responsible for getting him the necessary materials is not on time, it is not within his ability to change his performance. Third, feedback should be immediate. As discussed above, research has shown that immediate

feedback leads to greater increases in desired responding than delayed feedback. Fourth, feedback should be individualized for each person. If this is not possible, feedback should be given to the smallest group possible. This is due to the possibility of reinforcing the work of those who are not pulling their weight in the group. Finally, feedback should be easily understood. If the individual cannot understand the feedback, how can they know whether and what they need to change or keep doing?

Feedback is inexpensive and always available. Most people find it reinforcing (when it is sincere), and it has the added benefit of being reinforcing for most supervisors as well. Obviously, there will be times when feedback and positive praise alone are not sufficient for changing staff behaviors, but these methods are a good starting point. (Daniels & Bailey, 2014)

An area in which there is limited research is in the area of employee preference. This looks at what causes a person to choose one potential reinforcer over another. Future research could identify EOs involved in employee choices of reinforcement, including familial issues, financial issues, age, health considerations, etc. Hopefully, this line of research is picked up in the future, as it will help corporations with bottom lines while also increasing the quality of life of employees while they are at work.

A focus on both bottom lines and employee job satisfaction is what lends the current topic its social validity. Social validity relates to whether or not the behavior(s) being changed will lead to socially meaningful, or significant, change. (Cooper et al., 2007) In the field of applied behavior analysis, any behaviors

that are targets for change should have social significance for the individual(s) whose behavior is going to be changed, with attention paid to the effects on other relevant individuals. The Professional and Ethical Compliance code for Behavior Analysts (BACB, 2014) lays out guidelines relating to choosing behaviors that will be changed, as well as methods that can be used for changing them, and other considerations to be made prior to starting any treatment or intervention package. Additionally, the BACB Fourth Edition Task List (BACB, 2012) discusses the core competencies expected of those who attempt to undertake behavior change services or programs. Being proficient in the field should increase the likelihood of successfully identifying socially significant problems that can be targeted.

In addition to social validity, as Baer, Wolf, and Risley (1968) pointed out, behavior change programs should aim to have generality, or the capability of being applied to more than one situation, setting, individual, etc. This means that the procedures developed for one group, if behaviorally sound, should be able to be applied successfully in more than one set of circumstances.

In conclusion, there are many methods that can be used to increase desired staff behaviors. Most of these involve positive reinforcement used in varying ways. They require differing levels of effort and resources from supervisors and organizations, and must be customized to fit the organization and individuals involved, with ethical considerations always in the forefront of the practitioner's mind.

ETHICS AND INTEGRITY

When considering ethics, professionalism, and responsibility in relation to increasing desired behaviors in staff, both the Professional and Ethical Compliance Code for Behavior Analysts (BACB, 2014) and additional ethical guidelines more specific to organizational behavior management (OBM) should be discussed, even though a comprehensive set of goals specific to OBM with the scope of those accepted by the field of ABA in general has not yet been created and universally agreed upon (Johnson, Redmon, & Mawhinney, 2001).

Since a lot of work in the field of OBM is done via consulting, ethical and professional concerns related to this role will be the focus of this section of the paper. One of the first Code guidelines, 1.04, relates to following through with agreed upon commitments (BACB, 2014). Behavioral services should involve a contract, and these should be honored. This is important for several reasons. First, the goal of behavior analysts is to create socially significant change for our clients. This cannot be done if a practitioner is not fulfilling obligations related to helping clients attain desired outcomes. Second, the reputation of the consultant, and the related effects on future business, is affected by failures in this regard. Clients are unlikely to give repeat business, or word of mouth recommendations to an individual that fails to fulfill their commitments. Third, another Code item, 6.01, addresses practitioners' obligation to represent the field of behavior analysis ethically. This is how the field will spread and gain support among not only clients, but funding sources and government entities as well.

Another Code item that applies to the current topic is

2.02, which concerns identifying exactly who the client(s) is (BACB, 2014). This Code item requires that behavior analysts be aware of all individuals that can be considered clients, not just the individual who is paying them, and that this should be made clear up front. In the case of changing staff behaviors, the clients are not only the managers who are paying for the service, but also the employees whose behaviors are being changed, their direct supervisors, shareholders, etc. The Code states that a behavior analyst is obligated to consider all clients' needs. Bailey and Burch (2011) take this a step farther and require that behavior analysts identify the most vulnerable person(s) involved in the situation and advocate for their needs above others.

Code item 2.12 discusses the obligations of practitioners to create a contract with clients and outline compensation and billing. Bailey and Burch (2011) recommend using a Declaration of Professional Services to clarify this information as soon as is feasible in order to avoid questions and issues about these issues later. Getting these items taken care of and agreed upon up front may save a lot of time and energy later, and will ensure that everyone involved is operating in good faith.

Item 4.01 of the Code requires that behavior analysts ensure that all programs are behavior-analytic in nature and supported by research (BACB, 2014). This means that interventions and programs recommended to clients should be consistent with the operant learning theories upon which the field is based (Bailey and Burch, 2011). Pseudo-science, flavor of the month interventions, and miracle cures cannot be used by behavior analysts. Only interventions that are backed by peer-reviewed research are appropriate. If a behavior analyst is involved in a

collaboration where these items are suggested, the behavior analyst is obligated to inform all involved that only behavior analytic, research-supported interventions can be used according to their ethical obligations.

Section 4 of the Code also addresses gaining full consent from clients regarding assessment, treatment, and mastery criteria (BACB, 2014). This is achieved by fully explaining all steps of the behavior-analytic process. After all, can one give truly informed consent if they do not know exactly what they are agreeing to?

Aside from the Code, it is worthwhile to address a seminal work on ethics in behavior analysis. The article, entitled *The Right To Effective Behavioral Treatment* (Van Houten, Axelrod, Bailey, Foxx, Iwata, & Lovaas, 1988), outlines client rights that are considered essential and required within the field. Some of these guidelines need to be adjusted in order to apply to workplace situations, but many are still applicable, such as the right of a client to be treated by a competent behavior analyst, and the right to have access to the most effective treatments available. Obtaining and maintaining competency in the field requires not only initial training in ABA, but also a continuation of those studies via trainings, classes, reading journals, etc. Additionally, BCBAAs can meet their continuing education requirements by performing activities such as attending conferences, teaching university courses, or presenting at workshops (Fisher, Piazza, & Roane, 2011). These activities ensure that clients are receiving the most accurate and up to date treatments in the field.

Another right addressed by Van Houten, et al. (1988) is the right of an individual to have goals be in the interest of their personal welfare. This right relates to the fact

that when attempting to change staff behaviors at the request of companies, the individuals hiring a BCBA may be concerned about the bottom line, but the BCBA must be concerned about the welfare of employees as well. This means that any intervention should have a benefit to the employees by increasing their job satisfaction, teaching them useful skills, increasing access to reinforcement, etc.

In addition to the ethical obligations laid out by the Board, behavior analysts must comply with laws and any guidelines of their place of employment (although their responsibilities as BCBAs take priority). Additionally, personal morals and ethics need to be taken into account in any given situation. If a behavior analyst is instructed to do something unethical or that they find personally unacceptable, it is useful to review the Code and then look to colleagues, supervisors, professors, etc. for advice as to how to proceed. It is worth noting that if a behavior analyst's personal values and ethics interfere with effectively and ethically treating a client, the behavior analyst should refer the client to another qualified professional in order to remain in compliance with BACB obligations.

The ethical and professional responsibilities of behavior analysts are many and cover a wide range of topics. Due to the importance of ethical behaviors to our clients, colleagues, and our field, the BACB requires continuing education in ethics for all of its certificants. This is not sufficient, however, and it is the responsibility of all behavior analysts to stay up to date on current best practices related to the ethics and values of the field (Johnson, Redmon, & Mawhinney, 2001).

COLLABORATION WITH FAMILIES AND STAKEHOLDERS

In the course of practice, BCBA's will need to collaborate effectively with others in order to achieve behavior change goals. When discussing employee motivation, this is no less true. Although families are not necessarily involved in the collaboration process, it will be necessary to collaborate with all relevant parties within both the BCBA's agency and the hiring organization.

The first step in effective collaboration is to identify who the stakeholders are. In the case of employee behavior change, the stakeholders may include the employees, their direct supervisors, executives, and even the customers served by the organization. It is important to consider the effects of all actions on these groups prior to and during implementation (Bailey and Burch, 2010).

Porterfield, Evans and Blunden (1985) conducted a study that underlined the importance of involving stakeholders in the implementation and evaluation of behavior plans. In this study, they illustrated that when staff and family members were trained to target certain behaviors of both themselves and their clients, improvements were seen across the board in targeted skills, and were maintained long after the study's conclusion. Furthermore, this study discussed previous research on the topic that yielded similar results. Obtaining buy-in and support from significant others is vital to a successful intervention.

To that end, Bailey and Burch (2010), discuss the importance of keeping the audience in mind. This includes recognizing that individuals who are outside of

the field of ABA likely do not know the technical terminology used by BCBA's. Using this language can make it difficult for others to fully understand and participate in the planning and intervention processes. Additionally, they suggest that usage of technical language may have an effect on the BCBA's 'likeability', which could have an impact on the buy-in obtained by stakeholders.

Block and Markowitz (2012) explain that truly effective collaboration occurs only when the individuals involved in an endeavor form connections with one another. They further suggest that these connections are formed by getting to know all collaborators and, as noted above, using this knowledge to select an appropriate manner of speaking, as well as appropriate topics for focus. For example, if the supervisor who is contracting for a BCBA's services is concerned about the bottom line financial aspect of a situation, the BCBA would be well-served to focus discussions of outcomes around financial benefits of the plan. In this same way, if the employees are more concerned with correcting barriers to their work performance, that should be the focus of discussions with the employee group.

Another important consideration to be made when collaborating with others is the fact that at some point, it is likely that someone will propose something unethical. Whether the suggestion comes from a superior, another BCBA, or any other source, it is important to handle the situation delicately in order to both maintain ethical standards and keep the working relationship intact. Bailey and Burch (2012) stress the importance of speaking up in these circumstances and outline tips for doing so effectively. They, of course, suggest that

knowing the ethics code is the most important thing a BCBA can do to prepare for types of situations, but they also give other suggestions. One suggestion they provided was buying some time when possible, which will give the BCBA time to both find all relevant information and resources, as well as time to formulate a well thought-out, coherent response. Additionally, they discuss that instead of immediately confronting a person with an ethical issue, the BCBA should establish rapport, ask questions, listen, state the facts, refer to the ethical issue, and then discussing the steps to be taken to correct the issue.

Even with suggestions for navigating ethical conundrums, interactions of this type can be uncomfortable and intimidating. This is even more applicable when the individual who is being confronting is a supervisor. In this case, Bailey and Burch (2012) suggest following the suggestions above, but also presenting a solution. Additionally, they stress the importance of remaining calm and thinking before speaking, particularly since the BCBA's job, and possibly career, may depend upon the other party. Furthermore, failure to maintain a positive working relationship can lead to less fruitful collaborations in the future, and make obtaining buy-in more difficult.

Another subject that relates to collaboration is cultural responsiveness. Fong, Catagnus, Brodhead, Quigley, and Field (2016), wrote a paper providing suggestions for behavior analysts to increase their cultural awareness practices through understanding of both their own cultural factors and those of their clients, colleagues, etc. They stress that being culturally aware is important in

building rapport and gaining support and follow through for data collection, interventions, etc.

The first suggestion given is to develop a cultural awareness of self. In order to do this, a BCBA could participate in discussions about diversity in client and colleague interactions within group discussions, journals, meetings, or other forums. Exposure to these types of activities can increase the BCBA's self-awareness as well as their awareness of varying cultural considerations. (Fong et al., 2016)

The second suggestion is to be mindful and attending to the current moment, trying to avoid judging or evaluating events as they are occurring. This may help increase self-observation skills as well as reduce the biases that can reveal themselves when interacting with culturally diverse people by keeping those types of thoughts from emerging (Fong et al., 2016).

Finally, the reliance by BCBA's on data instead of personal opinions and biases can result in a more culturally-aware practice. Collecting and evaluating data instead of relying upon personal experience and anecdotes reduces the level of bias that could otherwise interfere in providing culturally sensitive service. (Fong et al., 2016)

Fong et al., 2016, also note that there are self-assessment tools available to help BCBA's become more aware of their personal cultural biases and values, and suggest that these assessments may provide insight that can lead to BCBA's providing more culturally aware services.

Additionally, there are existing studies and tools available to assist BCBA's in maintaining culturally-sensitive and responsive practices. These include

research across several fields and describe things like terminology differences, etiquette differences, and differences in overall behavioral norms across various cultures (Fong et al., 2016).

Overall, the most important aspect of a BCBA achieving high levels of cultural responsiveness in practice is to remain aware of the fact that cultural differences exist, and that they are not merely related to race, gender, nationality, etc. Any number of factors can create a 'culture', and wherever a culture exists, the BCBA needs to be aware of the effects it may have on clients, interventions, etc. (Fong et al., 2016).

The goal of a BCBA is to improve the lives of clients in socially significant ways. This is a goal that can be reached more quickly and effectively through collaboration with all stakeholders. Therefore, BCBAs should constantly be working on their interpersonal skills (Bailey and Burch, 2012).

MEASUREMENT AND ASSESSMENT

When considering measurement and assessment relating to increasing desired staff behaviors, it is important to consider assessing employee preferences as well as intervention efficacy, since finding effective reinforcers is vital to effective behavior change (Wine, Kelley, & Wilder, 2014).

Waldvogel and Dixon (2008) conducted a study that compared the effectiveness of a survey and a preference assessment using the multiple stimulus without replacement (MSWO) method in identifying effective reinforcers. An MSWO preference assessment consists of an array of potentially reinforcing stimuli are

presented to the subject simultaneously. The participant is asked to choose one. The choice is recorded and then the process is repeated until a hierarchy of preferences is identified (Fisher, Piazza & Roane, 2011).

The results of the study indicated that the MSWO appeared to yield more accurate results in regard to employees' reinforcer preferences. Additionally, the study illustrated that implementing these types of assessment in the workplace could be relatively simple and non-intrusive into the work environment (Waldvogel & Dixon, 2008).

In adding to the OBM literature on preference assessments with their 2014 study, Wine, Kelley, and Wilder discussed the importance of not making the assumption that money alone is reinforcing for everyone. They explain that too often organizations offer monetary awards without considering whether or not the employees find these reinforcing enough to lead to behavior change. Additionally, organizations tend to fail to account for the changing preferences of their staff members. To address these issues, this study evaluates the use of a survey assessment and a ranking assessment for identifying potential reinforcers for employees, as well as evaluating how often these assessments should be done.

The survey assessment consisted of participants scoring how much work they would be willing to do to procure the item on a scale from 0 (no work) to 4 (a lot of work). The ranking assessment required participants to rank the items from 1 to 8, where 1 means they would perform the least amount of work to access that item and 8 means they would perform a lot of work to access that item (Wine, Kelley & Wilder, 2014).

The results showed that employee preferences were relatively stable for a week, but then shifts in preferences began to occur at 2, 3 and 4 weeks. This indicates that employers need to be more aware of the constantly changing effectiveness of reinforcers. Resistance to this idea may be due to the amount of time and resources such an endeavor requires (Wine, Kelley & Wilder, 2014).

In addition to discovering potentially reinforcers for employees, the problem itself must be diagnosed. An intervention cannot be put into place to solve a problem when the function of the employees' behavior is understood. One tool that can be useful in assessing the factors that contribute to performance issues, specifically in the field of human services, is the Performance Diagnostic Checklist —Human Services (Austin, 2000).

Ditzian, Wilder, King & Tanz (2015) state that the PDC-HS is the most widely-used performance analysis tool in existence. It can identify variables that can contribute to employee performance issues, which can point the BCBA towards the most effective intervention possible. Their study expanded on previous research by evaluating the effectiveness of the PDC-HS when used with a different type of behavior. Their study showed that the PDC-HS was more effective than a non-PDC-HS intervention (in the form of a written prompt) at identifying factors that contributed to performance issues. The authors did, however, state that methods of assessment that involve direct observation and assessment could be more accurate than the PDC-HS, but that due to ease of use, the PDC-HS is likely to remain more commonly used than direct assessment methods.

The PDC-HS focuses on identifying possible performance and environmental issues in four areas:

training, task clarification and prompting, resources, materials and processes, and performance consequences, effort and competition (Austin, 2000).

The training area focuses on what levels and types of training the employee has received relating to the target task, and whether or not that training seems to have been effective. The task clarification and prompting area evaluates whether the employee knows that they are supposed to perform the task and why the task is performed, as well as whether or not prompts in the form of job aids exist. This section also investigates whether the environment is well-suited to task completion (Austin, 2000).

The resources, materials and processes section evaluates staffing levels, the availability and effectiveness of job-related materials, the dependence of task completion on other behaviors being performed first, and the dependence of task completion on the behavior of others. The performance, consequences, effort, and competition section of the PDC-HS focuses on the frequency and levels of supervision and feedback, response effort, and potentially competing tasks (Austin, 2000).

The assessment also provides a resource page at the end of the survey that gives suggested articles that may help practitioners find solutions and interventions that will work for the identified performance issues (Austin, 2000). This assessment should help the BCBA identify areas that can be targeted in order to help employees increase the desired target behavior.

Aside from reinforcement and assessment of problem areas, it is necessary to track and display collected data in a way that is reliable and understandable. In the field of

ABA, most research is done using single-subject research designs. Within this type of design there are several subtypes that can be used when evaluating and displaying data (Bailey and Burch, 2002).

In general, collecting baseline data is a vital part of the data collection process. Without baseline data, the BCBA will not have anything to compare the intervention data with in order to determine its effectiveness. However, Bailey and Burch (2002), do discuss an experimental design called B-Only, which involves just treatment. This is considered a very weak design because it does not show experimental control.

The AB experimental design consists of baseline data and an intervention. This is an improvement over the B-Only design, but still does not show solid experimental control due to the fact that an unrelated variable could have caused the behavior change (i.e. something else in the environment, etc.). Similar to the AB design is the ABC design, which consists of baseline, and intervention, and a second intervention. Even more interventions can be added as desired (ABCDEF...etc.) (Bailey & Burch, 2002).

When looking to show that an intervention is effective (experimental control), reversal designs can be used. These designs consist of a baseline phase, and intervention phase, and a return to baseline phase. Additional intervention and return to baseline phases can also be added to show even more experimental control. It should be noted that this type of intervention cannot be used when looking at skill acquisition, because once the skill is learned it cannot be unlearned (Bailey & Burch, 2002).

Multiple-baseline designs evaluate the effects of an

intervention on multiple behaviors. First, the intervention is applied for one behavior. Then, when that behavior has improved to meet criteria, the intervention is applied to the second behavior. This can go on for multiple behaviors, and the relationships between the behaviors and interventions can be visually analyzed. This design can also be used for multiple participants in much the same way. The intervention is applied to the target behavior of one individual until criteria are met and then applied to other individuals. Finally, the design can be used across settings, with baseline data in each setting and interventions put into place as each setting's behavior meets criteria (Bailey & Burch, 2002).

A third type of treatment design is the multielement design, which is also referred to as alternating treatment design. This design brings one behavior under the control of multiple factors associated with certain discriminative stimuli. Stimuli are presented in no set order to participants in order to keep patterns from having an effect on behavior. The strength of this design is that it gathers a lot of data very quickly. Instead of breaking up data gathering into separate phases, data for multiple situations can be gathered concurrently (Bailey & Burch, 2002).

In the field of Organizational Behavior Management, group designs may be helpful, as frequently organizational change involves changing the behaviors of multiple people. Group designs are not, however, common in the field of ABA, and have the limitation of not being able to show true causality, focusing instead on probabilities and averages (Bailey & Burch, 2002).

In conclusion, main factors that should be considered related to measurement and assessment of employee

behaviors include reinforcer preferences, assessment and diagnostics of problem behavior(s), and research design. Each of these items involves careful thought and attention to the participants, stakeholders, and environments involved.

TEACHING AND LEARNING

The technologies and research produced by behavior analysts are only useful when they can be understood and used by others. In the field of OBM, this was pointed out as a weakness within the field and its journals by Balcazar, Shupert, Daniels, Mawhinney, and Hopkins (1989). The difficulty arises from the fact that the field of applied behavior analysis contains a large number of technical terms that are difficult for those without a background in behavior to understand. The Professional and Ethical Compliance code for Behavior Analysts (BACB, 2014), requires behavior analysts to be able to discuss ABA principles in both technical and layman's terms. This requirement certainly applies to those working in the field of OBM as well, and should be considered by any behavior analyst working in any setting.

Additionally, if clients, stakeholders, etc. do not fully understand what the behavior analyst is saying during the evaluation and intervention processes, they are not truly giving informed consent, which is another Code requirement.

In addition to using accessible language, behavior analysts should concern themselves with obtaining buy-in from all involved in any diagnostic and intervention process. McSween, Myers, and Kuchler (1990) stated that

in order to be successful, behavior analysts must provide a service that meets clients' needs. They further discussed that this requires both knowing the needs of clients, and focusing on their needs as well as the needs of their customers. When considering increasing desired employee behaviors, it is vital that management, as well as the employees themselves, understand the value to them and how they are getting their needs met. Additionally, clients should feel as though the behavior analyst has listened to and fully reconciled any concerns expressed by all parties. This builds trust and increases the likelihood that involved individuals will want to collaborate with the behavior analyst. Even a well-constructed, principally sound intervention will fail if not implemented properly. Fully invested behavior-change agents that feel respected and understood, and that understand the value and purpose of the undertaking are more likely to follow through with behaviors that lead to successful interventions (McSween, Myers, Kuchler, 1990).

A third consideration that behavior analysts should be aware of when teaching clients, staff, and significant others how to perform proposed interventions is training. To this end, Adams, Tallon, and Rimmell (2008) compared the use of lecturing versus role-playing when training staff to use positive reinforcement. Their research added to previous research that showed that role-playing tends to be more effective in leading to successfully training staff behaviors than lecturing. This occurred despite the fact that the role-playing training was shorter than the lecture training, which is important because it decreases the amount of time trainers must spend training staff, which leads to an effect on the

organization's bottom line (Adams, Tallon, & Rimmell, 2008).

Fisher, Piazza, and Roane (2011) also discussed procedures to train staff that included the role-playing aspect. The procedures discussed were specifying desired behaviors, describe them and the rationale for them to staff, provide staff with a written description of desired behaviors, model the behaviors for staff, support the staff in practicing the skills (role-playing), provide both positive and corrective feedback based on observations, and repeating the final three steps until mastery is achieved. When looking at increasing staff behaviors, this list is applicable not just for the staff members whose behavior is targeted for change, but also for their managers who will be implementing interventions. Given this research, behavior analysts looking to train others to implement interventions may want to consider role-playing as one part of their training package (Fisher, Piazza, & Roane, 2011).

One method for training staff that addresses maintenance of training program fidelity is pyramidal training. This training technique was evaluated by Page, Iwata, and Reid (1982), who illustrated its effectiveness in training staff, as well as discussed its cost benefits. Pyramidal training, also sometimes referred to as "train the trainer", consists of one person training supervisors to then, in turn, train their supervisees. One benefit of this type of training is the fact that the original trainer's presence is required for a much shorter amount of time than it would be if each staff member were trained individually. This frees up the trainer to do other tasks, or, if the trainer is a contractor, it allows the organization to save money since less of the contractor's time is spent

working with staff (Page, Iwata, & Reid, 1982). When dealing with employee behaviors, behavior analysts are frequently working with corporations or other organizations which are concerned with the bottom line. Pyramidal training is likely an attractive teaching option for these types of organizations from both a financial and manpower point of view.

From the broader perspective of disseminating information about OBM research related to staff behavior, the first consideration is to consider the usage of technical terms, as discussed above. Few people would be interested in attending a conference or speech when the language used is incomprehensible for them. The same goes for any writings that are done for public consumption. While scholarly research is vital to the field, less technical and intimidating writing styles will be more effective in gaining and maintaining the attention of individuals that are not experts in the field of applied behavior analysis. Additionally, when technical language is used, a result may be that individuals do not correctly understand what they have been told and then go out and spread misinformation. There is already plenty of misinformation about the field of ABA, so it is important that behavior analysts are careful about adding to it.

As discussed above concerning staff training, helping the audience identify the benefits to them will pique and retain interest. Behavior analysts may consider leading off a speech or paper with data, facts, and anecdotes relating to successful interventions and outcomes relating to the topic. Again, these should be accessible and low on technical language.

The Professional and Ethical Compliance code for Behavior Analysts (BACB, 2014) requires that behavior

analysts stay up to date on research and best practices. This can be a challenge, particularly when after graduate school, many newly minted behavior analysts lose access to the resources required to maintain competency. One way to combat this problem is to join social media groups that share information and resources. These can be invaluable tools that lead behavior analysts to new information as well as new methods of accessing research.

In conclusion, there are numerous factors that need to be taken into consideration when training others on interventions, as well as obtaining and spreading information about the field of applied behavior analysis. Keeping them in mind when developing proposals, interventions, speeches, presentations, and articles will be invaluable in both obtaining cooperation regarding treatment procedures, as well as fulfilling the ethical obligation to disseminate information about the field of ABA.

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CHAPTER 8.

APPLIED BEHAVIOR ANALYSIS AS A TOOL TO TEACH INDIVIDUALS WITH AUTISM TO EXPRESS PRIVATE EVENTS OF PAIN



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The topic of interest and emphasis of this research pertains to the communication deficits associated with many individuals with Autism Spectrum Disorder (ASD) and how these deficits can in turn lead to difficulties expressing and communicating private events of pain, sickness, and injury. Wetherby and Prizant explain that, "the communication and language impairments of children with autism range from failure to develop any functional speech to the development of functional but idiosyncratic use of spontaneous speech and language" (Prizant & Weatherby, 2007, p. 109). Michael May and Craig

Kennedy (2010) conducted a review of available supports and research related to individuals with intellectual disabilities and the possibility of health and medical risks. In their research they describe that,

Good health significantly improves a person's quality of life. However, people with intellectual disabilities disproportionately have more health problems than the general population. Further complicating the matter is that people with more severe disabilities often cannot verbalize health complications they are experiencing, which leads to health problems being undiagnosed and untreated. (May & Kennedy, 2010, p. 4)

This area of the field is vital to study further, as a future practicing Behavior Analyst, since one of the largest populations served by BCBA's are individuals with ASD, who have limited to no vocal communication skills. Examining this topic in greater detail will allow further insight into how to best support individuals with communication deficits and ideally prevent further health and medical issues from occurring.

This research will begin by exploring the history of Autism Spectrum Disorder and the limited language skills often characteristic of the diagnosis. Specifically, the history and development of ASD into the social and communication disorder that it is recognized as today (Tager-Flusberg, Paul, & Lord, 2013, p. 336). Establishing the diagnosis of Autism as a communication disorder is significant to addressing the implications of these deficits, such as the expression of medical and health concerns. Additionally, reflecting on the services and supports that have historically been provided to treat and develop these individuals' communication will provide

a historical lens to examine the effectiveness of these previous treatments at addressing the communicative deficits characteristic of Autism. Evaluating past treatments will then transition to an analysis and discussion of the behavioral elements and theoretical underpinnings of this topic. This will be followed by an in-depth review of the current available treatments demonstrating how Applied Behavior Analysis as a field can target the common communicative deficits, associated with ASD, in order to help this population access appropriate medical treatment. With this topic and the inherent implications and risks of serious health and medical concerns, due to restricted communication, an ethical examination will be important to reiterate the importance of ethics in best supporting a future caseload of clients. Lastly, an exploration of where the direction of the field is heading in the treatment of the communication deficits associated with Autism Spectrum Disorder will conclude the current research.

HISTORICAL OVERVIEW

HISTORY OF AUTISM AS A DIAGNOSIS

Throughout the 109-year history of the diagnosis of Autism Spectrum Disorder (ASD), it has been reevaluated, relabeled, and in turn what it means to have Autism has been transformed entirely (Evans, 2013, p. 13). Researchers, scientists, psychologists, and other medical professionals across the world and across decades of cases and studies have investigated many individuals and their personal symptomology of Autism Spectrum Disorder. Their work has sought to better grasp the diagnosis and how it impacts the lives of those who have

it. Understanding the historical context of the diagnosis of ASD directly reflects the past treatments and procedures utilized to support individuals with Autism. As the very definition of what it means to have Autism has transformed over time so have many of the prevalent and suggested interventions and treatments. Reflecting on this history enables a fuller grasp of the current state of available treatments for individuals with Autism Spectrum Disorder. Analyzing the history of and past treatments for ASD is vital to conceptualizing how the diagnosis has consistently moved towards a communication disorder. Autism being viewed and treated as a communication disorder has directly led to treatments that target these deficits in language, as well as training that addresses these communicative barriers, in order to help this population express private events of pain and illness.

The term Autism was first used and coined in 1911 by Swiss psychiatrist Eugen Bleuler. He used the term in his seminal text *Dementia Praecox, or The Group of Schizophrenias*. This influential text describes and names the diagnosis of Schizophrenia, denoting Autism as a more severe form of Schizophrenia. During his work, Bleuler portrays a subset of individuals with Schizophrenia and uses the term Autism to describe their characteristic traits. Bleuler described these patients stating:

The most severe schizophrenics, who may have no more contact with the outside world, live in a world of their own. They have encased themselves with their desires and wishes (which they consider fulfilled) or occupy themselves with trials and tribulations of their persecutory ideas; they have

cut themselves off as much as possible from any contact with the external world. This detachment from reality, together with the relative and absolute predominance of the inner life, we term autism (Bleuler, 1950, p. 63).

Bleuler's description and observations of these individuals as disengaged, withdrawn, and removed from their environment initiated many of the beginning ideologies of what Autism even was. He later depicts the communicative abilities of one individual with Autism, stating that "he does comprehend the sense of our words, can reproduce them but immediately afterwards he substitutes his own meaning for that of ours" (p. 373). Bleuler's research begins to highlight some of the hallmark traits of what we now know as Autism Spectrum Disorder. Eugen Bleuler noted the communication deficits of Autism and even what is now known as echoic language. However, much of Bleuler's emphasis on individuals with Autism is their preoccupation with their own imaginative world. He theorized that these individuals had deep imaginative thoughts; thus, they were disengaged from the world around them. However, throughout the majority of the early 20th century, Autism continued to be viewed as a subset of childhood Schizophrenia.

Thirty-years later, in 1943, Leo Kanner—an Austrian-American psychiatrist and physician—conducted further research on Autism at John Hopkins University (Ritvo, 1984, p. 3). Kanner's groundbreaking study *Autistic Disturbances of Affective Contact* focused on eleven young children. Throughout his publication and research, Kanner thoroughly characterizes each individual's level of behaviors, health, family history, linguistic ability, and

other related symptoms. He describes the language abilities of the participants stating, “Eight of the eleven children acquired the ability to speak either at the usual age or after some delay. Three have so far remained ‘mute.’ In none of the eight ‘speaking’ children has language over a period of years served to convey meaning to others” (Kanner, 1943, p. 243). Kanner noted these language delays and limitations to speech in the children in his study, and elaborated that even the children who engaged in spoken language used words literally and had great difficulty with figurative or imaginative language. Kanner provided an example of one of the participant’s literal use of language, he explained that one of the participants was asked to put something down and sat the item on the floor. Another provided example was from the same participant, correcting his father’s statement that the picture was on the wall, whereas the participant insisted the picture was near the wall. These examples illustrate Kanner’s observations that individuals with Autism often use language in very rote, literal, and frequently inflexible ways (p. 220).

Kanner went on to state that, “when sentences are finally formed, they are for a long time mostly parrot-like repetitions of heard word combinations. They are sometimes echoed immediately, but they are just as often ‘stored’ by the child and uttered at a later date. One may, if one wishes, speak of delayed echolalia (p. 243). Kanner’s description of these children’s communication and literal use of language closely portrays some of the hallmark traits of ASD, even as they are viewed today. His research characterized Autism as a social and emotional disorder, arguing that it was a separate and very different diagnosis than childhood Schizophrenia (p. 248). Kanner’s

influential publication directly contradicted how Autism had been defined and viewed prior.

Perhaps one of the most lasting and unfortunately detrimental elements of Kanner's 1943 publication related to his observations of the participants' families. Kanner noted "in the whole group, there are very few really warmhearted fathers and mothers...the question arises whether or not to what extent this fact has contributed to the condition of the children" (p. 250). Kanner elaborates and questions if the families' demeanor directly led to the symptoms of their children or if there is perhaps a biological element to the diagnosis.

Kanner's research and theoretical questioning initiated an idea that parents' *coldness* resulted in infantile or childhood Autism. The theory was further popularized and coined as "The Refrigerator Mother Theory" by Bruno Bettelheim (1967). Bettelheim published *The Empty Fortress: Infantile Autism and the Birth of the Self*, which repeatedly referenced Kanner's earlier research in Autism. Bruno claimed that the cold and unloving parents of these children with Autism directly caused their children's symptoms. Bettelheim states in his publication, "throughout this book I state my belief that the precipitating factor in infantile autism is the parent's wish that his child should not exist" (Bettelheim, 1967, p. 125). Throughout his text, Bettelheim reiterates the rejection of the child by the mother, motherhood depression, and the withdrawn affect of the parents and how these factors lead to the child's symptoms of Autism. Bettelheim states, "maternal feelings, indifferent, negative, or ambivalent, are then made to explain infantile autism, while in my opinion only the extreme of negative feelings in the parents can set the autistic process in motion" (p. 127).

Bruno's theory, based on Kanner's research, remained widely accepted throughout most of the 20th century. While the medical community now widely acknowledges that Bruno Bettelheim's theory is inaccurate, it has continued to have lingering and lasting effects into the 21st century.

American psychologist Bernard Rimland took great trouble with Kanner's research and insistence that the root of Autism stemmed from parental coldness. In 1964, he published *Infantile Autism: The Syndrome and Its Implications for a Neural Theory of Behavior*. Much of Rimland's passion and interest stemmed from his own child's diagnosis of Autism. He explores past research and potential flaws, specific to Kanner's 1943 research. Rimland discusses limitations in Kanner's study and his proposed etiology of Autism. He explains that, due to Kanner's sample size, as well as the fact that his cases all were treated in a clinical setting, a disproportionate number of families were of higher socio-economic status. Rimland explains that this biased sample size is possibly an extraneous variable to Kanner's observations (Rimland, 1964, p. 28).

Another potential variable highlighted in his research is the assumptions of the psychiatrist that the family has caused their own child's diagnosis. Rimland states, "it has also been recognized that the parents, perceived that the psychiatrist regards them as having caused autism in the child, appear more cold and hostile to the psychiatrist than they otherwise would" (Rimland, 1964, p. 31). He continues to explain that it is not far-reaching for families to become reactive to a psychiatrist who perpetuates the concept that the parents are responsible for their child's Autism. Rimland reiterates that families may become

reactive, cold, and withdrawn with the therapist solely to the circumstances at hand. Later, in his research, Rimland emphasizes the plausibility that Autism is not environmentally controlled, rather that it is potentially tied to genetics or family biology (p. 39-43). He denotes many possible ties to genetic variables, instead of environmental circumstances, that may be the true etiology of Autism. Rimland even states that the potential coldness of families could be tied to genetics rather than environmental factors. Rimland's research proposed contrasting ideologies of the potential cause of Autism. His research developed a broader discussion of the etiology of Autism.

Meanwhile, in Europe, Hans Asperger published an article "Autism and Asperger Syndrome" in 1944 related to Autism and defined it as a communication disorder (Asperger, 1944). However, Asperger's research would not be translated into English until 1991. His research focused on children displaying symptoms characteristic of Autism, as described by Leo Kanner's work. Asperger describes the communicative deficits of one of the participants in his research;

The content of his speech too was completely different from what one would expect of a normal child: only rarely was what he said in answer to a question. One usually had to ask a question many times before it registered. When he did answer, once in a while, the answer was as short possible. Often, however, it was sheer luck if he reacted at all! Either he simply did not answer, or he turned away while beating a rhythm or indulging in some stereotypic behaviour. Occasionally, he repeated the question or a single word from the question

that had apparently made an impression on him; sometimes he sang, 'I don't like to say that...'
(Asperger, 1944, p. 43).

Asperger's description of the communication limitations and deficits of individuals with Autism further reiterates the research and observations of Leo Kanner. He further reinforces claims similar to Kanner's research when he delineates the differences between Schizophrenia and Autism: "While the schizophrenic patient seems to show progressive loss of contact, the children we are discussing lack contact from the start" (Asperger, 1944, p. 39). Asperger continues and later discusses common traits of his cases; "Autistic individuals are distinguished from each other not only by the degree of contact disturbance and the degree of intellectual ability, but also by their personality and their special interests, which are often outstandingly varied and original" (p. 67). He explains that noting these individualized differences of the participants allowed a more thorough understanding of Autism. An interesting footnote left by Uta Frith, the translator of Asperger's work, discusses his brevity with describing more severe cases of Autism and his greater depth and focus on the milder cases of individuals with Autism. Frith claims that this is indicative of a shift in his niche area of interest in the field of autism (1991).

While Asperger's research reiterates many of the same ideologies as Leo Kanner and both were published within the span of a few years, Asperger's research did not receive widespread attention until Lorna Wing's article, which describes the characteristic symptomology of Hans Asperger's work, was published in 1981. Her publication popularized Hans Asperger's 1944 research and brought

Aspergers Syndrome to the forefront of the mental health world. Wing stated, “whereas Kanner’s work is widely known internationally, Asperger’s contribution is considerably less familiar outside the German literature” (Wing, 1981, p. 115). She continued to explain that Asperger’s research was less notable due to limited translations. Her publication made Asperger’s Syndrome and its related symptoms more widely recognized during this time.

In 1980, Autism was added to the *Diagnostic and Statistical Manual of Mental Disorders III*. The DSM III stated that over the years, “Various diagnostic terms, including Atypical Development, Symbiotic Psychosis, Childhood Psychosis, Childhood Schizophrenia, and others, have been used to describe these disorders in the past. However, clinical descriptions have typically overlapped and apart from Autistic Disorder, no generally recognized subtypes have emerged” (DSM-III, 1987, p. 33-34). They continue and explain that the symptomology of ASD is not related to that of adult *Schizophrenia*, as many researchers have hypothesized previously. The *Diagnostic and Statistical Manual III* also notes the characteristic traits related to Autism, stating that, “Impairment in communication includes both verbal and nonverbal skills. Language may be totally absent” (DSM-III, 1987, p. 34).

In 1997, the *Diagnostic and Statistical Manual of Mental Disorders IV* was released and characterized Autism as, “the presence of markedly abnormal or impaired development in social interaction and communication and a markedly restricted repertoire of activity and interests” (DSM IV, 1997, p. 66). The DSM IV further described that, “manifestations of the disorder vary

greatly depending on the developmental level and chronological age of the individual. Autistic Disorder is sometimes referred to as early infantile autism, childhood autism, and Kanner's autism" (DSM IV, 1997, p. 66). The DSM IV also notes that Pervasive Developmental Disorders (PDDs) and Autism Spectrum Disorder were often used synonymously at this time to reference a slew of neurodevelopmental disorders (DSM IV, 1997, Wetherby & Prizant, 2007, p. 1). The overlapping core characteristics of both diagnoses being impairments in social interaction, verbal and nonverbal communication, and restricted and repetitive patterns of behavior (DSM IV, 1997, p. 66).

In 2013, *Autism Spectrum Disorder* was once again reclassified and adjusted as a diagnosis with the publication of the *Diagnostic and Statistical Manual of Mental Disorders V* (DSM-V, 2013). Perhaps the greatest shift between fourth and the fifth edition of the *Diagnostic and Statistical Manuals* was the expansion of the definition of the spectrum of Autism. Historically, there have been specified and separated diagnoses based on the severity of language and communicative deficits, repetitive behaviors, and other hallmark traits of ASD. However, in 2013, with the publication of the DSM-V, Autism Spectrum Disorder broadened to include both Asperger's Syndrome, Pervasive Developmental Disorder-Not Otherwise Specified (PDD-NOS) "Individuals with a well-established DSM-IV diagnosis of autistic disorder, Asperger's Disorder, or pervasive developmental disorder not otherwise specified should be given the diagnosis of autism spectrum disorder" (DSM-V, 2013, p. 51). The DSM-V continues to characterize the spectrum by, "persistent deficits in social communication and social

interaction,” however the DSM-V emphasized these deficits across multiple contexts and settings (DSM-V, 2013, p. 50).

Another significant difference between the fourth and fifth editions of the *Diagnostic and Statistical Manual* is the introduction of “severity levels for Autism Spectrum Disorder” (DSM-V, 2013, p. 52). In the DSM-V, a tiered level system is introduced to better differentiate the range of symptoms, deficits, and behaviors associated with the spectrum of Autism. DSM-V distinguishes Level 1 as “requiring support”, Level 2 as “requiring substantial support”, and Level 3 “requiring very substantial support” (p. 52). They further elaborate stating that for individuals with Level 1 ASD, “without supports in place, deficits in social communication cause noticeable impairments. Difficulty initiating social interactions, and clear examples of atypical or unsuccessful responses to social overtures of others. May appear to have decreased interest in social interactions” (p. 52). For individuals with Level 2 Autism, “marked deficits in verbal and nonverbal social communication skills; social impairments apparent even with supports in place; limited initiations of social interactions; and reduced or abnormal responses to social overtures from others” (p. 52). Level 3 ASD is noted as the most pronounced level of Autism Spectrum Disorder, they indicate that individuals with this level have, “severe deficits in verbal and nonverbal social communication skills cause severe impairments in functioning, very limited initiation of social interactions, and minimal response to social overtures from others” (p. 52). For all intents and purposes of this paper the predominant focus is on the communicative deficits of ASD, rather than the repetitive

behaviors and restricted interests commonly associated with Autism.

As newer versions of the *Diagnosis and Statistical Manual* have been released the diagnosis and described symptomology of Autism Spectrum Disorder have been adjusted and changed with time. ASD has been defined differently as a diagnosis over the last three editions of the *Diagnostic and Statistical Manual*. The changing of the diagnosis over time has directly correlated with the availability and quality of services and resources provided to individuals with ASD.

Since 1911, when Autism was first referenced in the literature to present day, its definition as a diagnosis has shifted entirely. Autism has been transformed from a subset of Schizophrenia to what it is now recognized as today as a spectrum or wide-ranging social-communication disorder. As research and studies have progressed over time, and the understanding of ASD has become more thorough, it has allowed for higher quality and more effective therapies, interventions, and treatments to be developed that explicitly target the hallmark characteristics of the disorder. Reflecting on the history of the diagnosis directly provides a comprehensive lens to analyze how the view of ASD over time directly effects the therapies and other supports that have been used with individuals on the spectrum. As the link between communication deficits and Autism have become increasingly recognized, specific interventions have been put in place to target these deficits in communication. Some of these interventions have been developed to target communication barriers of the expression of pain and illness often prevalent in this population.

HISTORY OF TREATMENTS FOR AUTISM

As years of research have expanded the very definition and diagnosis of Autism Spectrum Disorder, the treatments utilized have drastically varied over the course of time. Throughout years of Autism treatment, a variety of approaches and therapies have been used; ranging from electroconvulsive therapy to dietary restrictions, removal of children from the home to psychotropic medication, and punishment procedures to speech and behavioral therapy. Many of these treatments have not stood the test of time or scientific scrutiny and are no longer considered viable or ethically-sound forms of treatment for ASD. Evaluating these past treatments allows an analysis of, both effective and ineffective, interventions used over time for individuals on the Autism Spectrum. The course of these interventions over time has increasingly moved towards communication-based strategies and interventions that target the hallmark communication deficits associated with the spectrum. This trajectory of treatment allows for specific training for expressing private events to be taught, such as pain and sickness.

One prevalent treatment used throughout decades of treatment for Autism is specialized diets. Modifying diets of individuals with behavioral difficulties is a strategy that has been attempted since the very beginnings of Autism research and treatment. Groden and Baron (1991) state that;

Special diets and exclusion of certain foods from the diet have been recommended methods of treatment. Although certain nutrients do impact on the metabolic function of the central nervous

system, there are no well-controlled studies that show that a particular nutrient (amino acid or vitamin) resulted in significant improvement of the overall function and behavior of these children (Grodén and Baron, 1991, p. 146).

Herbert et al. (2002) made similar statements, noting the trend of gluten and casein free diets for individuals on the spectrum. They stated that there is some, “the vast majority of the evidence for the benefits of these diets derives from anecdotal reports or case studies (Herbert et al., 2002, p. 15). While there are some reports of improved behavior with the use of modified diets, there is no empirical data or evidence indicating so, beyond that of anecdotal reports. However, many fad diets continue to be used by many families, caregivers, and professionals in an attempt to address characteristic traits of Autism Spectrum Disorder. While specific diets can be medically necessary (i.e., Celiac Disease, Lactose-intolerance) and may in turn alleviate some pain and associated symptoms, they do not address or expand communication. Undeniably, diet-based interventions do nothing to improve the communicative repertoire of individuals with Autism.

Beginning in the 1950s following research by Bruno Bettelheim, a therapy titled parentectomy was recommended as treatment for children and individuals with Autism. Parentectomy involved separating families from their child with Autism for extended periods of time. The theory behind this therapy was that, “the problems in the mother-child relationship as causing autism” (Herbert et al., 2010, p. 4). Bettelheim was a large proponent of the time for using parentectomy as

treatment for ASD. He stated in his work *The Empty Fortress* that;

These children have stopped expecting any part of the environment to be need-satisfying, we have to provide for them an environment of potentially positive valence long before it wakes any positive interest. Only after they have been exposed to this for a long enough time do they begin to fathom that perhaps some other than the all-pervasive one they have known may be possible (Bettelheim, 1967, p. 93).

This notation exemplifies Bettelheim's view that parents were directly to blame for their child's diagnosis. He believed that children with behavioral difficulties, in order to progress, needed extended time away from their families and caregivers. He specifically advocated for a therapeutic environment that would meet the needs of the individual, such as the Orthogenic School where he conducted much of his research. His recommended mode of treatments and theoretical positions have certainly not stood the test of time and are no longer considered to be effective or ethical in nature. Additionally, beyond the unquestionable unethical nature of this practice, the use of parentectomy does not involve any specific training to target and expand communication.

Pharmaceutical therapies in the form of psychotropic medications have been utilized for the treatment of behaviors, characteristic of Autism, since the 1960s and 1970s. Peter Tanguay, in a chapter from *Autism: Diagnosis, Current Research, and Management*, states, "occasional studies have claimed that various medications are of use in treating early infantile autism, but such studies are

rare” (Tanguay, 1984, p. 80). In another chapter from the same text, Barbara Fish discussed the effects and benefits of appropriately prescribed and utilized medication. She states, “what drugs do, when they are effective, is to make a child more receptive to educational and social therapies” (Fish, 1984, p. 109). Fish and Tanguay explain that the use of medication to regulate individuals with Autism common symptomatic behaviors can allow other therapies to further impact and benefit these individuals. Herbert et al. reiterated a similar perspective in their historical review of Autism treatments, stating, “several medications appeared to improve various symptoms associated with autism, thereby increasing individuals’ ability to benefit from educational and behavioral interventions” (Herbert et al., 2002, p. 23). Groden and Baron made similar statements in their research on the use of medication as well. They also noted that, “medication can inhibit or decrease negative behaviors or improve the organization and control of behavior. These children then will be more receptive to educational instructions and social interactions” (Groden and Baron, 1991, p. 144).

As demonstrated in these passages, appropriately prescribed and carefully used medication can be effective as a component in a treatment package for individuals on the spectrum. While appropriately prescribed medications may make a drastic impact in improving the medical and behavioral health with the Autism population, medication alone does not address many of the hallmark deficits of ASD. Medication as a sole treatment does not train these individuals to express their private events of pain, in order to access the medical treatment and health care they may require to maintain

the highest quality of life. Medication in collaboration with a well-developed communication program can be a great treatment package to care for individuals on the Autism Spectrum.

Throughout the 1970s, and continuing into the 21st century, there has been a great push in school systems for speech therapy with students with Autism. These services have been used to expand and improve communication in students with ASD. Evans describes the educational movement that occurred in the United Kingdom stated that, “the early 1970s in the UK saw a major push to increase numbers of speech therapists employed by health authorities...” (Evans, 2013, p. 17). This increase in available speech services was mirrored in the United States, as well. “Language therapy must take place in a social milieu in which communication is reinforced, or there is no use in talking” (Grodén & Baron, 1991, p. 129). Groden and Baron state the importance of integrating Speech Therapy into the client’s daily life and routines in order to further promote the child’s communicative repertoire. Groden and Baron explain that, “Speech therapists work on every level of language-development, from encouraging speech-like sounds in mute children with autism, to developing syntax in those with delayed language, to fine-tuning intonation and the ‘pragmatic’ aspects of speech in children with autism who speak in fully formed sentences” (Baron-Cohen & Bolton, 1993, p. 73). These descriptions display the importance and potential impact that Speech and Language Therapy can make in the lives and communication of individuals with Autism Spectrum Disorder. Speech Therapy continues to be an integral component of effective treatment for the communication deficits associated with ASD well into

the 21st century. The use of Speech Therapy as treatment directly targets the hallmark communication deficits associated with ASD. If targeted specifically, Speech Therapy based services may promote the communicative repertoire of people with Autism in order to teach these individuals how to express their personal experiences of pain, sickness, and illness.

One controversial and potentially unethical treatment for Autism Spectrum Disorder that has been used intermittently across decades of research is the use of Electric-Convulsive Therapy, commonly referred to as shock therapy, or ECT. Records indicate the use of ECT as early as the 1920s for symptoms characteristic of ASD. Aliza Bell in her historical publication on Autism indicates that many of the “interventions that were used during the 1970’s was quite controversial. For instance, in 1976, electric shock therapy became popular and was used as punishment” (Bell, 2017, p.4). The use of ECT as a punishment procedure is blatantly problematic and dangerous to the individual. While shock therapy remains a notably controversial form of therapy, it continues to be used as a rare form of treatment for individuals on the spectrum. Recent publications from the past few years have been released indicating ECT as effective procedure to reduce high and dangerous levels of severe self-injury and physical aggression (Wachtel et al., 2009). While studies have been conducted and published into the 21st century, the use of ECT remains highly controversial as a form of treatment (Ritvo et al., 1984, p. 108). The use of ECT as a treatment inherently is controversial and debatably unethical, it also as a treatment does not seek to improve or develop the communicative repertoire of people with ASD.

Also, developed in the 1970s, a communicative treatment known as Facilitated Communication was created by a teacher named Rosemary Crossley. The treatment involved the use of a letter board or keyboard and a “facilitator’ holding the disabled person’s hand, arm, or shoulder while the latter apparently types messages on the keyboard device” (Herbert et al., 2002, p. 8). The underpinning philosophy was that many individuals with ASD do not have the necessary neurological ability to use motor planning effectively to communicate. However, this therapy has been heavily evaluated, and not sustained the test of time and scientific scrutiny (Herbert et al., 2002). While Facilitated Communication intended to target the communication deficits of ASD, it failed to promote the individual’s independence with the communication system and in turn did not expand the communicative repertoire of people with Autism, in any capacity.

In 1987, O. Ivar Lovaas published one of the first behavioral therapy interventions for individuals with Autism Spectrum Disorder. His research from the University of California, Los Angeles emphasized principles of operant behavior and emphasized reinforcement as the main treatment (1987). Lovaas’ research directly applied principles of classical behaviorism to a new population and expanded an entire field of practice. Lovaas states in his article that, “High rates of aggressive and self-stimulatory behaviors were reduced by being ignored; by the use of time-out; by the shaping of alternate, more socially acceptable forms of behavior” (Lovaas, 1987, p. 5). Lovaas utilizes behavioral principles to target the problem behaviors characteristic of ASD and directly improve the communicative and

other associated deficits of the diagnosis. Prior treatments have seldom sought to address the deficits by reinforcing a socially significant alternative behavior. While his research was groundbreaking and drastically altered the available treatment of ASD, Lovaas' publication presents some ethical dilemmas as well. In his publication, it is referenced that aversive, and arguably abusive, tactics were occasionally used as treatment for severe problem behaviors. Lovaas explains that as a last option staff would use "a loud "no" or a slap on the thigh contingent upon the presence of the undesirable behavior" (p. 5) to in turn reduce the likelihood that this behavior would occur in the future.

Throughout the late 80s and into the 1990s, special education gained incredible traction as an influential and integral component of the treatment of Autism Spectrum Disorder. Several studies and reviews depict the growing importance of special education programs and the treatment of ASD. Baron-Cohen and Bolton state, "highly structured teaching programs have been claimed to produce the greatest gains" (Baron-Cohen & Bolton, 1993, p. 61). They explain that heavily involved and proactive teaching strategies have been shown to lead to the most significant educational success in the classroom setting. Additionally, Wing displays several important goals for best supporting students with ASD in the school setting and beyond. She states that "Education...is likely to be most successful if geared to aims that are realistic" (Wing, 1986, p. 151). She continues stating that the symptoms and diagnosis of ASD are not something that will ever be eradicated, and goals should be realistic to the individual needs of the student. Furthermore, many of the strategies utilized in Special Education programs

seek to expand communication of people with Autism and other related developmental disabilities. While all strategies involved, may not be inherently communication based, the emphasis on expanding communication makes Special Education an important treatment option to developing the communicative repertoire of people with Autism Spectrum Disorder.

Wing continues and explains that the four main goals of education should prepare a child to be a member of a society, so that the child can successfully live in the natural home with their family or in another alternative community setting. Another important goal of education that Wing describes is to teach coping skills, so the individual has a repertoire of strategies for “coping with the world” (p. 151). The last two important goals of education she describes are to prepare individuals with ASD for employment and to increase the individuals understanding of the world. All of these referenced goals reiterate the importance of realistic expectations and goals that directly lead to the best quality of life for students with ASD across their lifespan.

Another important aspect of education to note is the use of integrated or inclusive classroom settings. Inclusive classrooms where both students with special needs and neurotypical students are allowed to learn have been a contested and debated element of educating children with special needs. Many argue for inclusive classrooms stating that it gives students with special needs an opportunity to learn social norms from their age equivalent peers. Whereas others have stated that integrating children with special needs into typical classrooms may restrict the opportunities of the students without disabilities. Baron-Cohen and Bolton state that,

“it seems sensible to provide opportunities for children with autism to be among normal peers” (Baron-Cohen & Bolton, 1993, p. 66). Wing makes similar claims stating, “there has been much argument as to whether children do best if mixed with normal children, other kinds of handicapped children, or in special schools dealing only with autistic children” (Wing, 1986, p. 142). She goes on to state the importance of individualized programming and a structured environment to meet the needs of students with ASD. She explains that providing these level of serves for the spectrum of needs can be difficult, though not impossible in mainstream classrooms. Education continues to play an interval role in educating and shaping socially significant behaviors of individuals with Autism potentially for the workforce and in general life after school. Moreover, when used appropriately, integrated classroom settings may provide opportunities for individuals on the spectrum to have functional communicative responses modeled by peers. These modeled opportunities may help expand and further develop the communication of people with Autism.

In the 1990s, one cutting edge approach to Autism treatment was Holding Therapy. This therapy involved parents or caregivers literally hugging their child with Autism, refusing to let go, until the child “gives up resisting” (Cohen & Bolton, 1993, p. 72-72). Possible benefits described by Cohen and Bolton include “reports from parents that this leads to more normal social relationships and communication” (p. 73). However, Cohen and Bolton go on to note that there are notable, and seemingly obvious, risks associated with the therapy. Holding, especially for extended periods of time, can become extremely aversive and even potentially

dangerous (p. 73). Since this time period, there have been reports of severe injury of clients and even instances of death with the use of Hold Therapy (Herbert, Sharp, Gaudiano, 2010; Cohen & Bolton, 1993). There are many blatantly potentially dangerous elements of this form of treatment. Additionally, it does not seek to expand the communicative repertoire of the Autism population and has contributed to injuries and even death of people with ASD and other disabilities.

The overall trajectory of the treatment for Autism Spectrum Disorder over this timeline has steadily moved towards the least-restrictive treatment possible and advocating for preventative measures that increase communicative skills and independence with daily living. As the diagnosis, symptoms, and associated characteristics of ASD have become more thoroughly understood, more effective, and proficient treatments and procedures have been developed and put in place. Specifically, communication is one of the most common deficits of ASD that is systematically targeted by intervention procedures. As the treatments for Autism have moved increasingly towards targeted functional communication this has allowed more specific training to communicate experiences of pain and sickness that the individual may endure in their lifetime.

Throughout several pieces of research, Applied Behavior Analysis is noted as one of, “the most promising approach(es)” (Grodén and Baron citing Brown et al., 1976). Applied Behavior Analysis or ABA uses principles of behaviorism, assessing antecedents and consequences that maintain targeted behaviors. Interventions—based on empirical research—are utilized and closely monitored through individualized data collection

systems. Many of the methods used in ABA specifically train and reinforce communicative responses. Applied Behavior Analysis has also been utilized to train communication for individuals with limited communicative repertoires, to express their feelings, experiences of pain, and other private events.

THEORETICAL UNDERPINNINGS

Over generations of research, related to Autism Spectrum Disorder, it has been widely recognized that individuals with ASD have deficits in the area of social communication. Applied Behavior Analysis has been a prevalent and effective therapeutic treatment that directly addresses the communication deficits, often associated with Autism. The field of Applied Behavior Analysis, or ABA, is “a science devoted to the understanding and improvement of human behavior” (Cooper et al., 2008, p. 3). ABA focuses on observable and measurable elements of behavior and defining these behaviors and related environmental variables in an objective way. Applied Behavior Analysis directly puts the scientific method into practice to make socially significant change and improve the lives of the individual. ABA has been utilized to teach and replace problem behaviors with socially acceptable replacement behaviors. Often these replacement behaviors are a form of communication, based on the identified function of the problem behavior (Cooper et al., 2008, p. 3).

Historically, researchers in early psychology believed that the intricacies of the mind were pertinent and relevant points of research for the field (Moore, 2011,

pp. 449-450). However, John Watson proposed a school of thought known as Methodological Behaviorism. He suggested that thoughts, emotions, and other private events were behavior, however, he explained that they were not in the scope of study for Behaviorism. He emphasized that private events, thoughts, and emotions could not be viewed as behavior as they were not observable and measurable to the outside world. The emphasis of many early behaviorists was to only address and identify behaviors that were observable and measurable. Cooper et al explain that, “Watson argued that the proper subject matter for psychology was not states of mind or mental processes but observable behavior” (Cooper et al, 2008, p. 9). Meaning that emotions, feelings, thoughts, and other private events were not considered behavior, under Watson’s definition, as they were unable to be identified, monitored, and measured by an outside audience.

However, with B.F. Skinner’s research and publication of *Verbal Behavior* expanded the scope of what behaviorists considered behavior, founding a school of thought known as “Radical Behaviorism” (1974). Skinner stated, “what is inside the skin, and how do we know about it? The answer is, I believe, the heart of radical behaviorism” (Skinner, 1974, p. 218). This vantage drastically expanded the behavioral world and addressed an interval element of the human experience, since private events play a major role in behavior. In 1980, Jay Moore discusses private events and behaviorism in his publication, he states;

For radical behaviorism, private events are those events wherein individuals respond with respect to certain stimuli accessible to themselves alone...The

responses that are made to those stimuli may themselves be public, i.e., observable by others, or they may be private, i.e., accessible only to the individual involved. Nonetheless, to paraphrase Skinner (1953), it need not be supposed that events taking place within the skin have any special properties for that reason alone...For radical behaviorism, then, one's responses with respect to private stimuli are equally lawful and alike in kind to one's responses with respect to public stimuli (Moore, 1980, p. 460).

Moore's description of private events displays an important element of defining these discreet and private behaviors. He reiterates that private events as behaviors are not inherently different, other than that they are unobservable to others. This development drastically altered the course and study of behavior.

With the development of Skinner's Radical Behaviorism, discrete behaviors—such as thoughts, feelings, emotions, pain, and the like—were included in the study of behavior. This inclusion of private events is significant because it allows all behavior to be examined, including private experiences such as pain, frustration, and injuries. Private events are significant, especially in respect to individuals on the Autism Spectrum, because many individuals with ASD have pronounced deficits in communication, that restrict their ability to describe and express the private events they directly experience. Limited communicative repertoires may inhibit people with ASD from effectively expressing their experiences. Understanding the theoretical and behavioral concepts related to verbal behavior is crucial to developing effective treatment to target these communicative

responses and teaching individuals on the spectrum to communicate their private experiences of pain, illness, injury, and the like.

In addition to the development of Radical Behaviorism, Skinner differentiated specific components that make up all verbal behavior. Cooper et al. describe that, “Skinner defined verbal behavior by the function of the response, rather than by its form. Thus any response form can become verbal based on Skinner’s functional definition” (Cooper et al., 2008, p. 528). Meaning that Skinner emphasized the intent or purpose the communicative response served, rather than the form of the verbal interaction (i.e., phonemes, morphemes, grammar, semantics, etc.). With Skinner’s definitions of verbal behavior, there are six elements or operants of verbal behavior that are pertinent to the study of verbal behavior. These categories of verbal behavior include: “mand, tact, echoic, intraverbal, textual, and transcription” (Cooper, 2008, p. 529). The most relevant verbal operants to the expression of private events are manding, tacting, and intraverbal behaviors.

One of the most pertinent components of verbal behavior relating to the expression of private events is manding behavior. B.F. Skinner coined the term “mand” from demanding or commanding something from someone. Cooper et al. describe that, “the mand is a type of verbal operant in which a speaker asks for (or states, demands, implies, etc.) what he needs or wants” (Cooper et al., 2008, p. 530). Normon Peterson discusses that mands are unlike other forms of verbal behavior, in that, they are “controlled by an establishing operation,” meaning that the individual speaking engages in the behavior of communicating because they desire or want

something (Normon Peterson, PhD, “Foxylearning An Introduction to Verbal Behavior”). Peterson also notes that, with regards to manding, the response must be verbal, however the form may be spoken, signed, written, or a gesture. The other noted characteristic of the mand is that the speaker benefits. In essence, the mand is a communicative response that organisms engage in, in order to get something that they want. Examples of manding behavior range from asking a barista for a cup of coffee, using American Sign Language (ASL) to ask a significant other to pass the remote to the TV, or even emailing a professor for help with a difficult assignment. All of these are examples of manding because they are verbal, or a form of communication, in order for the speaker to get something they are motivated by.

Manding behavior is directly related to communicating private events of pain, illness, and injury because it allows the individual to make a request from their caregiver. Manding is the specific verbal operant involved when a child asks for medicine when they have a headache, when someone requests cough syrup when they have a cough, or even inquiring about a check-up at the dentist when they have a toothache. All of these types of requests are related to manding and are a vital component of requesting help or medicine when an individual is not feeling well. As previously described, due to the communicative deficits of many individuals with ASD, manding or requesting medicine, to be taken to the doctor, or to have their temperature taken when they are feeling sick can be very difficult for many people with Autism. However, teaching individuals to mand for assistance and tact their experiences of pain is something

that should certainly be targeted in treatment (Skinner, 1974).

The next verbal operant pertinent to communicating and expressing private events is tacting behavior. Cooper et al. define tacting as, “a type of verbal operant in which a speaker names things and actions that the speaker has direct contact with through any of the sense modes” (2008, p. 530). Peterson notes on *Foxy Learning* that the necessary characteristics of the tact is that the “controlling variable is a non-verbal stimulus” (Normon Peterson, PhD, “Foxylearning An Introduction to Verbal Behavior”). He indicates that the stimuli may be an object, event, or an element of an object or item. Peterson also adds with tacting that the listener benefits from this type of verbal behavior. Examples of tacting behavior include telling someone what new food or drink you are consuming, telling someone what street they are on when giving directions, or writing down the name of the song that is playing for someone. These are all examples of tacts because the speaker provides information that is of value to the listener.

Tacting is related to the expression of private events by the individual communicating and labeling specifically what physical suffering or pain they are enduring. It involves labeling and communicating exactly what private event of pain the individual is withstanding. Examples of tacting related to private events of pain being the person stating, “my knee hurts” or “I have a stomachache.” Identifying and labeling what specific part of the body and what sensation they are experiencing is vital to effectively communicating the private events of pain the person may be experiencing. Many individuals with ASD additionally struggle to label stimuli in the

physical environment, let alone internal stimuli unseen by outside observers. Training individuals to tact private events presents a series of difficulties, since others cannot observe another's private experiences, in order to support them in identifying and labeling these private experiences.

The last verbal operant pertaining to describing and expressing private events of illness is intraverbal behavior. Intraverbal behavior is what is often considered conversational speech. Cooper et al. describe it as, "a type of verbal operant in which a speaker differentially responds to the verbal behavior of others" (p. 531). Peterson describes specific characteristics related to intraverbal behavior noting that the controlling variable is another verbal stimulus and that there is "no point-to-point correspondence between stimulus and the response" (Peterson, Foxylearning an Introduction to Verbal Behavior). In other words, intraverbal behavior is a communicative response to another communicative response that is non-identical. Examples of intraverbal behavior include many of the conversations we have on a daily basis or waving at someone when they say "hi". Intraverbal behavior is aligned with the expression of private events because individuals must be able to respond to the questions and statements of others in order to effectively and thoroughly communicate the private events they are bearing at that time. Intravebral behavior is equally as complex as other verbal operants but can be drastically more difficult to train due the complex and variable social nuances involved (Sundberg, 2011).

All three of the elementary verbal operants described above collectively make up the complex process of

communicating pain, injuries, and other private events. Each of these verbal operants is an influential underpinning that is necessary to consider and deeply understand when evaluating an individual's communicative repertoire, particularly in relation to expressing private events of pain, sickness, and even emotions.

APPLICATIONS

It is well established, through both current and historical research, that individuals with Autism Spectrum Disorder have pronounced deficits in communication. Many studies in the current body of research depict that these language limitations may put individuals with ASD at a greater risk of long-lasting health and medical concerns, over the course of their lifespan. Several approaches to address this dilemma have been proposed and assessed in research in Applied Behavior Analysis and other related fields. Some of the suggested measures include: teaching individuals with ASD to label and then communicate private events of pain and even emotion. Further research also assesses the risk for individual's with ASD to suffer from injury and illness. Additionally, some studies and anecdotal reports propose the concept that many people with Autism have a heightened tolerance to pain, greater than that of the average individual. The current body of available research puts the potential medical and health risks of individuals with ASD into a contextual perspective in which to best support individuals with Autism.

HEALTH AND MEDICAL RISKS ASSOCIATED WITH THE SPECTRUM

A series of studies have been conducted related directly to Autism Spectrum Disorder and the risk of medical conditions and health disorders, due to the diagnosis. May et al. explain that, “people with intellectual disabilities disproportionately have more health problems than the general population. Further complicating the matter is that people with more severe disabilities often cannot verbalize health complications they are experiencing, which leads to health problems being undiagnosed and untreated” (May & Kennedy, 2010, p. 4). Shavelle and Strauss published findings, in the late 1990s, demonstrating that, “persons with autism are subject to increased mortality risk” (Shavelle & Strauss, 1998, p. 220). Carr et al. make comparable claims explaining that, “physical illness is very common in people with developmental disabilities. In fact, a number of studies have documented substantially higher rates of both chronic and acute medical conditions in people with developmental disabilities as compared to the general population” (Carr et al., 2007, p. 413). All of these findings perpetuate the potential risk of individuals with Autism Spectrum Disorder for health and medical problems, over the course of their lifetime. This is pertinent for practitioners, parents, families, teachers, and other caregivers to consider carefully when supporting individuals on the Autism Spectrum.

Research conducted by Cohen et al. extend these findings into the field of pediatric medicine and the population to infants and young children. Cohen et al. evaluated the effect of evidence-based pediatric pain

assessments and make similar statements saying that, “pain is a frequent and vivid part of childhood, whether as part of routine care or a symptom of a chronic illness” (Cohen et al., 2019, p. 939). Cohen goes on to state that “untreated pain may have long-term negative and permanent repercussions on pain sensitivity, immune functioning, neurophysiology, attitudes, and health care behavior” (Cohen et al., 2019, p. 939-940). While Cohen’s statements do not directly correlate with Autism Spectrum Disorder, and related intellectual disabilities, the limited communicative repertoire of young children makes this demographic a strikingly similar population to the ASD population, in many respects.

AUTISM SPECTRUM DISORDER AND THE EXPRESSION OF PRIVATE EVENTS

One common treatment proposed in several studies is to target the communicative deficits of the individual and teach the person to first identify the private experiences of pain, injury, or illness and then train them to communicate these experiences to a caregiver to receive appropriate medical treatment, as needed. Stocco et al. conducted research using “public accompaniments” as a strategy for training and reinforcing communication of private events (2014). The authors define public accompaniments as, “public events that correspond, to some degree, with private events and provide an opportunity for members of the verbal community to occasion and reinforce acts of private events” (Stocco et al., 2014, p. 2). Stocco et al. provide the example of a child suffering the private event of a stomachache and the public accompaniment may be “a pale face” or the child

leaning over. At this time the parent may comment or acknowledge this experience and say 'It looks like your stomach hurts' and the child may reply that their stomach does hurt. The parent would provide reinforcement by offering options to ease the child's pain. The use of public accompaniments is a viable strategy to train individuals on the spectrum to identify their own private experiences and in turn access appropriate medical treatment, as needed.

However, another study by Nader et al. proposes a conflicting perspective to Stocco's suggestion of public accompaniments with pain. Nader et al. state that;

Given this lack of social responsiveness and language impairment, the expression of pain would also likely be altered, contributing to perceptions of atypical pain experience by parents or other caregivers. For example, if the child does not cry or seek comfort from a parent after an injury, it could be inferred that the child is not experiencing pain...Even if the children were to approach their parents, they would have difficulty verbally communicating their pain experience. They also have difficulties in the use of body gestures and understanding the language of others. Therefore, it is not surprising that these children do not seem to express pain or readily seek comfort from others when in distress (Nader et al., 2004, p. 89).

Nader's description of the limited communication and restricted emotional affect in the Autism population presents a conflicting standpoint to that of Stocco et al. Since the research by Stocco et al. emphasized the outward signs—or as they described public accompaniments—as a useful strategy to train individuals

with ASD to tact and communicate private events. However, the research by Stocco et al. does not address the reality that often individuals with ASD may not engage in outward expressions of these private events, as Nader et al (2004) noted.

Another study by Carr et al. (2007) evaluated the role that illness and pain may play in increasing problem behaviors in individuals with ASD and other related developmental disabilities (Carr et al., 2007, p. 413). The authors note that assessment of pain is often “difficult since many individuals have minimal verbal communication skills” (p. 413). Similarly, to the research conducted by Stocco et al., Carr et al. recommended utilizing a Functional Communication Training procedure to teach individuals to mand for medication, tact their pain, and generally communicate how they are “feeling” while sick. The researchers state that;

A functional communication approach could...teach communicative phrases relevant to obtaining attention or tangibles, thereby further helping the individual to cope with his/her illness. Perhaps, most critically, however, one might focus on teaching the individual to indicate (if not through speech, then through picture or sign language communication) the body part that hurts (e.g., “tummy sick”), thereby triggering appropriate palliative and supportive behaviors on the part of others. Systematic programs for teaching individuals to communicate complex “feeling” states have been available in the literature for some time (Lovaas, 1981)” (Carr et al., 2007, p. 421).

The research by Carr et al. reiterates the importance of closely monitoring individuals with ASD for potential

symptoms of pain and seizing these moments as opportunities to teach them how to communicate their needs at that time. This approach as described by Carr et al., closely replicates the use of public accompaniments as utilized in the research by Stocco et al.

Schmick et al. also conducted similar research pertaining to tact training of private events. Their research focused on three male teenagers on the spectrum and teaching these individuals to identify the private events of others based off of video-based scenarios (Schmick et al., 2018). Their research has the same intent and focus; however, they trained the individual to identify others' private experiences rather than identify their own personal private events. This study discusses the use of relational training, including both derived and trained relations, related to identifying private events as well. Schmick et al. describe that many individuals with ASD experience difficulties labeling and identifying emotions in themselves and in others. While their work does not directly train the identification of their own emotional experiences, the use of multiple exemplars and application of Relational Frame Theory may promote generalization of the emotional identification repertoire of these individuals (Schmick et al., 2018, p. 400). Their research presents a variety of training materials to the participants in order to promote generalization. In other words, the participants may be trained that someone is hurt by identifying a video where someone stubs their toe, scrapes their knee on a skateboard, or experiences a headache. Training that all of these different experiences all represent the same experience of hurt, promotes generalization and may in turn teach the individual to recognize the experience in themselves. The research

conducted by Schmick et al. notes that the use of multiple-exemplar training can be a viable and impactful treatment option to promote both to identify the private events of others as well as generalize these skills to novel emotions and experiences.

McHugh et al. also utilized multiple-exemplar training as a strategy to train and promote generalization of emotional recognition in three young children. The research conducted by McHugh et al. employed video modeling as a means to train 3 individuals with Autism to, “tact situation-based emotions” (McHugh et al., 2010, p. 1). Similarly, to Schmick et al., McHugh et al. used multiple-exemplars to further promote generalization to new or novel videos. In this research, they specifically targeted the children to identify the emotions of happiness, sadness, anger, and fear in the individuals in the videos. The research was conducted by first training on 1 emotion and, then utilizing a multiple-baseline design, extending the study by then training on the following emotion. The findings in this study corroborate the results from research by Schmick et al., indicating that video modeling and the use of multiple exemplars is a viable training option to teaching individuals to recognize and label (i.e., tact) the emotions of others. While this study does not directly target and train individuals to recognize their own personal experiences of emotion, the use of multiple-exemplars promotes generalization and may in turn lead to identification of private experiences of happiness, sadness, anger, and fear that could then be extended to pain or sickness.

PAIN ASSESSMENTS AS TOOLS TO SUPPORT INDIVIDUALS WITH AUTISM

A slew of studies indicate the vital need for effective assessment tools to identify and then treat the pain and illness that individuals with Autism Spectrum Disorder will experience in their lifetime. As demonstrated through a range of research, the communicative deficits of ASD limit the repertoire in which many of these individuals may expressively relay their private events of pain. It is the responsibility of the medical professional, caregiver, parent, and other involved parties to utilize individualized and systematic assessment tools to evaluate the current health and medical state of the individual they are supporting. The span of the research related to medical assessment tools ranges from qualitative to quantitative assessments, including reports from parents to even assessing non-verbal cues of the individual. While medical assessments are not inherently behavior analytic, in nature, the use of these assessment tools may provide a valuable aid in supporting individuals on the Autism Spectrum. Especially in communicating private events of pain or training caregivers to recognize the nonverbal signs associated with private experiences of pain linked to the Autism population.

Research conducted by Elizabeth Ely et al., discussed options for allowing individuals with ASD to communicate their pain, in order to help manage their injury. Ely et al. examined how “the core deficits of ASD may interfere with this population’s ability to effectively use traditional pain assessment tools” (Ely et al., 2016, p. 53). Ely et al. described individualized communication methods for children with Autism to share their

experiences with pain, and “identify vocabularies that hold meaning with respect to pain to better understand pain from their context” (Ely et al., 2016, p. 53). Unlike the previous research mentioned—by Stocco et al. (2014), Carr et al. (2007), and Schmick et al. (2018)—Ely did not design or produce a training program to facilitate the communication of pain, rather Ely et al. developed a series of questionnaires and emphasized an individualized approach to pain management (Ely et al., 2016, p. 53). Ely et al. also prioritized parent involvement saying it, “was essential, both in helping interpret the child’s needs and providing trusted support” (Ely et al., 2016, p. 53). Parents and their role are not even referenced in the previous communication-based studies. Undoubtedly, parents become the experts on their children and are often keen at identifying their child’s pain.

There are several aspects of the research produced by Ely et al. that are beneficial to note for parents, caregivers, medical professionals, and other practitioners who support individuals on the spectrum. One helpful aspect of the work is the carefully curated questions that may help guide individuals with ASD to answer more accurately about the experiences of pain and injury that they may be experiencing. Noting these guided questions is useful to future practitioners and parents, alike, because it allows them to utilize the framework of these questions to support individuals with ASD. Some of the questions include, “can you draw a picture of some pain or hurt you have had?...Can you show me/mommy/daddy what hurts?...When you feel hurt or pain what do you do to make yourself feel better?” (Ely et al., 2015, p. 55). Using questions similar to this and modifying wording and

language, utilizing visual aids and gestures, and collaborating with parents and other caregivers are all advantageous techniques to ensure that the needs of the individual are best being met.

EXPERIENCES OF PAIN IN AUTISM

As noted previously, many published pieces indicate that individuals with ASD, or other related developmental disabilities, experience medical and health related issues at an increased rate than the general population. However, some studies suggest that these individuals with Autism may also experience pain differently than someone without Autism. While these findings may lean slightly out of the scope of Applied Behavior Analysis, and into the medical field, it is vital for future Behavior Analysts to be privy to these findings as practitioners supporting the Autism population. Clarke (2015) described that, “altered pain thresholds are a recognized feature of...Autism Spectrum Disorders (ASD)” (Clarke, 2015, p. 2). He continues and explains that it is common for individuals with ASD to have “unusual ways” of experiencing pain (p. 2). He provides an anecdotal example of an individual experiencing pain, “denying pain but describing such noxious stimuli as dental extraction as ‘discomfort’” (p. 2). Symons et al. (2009) make similar statements in their research stating, “a long standing but untested clinical impression about individuals with intellectual disabilities who self-injure is that they are insensitive to pain and/or the perception of pain is diminished” (Symons, 2009, pp. 521-522). Symons et al. elaborate indicating that these hypotheses are founded on observations of individuals with ASD who

engage in severe and dangerous self-injurious behaviors, that the average person would find excruciatingly painful (p. 522). Nader et al. also discuss in their research that, “children with autism have been described as having ‘reduced pain sensitivity,’ ‘not feeling pain as intensely as others,’ having an ‘indifference to pain,’ and having a ‘high threshold for pain’ Nader et al., 2004, p. 88). All of these researchers demonstrate that many past studies and findings have linked heightened pain sensitivity with the Autism population.

However, many published findings have contrasted greatly with these opinions stating that it is unfounded, inaccurate, and speculative that individuals with Autism Spectrum Disorder have a differing threshold of pain than the general population. Nader et al. (2004) explain that, “remarkably, most of these reports of altered pain sensation have been based on anecdotal observations and clinical impressions” (Nader et al., 2004, p. 88). Nader et al. continue and emphasize the need for further empirical evidence to support these claims of pain insensitivity in the ASD population. In the research conducted by Nader et al., they examined 21 young children’s pain reaction to a medical procedure of venipuncture (p. 88). The researchers videotaped the procedure for each child and used the child’s facial activity as a means of objective pain measurement. Their findings indicate that, “children with autism should be viewed as being as reactive to painful stimuli as children without autism and do not support beliefs about pain insensitivity in children with autism” (Nader et al., 2004, p. 96). Nader et al. also illuminate that children with ASD “display a substantial facial pain reaction” to painful stimuli, such as a needle in this research study (p. 94). These findings contrast

considerably from the claims that people with Autism do not experience pain in a similar manner to individuals without Autism.

Symons et al. published research in 2009 that corroborates the same findings as Nader et al. In the research conducted by Symons et al., they utilized a pain assessment checklist to compare the non-verbal signs of pain in individuals with developmental disabilities, who also exhibit frequent and recurring episodes of self-injurious behaviors. The researchers utilized this pain scale checklist to monitor non-verbal signs of pain and distress in individuals with intellectual or developmental disabilities. Their results, similarly to Nader et al., show that their findings, “are not consistent with a model of pain insensitivity for individuals with self-injury” (Symons et al., 2009, p. 525). They divulge that their results indicate that individuals who exhibit severe self-injury also have a range of associated non-verbal signs of pain. Symon’s findings reiterate and indicate that individuals with ASD and developmental disabilities do indeed experience pain, similarly to the general population. These findings directly contrast with the proposed concept that individuals with ASD do not experience pain comparably to people without Autism Spectrum Disorder.

Clarke (2015) further demonstrates these findings and emphasizes the significance of future empirical research on the topic of pain sensitivity in the Autism population (Clarke, 2015, p. 2). Clarke also states that it is crucial to be mindful of the potentially limited vocabulary often associated with ASD. He elaborates that, “when enquiring about pain, it may be useful to be mindful of a wider vocabulary, enquiring about ‘discomfort’, ‘anxiety’, and so

forth” (p. 2). Individuals may relay severe and painful experiences in more understated terms, not because the pain is not severe, but simply because they do not have the language to more accurately and precisely describe their painful experience. He denotes that it is of upmost importance as a practitioner to be cognizant of the linguistic and communicative repertoire of individuals on the spectrum in order to best identify and treat the pain these individuals are enduring.

ETHICAL CONSIDERATIONS

In the field of Applied Behavior Analysis, the presiding code relating to ethics and ethical decision making is determined by the Professional and Ethical Compliance Code for Behavior Analysts, often referred to as the PECC (BACB 2014). The PECC is a collection of codes that guide Board Certified Behavior Analysts’ practice with clients, families, and other related parties as well as treatment development and the procedures used that directly impact the lives of clients. As discussed throughout the development of this research, Applied Behavior Analysis can systematically train and target many of the communicative deficits of ASD, in order to help this population access medical treatment as needed. With the described topic in mind, there are many ethical considerations that must be considered related to the PECC. Some of these codes include; 1.02 Boundaries of Competence, 3.02 Medical Consultation, 4.03 Individualized Behavior-Change Programs (BACB, 2014, pp. 2-13).

The first referenced code related to the topic at hand is 1.02 Boundaries of Competence. With this specific code

the PECC outlines that practicing BCBA's must "provide services, teach, or conduct research only within the boundaries of their competence, defined as being commensurate with their education, training, and supervised experience" (2014, p. 4). Remaining within the boundary of competence, in regard to health and medical concerns, is especially pertinent since Board Certified Behavior Analysts must monitor and teach many of our consumers with ASD to communicate their experiences of pain, however BCBA's are not credentialed to treat these medical concerns and must collaborate with responsible medical experts. As professionals it is important to clearly distinguish the boundaries of the field and thoroughly recognize when collaboration with other professionals is necessitated.

One of the most important codes related to this specific topic is 3.02 Medical Consultation. When Behavior Analysts are undergoing assessment procedures to identify function and potential intervention procedures to treat problem behavior of consumers, it is specifically outlined in the PECC that any potential medical factors should be carefully considered. As discussed throughout this research, individuals with ASD and other related developmental disabilities have more prevalent health and medical concerns, this phenomenon is essential to consider as a practicing BCBA. The PECC describes that, "Behavior analysts recommend seeking a medical consultation if there is any reasonable possibility that a referred behavior is influenced by medical or biological variables" (p. 11). The PECC does not outline further what constitutes a reasonable possibility, but carefully examining all environmental and potential biological

factors throughout the assessment process is pertinent to the greatest benefit to the consumer.

Another code relevant to this topic is 4.03 Individualized Behavior-Change Programs. According to the PECC, “Behavior analysts must tailor behavior-change programs to the unique behaviors, environmental variables, assessment results, and goals of each client” (p. 12). This specific code is apposite to this current topic, because it is necessary for the practicing BCBA to design an intervention that meets the diverse and specific behavioral needs and supports for the clients that they serve. As discussed throughout this research, many individuals with ASD and other related developmental disabilities have deficits in communication and additionally are more likely to experience pain, injury, and other medical difficulties over the course of their lifespan. With this information in mind, it is the responsibility of the ethical Behavior Analyst to design specific programming to monitor and train the supported consumers to access medical treatment as necessary. This support may be targeted through specific checklists for caregivers and staff related to diet, bowel movements, sleep, and the like or dependent on the individual may take place in the form of a specifically designed Functional Communication Training procedure. It is also important for the ethical Behavior Analysts to be extremely cautious when spontaneous problem behaviors arise. Often these seemingly sporadic behaviors may be tied directly to pain and sickness. These important aspects of this topic should be considered carefully and incorporated appropriately into the consumer’s ongoing treatment plan.

While in an ideal world with bountiful resources,

working closely with medical professionals throughout the Functional Behavior Assessment (FBA) and intervention process would be best practice undoubtedly. However, there are notable and apparent constraints that must be considered for real life application of these ethical standards. Some of these possible constraints include limited time and financial resources, as well lengthy waitlists to see appropriate medical professionals. When conducting an FBA and developing an intervention for a new consumer there is often an allotted and restricted amount of time and hours from the funding source. Meaning that the FBA must be conducted and completed in a timely manner. Additionally, families and caregivers are frequently eager and even desperate to intervene and find a resolution to the problem behaviors the consumer may be demonstrating. While it is most certainly best practice to conduct a thorough medical examination firstly, to rule out medically induced problem behaviors, this may not always be feasible. Considering a client who engages in severe physical aggression, property destruction, or self-injury their family and support system are sometimes in dire need of effective treatment and it may require an intervention be put in place, prior to a thorough medical examination. It is even possible, that due to the severity of the problem behaviors that a medical professional may deny the examination altogether due to safety precautions. Furthermore, many medical professionals and specialists have extended waitlists, sometimes upwards of several weeks and months. It is not ethically responsible to limit behavior analytic support when problem behaviors may place caregivers in extremely dangerous situations. Behavior Analysts may put placed into difficult situations,

as demonstrated by this example, where a decision to support the individual and maintain client and caregiver safety may be placed above another aspect of the Ethics Code. Situations such as these must be carefully considered, in order to determine what the best course of action may be.

FUTURE DIRECTIONS

The current supports available in the field of Applied Behavior Analysis involves specific procedures to train individuals on the Autism Spectrum to identify and communicate their private events of pain or emotions as well as using careful monitoring systems for parents and caregivers. While these supports have been tested and demonstrated through systematic research to be effective interventions, there are still gaps in these treatments that may be addressed through future treatment procedures and developments. There are many directions that these treatments may go in the future, but one of the greatest potential developments for this area of the field lies with continuing developments in technology. Two predominate areas available in the current research, that show great promise for this area of the field, include the use of Virtual Reality and robotics. These two uses of technology have great potential as applied treatments to address and further develop the communicative repertoires of many individuals with ASD and allow these individuals to access the appropriate medical treatment when they experience pain, sickness, or injury.

The use of Virtual Reality (VR) as a treatment option to train individuals with ASD to label and express private events of pain, injury, and even emotion is a technology

that is presently being developed and tested in current research. In the past decade the use of VR as a treatment option has been increasingly prevalent, specifically in the arena of Autism research. Didehbani et al. (2016) conducted research on the use of Virtual Reality as a social skills training tool, Ke and Im (2013) assessed the impact VR could have on communication and social interaction of individuals with high-functioning Autism, and Parsons and Cobb (2011) evaluated previously published research and the use of Virtual Reality as a training tool for individuals with ASD. All of these pieces of research provide evidence that Virtual Reality can be an effective teaching and training tool for individuals on the spectrum.

Each research noted why the technology of Virtual Reality is a viable technology for treatment for individuals on the spectrum. Parsons and Cobb explain that, “VR is argued to offer particular benefits for children on the autism spectrum, chiefly because it can offer simulations of authentic real-world situations in a carefully controlled and safe environment” (Parsons & Cobb, 2011, p. 355). They elaborate noting that VR can be implemented as a technology to train for social and life skills, because many of the variable aspects of the natural environment are removed with the use of this technology. Additionally, Didehbani et al. explain that VR is a more advantageous treatment option compared to many traditional social skills interventions. They explain that, “First, it [VR] can produce safe, unlimited, and commonly encountered day-to-day contexts to practice social scenarios” (Didehbani et al., 2016, p. 704). They note that VR has been demonstrated as an effective technology to teach social skills such as conversations

with peers and even finding a classmate to sit with at lunch. They emphasize that the use of VR as a training tool may also help eliminate or reduce anxiety or social discomfort that may be present if the training were conducted in real time. Providing these trainings via VR can allow the individual to experience these social situations and rehearse appropriate responses repeatedly to gain the target skills. VR removes the unpredictability that exists in naturally occurring social situations and can promote the individual to generalize these newly developed skill sets into real life situations (p. 704).

While these researchers did not specifically target communication-deficits related to pain and injury, communication and social skills are prevalent targets with the use of Virtual Reality training. Future research may employ VR as a means to expose individuals with ASD to private experiences and provide training on how to express these experiences to receive appropriate treatment and care. For instance, an individual with ASD could be shown an experience—through Virtual Reality—of riding a skateboard and falling off and skinning their knee. The subsequent steps could involve prompting the individual to label the experience as painful and then request First-Aid from a parent or other caregiver. These scenarios can be varied and systematically modified to promote generalization into real world experiences, as they naturally occur. Using VR as a training tool for individuals to express private experiences of emotions and even pain and injury allows massed practice and opportunities outside of occurrences as they naturally occur.

One outstanding and notable deficit in the presented research related to Virtual Reality as a training procedure

for individuals on the Autism Spectrum is that research has only targeted its use with higher functioning individuals. As research in this niche technology is expanded, individuals of all communicative and cognitive abilities should be incorporated. Including individuals on the spectrum with limited communicative repertoires is of upmost importance, specifically with the topic at hand, because VR technology could allow these individuals an opportunity to target communication. Furthermore, VR could allow individuals with ASD with restricted communication to experience private events virtually and then be trained to express what they experienced. Generalization of this skill set could be systematically trained and programmed for accordingly in order to promote the use of this skill in the natural environment. The use of Virtual Reality has great potential to benefit many individuals with ASD in the foreseeable future, however the technology must continue to further develop in order to benefit the diverse population represented on the Autism Spectrum.

Another technology that has been demonstrated in some aspects of current research as a promising treatment and support option to for the Autism population is the use of robotics. Current research has displayed the use of robotic technology to aid people on the spectrum in social situations (Feil-Seifer & Maja J. Matar , 2009), other studies have demonstrated its effectiveness as a tool to teach emotional expression and recognition (Pioggia et al., 2005), and other research has taught individuals on the spectrum to increase and maintain appropriate eye contact (Goldsmith & LeBlanc, 2005). The current scope of research related to robotics and the treatment of ASD has been limited predominately

to social skills and training these skill sets in predictable and repeated practice with a therapeutic robot. The research has demonstrated its effectiveness because it removes any unnecessary aspects that may interfere with training. The research is then systematically generalized to appropriate social settings in real time, similarly to the use of Virtual Reality technology.

While the current body of available research does not demonstrate the use of robotics related to the expression of private events of pain or injury specifically, it is not a far reach to utilize this technology as a means to train individuals to recognize and express their private events of pain or even potentially design a piece of technology that can closely monitor the individual's vital signs, temperature, affect, nutritional intake, gastrointestinal functioning, and other related health and medical concerns that would be pertinent to monitor to ensure the child is healthy and safe. A piece of technology that could identify, monitor, and then report these symptoms would undoubtedly result in a significant increase in the well-being of many individuals on the Autism Spectrum. This technology could easily be paired with a Functional Communication Training program that takes the report generated by the robotic technology and a therapist prompts the individual to communicate the painful experience. Examples of this include, but are not limited to, the robot noting the individual's blood sugar is low and the therapist prompts the individual to express feelings of hunger. The assistive technology could notify a parent that their child is feeling hot and feverish, the child could then be prompted to use their Augmentative Communication Device to express feelings of warmth or fever. The use of this technology could provide ongoing

and detailed monitoring that would effectively address both the communication deficits and potential medical concerns associated with ASD.

While the current technology is not available to provide this level of service, technology is increasingly more available and specific to the needs of a variety of consumers. This type of robotic technology could easily be adapted to a slew of high-needs populations including infants, the elderly, or the terminally ill. Having a robotic technology that can closely monitor these individuals on an ongoing basis and then prompt a communicative response would enable all of these populations to access the necessary treatments and medical care required to maintain their well-being.

CONCLUDING REMARKS

The field of Applied Behavior Analysis has targeted a variety of behaviors, diagnoses, populations, and the like over decades of research. Many of the specific strategies used in ABA target and treat the communicative deficits often characteristic of individuals on the spectrum. As research has depicted many of these individuals, specifically those individuals with limited communicative repertoires, often have difficulties expressing private events of pain and injury and may suffer a heightened rate of injury and illness over the course of their lifetime because of their limited communicative repertoires. Currently, in the field of ABA, Functional Communication Training and monitoring systems have been designed to teach individuals on the spectrum to express how they are feeling, as well as allow caregivers to monitor non-verbal signs that may display how they

are feeling. As specific technologies are further developed and introduced to this population—potentially Virtual Reality and robotics—many of the gaps in available supports and interventions for this population, as well as others, may be reduced. It is pertinent to Behavior Analysts, special education teachers, parents, and other caregivers to be cognizant of how the communication deficits associated with Autism Spectrum Disorder may put this population at a heightened risk for medical and health concerns. These caregivers should in turn monitor closely and utilize available technologies to promote communicative repertoires to express private events of pain, sickness, and injury in order to access appropriate medical care.

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CHAPTER 9.

**THE EFFECTS OF PRECISION TEACHING
AMONG THE LEARNING DISABLED
POPULATION**



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Over the years there have been discrepancies on how to define learning disability (LD). The National Joint Committee on Learning Disabilities (NJCLD) defined learning disability in 1990 and it was later updated. The National Joint Commission on Learning Disabilities provided the current definition as,

Learning disability is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur across the life span. Problems in self-regulatory behaviors, social perception, and social interaction may exist with learning disabilities but do not by themselves constitute a learning disability. Although learning disabilities may occur concomitantly with other handicapping conditions (for example, sensory impairment, mental retardation, serious emotional disturbance), or with extrinsic influences (such as cultural

differences, insufficient or inappropriate instruction), they are not the result of those conditions or influences. (National Joint Commission on Learning Disabilities, n.d.)

This is a lengthy and complex definition and one that is not agreed upon. This disconnect lends itself toward misconceptions. To assist in understanding learning disabilities, the National Association of Special Education Teachers (NASSET) in its online article, Introduction to Learning Disabilities, (2018/2019) lists eight myths that surround this disorder.

The eight myths are paraphrased here and relate to student intelligence, student motivation, as being dyslexic only, as being a childhood affliction only, it effects more boys than girls, it is diagnosed in early grades, it only effects academic progress and it denies student success in college.

In fact, for those students having learning disabilities, these myths are all unfounded. To begin, having a learning disability does not diminish a student's intelligence and the reality is that many students are above average intellectually and may also be gifted.

It is important to diagnose children early to put them on a path to success. Students not professionally identified in their early years may be told they are lazy and unmotivated to learn. This stigma can stay with them into adulthood and effect their confidence throughout a lifetime, academically and emotionally, effecting every part of their life.

Over the years, adults may have learned to cope with their learning disabilities, but science shows they do not out-grow them. There is no LD fix but there are strategies

that enhance their learning processes. However, through early intervention, coping skills can be developed that may help students to succeed in life, including earning a college degree, improving interactions in the workplace and in their personal life. There are many types of learning disabilities but dyslexia may be the one most recognized.

Lastly, while some studies state that there appears to be more boys than girls affected by learning disabilities, other studies refute that information and state both boys and girls are about equally effected.

As stated above, to achieve the best possible outcome for success, it is important that learning disabilities be identified early and have a timely presentation of interventions. It is known learning disabilities are neurobiological in origin and don't affect the ability to learn but they do affect the way the brain processes information. Think of it as a road map. For individuals with neurotypical learning functions, they find the direct path to their destination – individuals with learning disabilities see the map but take the route with a few more twists and turns. While people with learning disabilities are capable of ending at the same destination, they take a different path.

The Center on the Developing Child at Harvard University in their article, Building the Brain's "Air Traffic Control" System: How Early Experiences Shape the Development of Executive Function..., has compared the brain with the similar actions of a highly effective air traffic control center system. It means "being able to focus, hold, and work with information in mind, filter distractions, and switch gears... like having an air traffic control system at a busy airport to manage arrivals and

departures of dozens of planes on multiple runways” (2011, p.1). The good news is that individuals are able to learn these functions as they are not born with them.

In an accompanying flyer to the 2011 Harvard report titled Executive Function: Skills for Life and Learning (n.d.), it is suggested that once the child is in the educational system more often than not, it is their teacher who is the first to recognize difficulties. Some of the issues that teachers are inclined to notice is the inability for students to have impulse control, not being able to focus attention and follow directions plus exhibiting the lack of organizational skills. There are consequences when these problems are mislabeled. Too often they are deemed to be “bad behavior.” When misplaced labels are given it can lead to “a highly disrupted classroom, preventable expulsions, or the inappropriate use of psychotropic medications” (Center on the Developing Child at Harvard University, n.d.).

Generally, people are not familiar with the principles of behavior analysis unless they are professionally involved with it. They are unaware how it is used and what achievements may result from its use. Some may also believe that it is only used among the Autistic Spectrum Disorder (ASD) population, which is partly true. Behavior analysis has become a great intervention for working with individuals on the ASD spectrum and is becoming more widely known among those who have direct relationships with that population. However, behavior analysis can also be used for many different types of venues, including criminal justice, sports, organization management and animal training.

The focus of this paper is the use of behavioral analysis as it pertains to Precision Teaching to help individuals

with learning disabilities. Precision Teaching is a behavioral analysis strategy system that measures student learning progress but does not disrupt instructor teaching methods or curriculum. This research will provide the history of Precision Teaching, highlight how it is used, and showcase the entire package that leans on self-monitoring to achieve goals leading to student success. Using data collection and charting, it will highlight learning in a new and different way, one that is individualized for the child's unique learning style.

In the late 1960's the father of Precision Teaching, Ogden Lindsley, discovered that using the "clearest terms were the most basic plain English words" (1991a, p.450). The plain English descriptions were more to the point and less confusing than when using technical jargon. As humans, we are fluent listeners and speakers of the basic words that Lindsley discussed. These are words that have been used most often and in doing so they make us feel comfortable. It makes sense then, when working with individuals with learning disabilities, parents and professionals choose to use common, simple terms of plain English that benefit everyone.

While this paper is meant to discover and explain behavior analysis in terms of its use with Precision Teaching, it could easily be written using technical jargon. However, this paper follows the example that Lindsley developed which includes using plain understandable language to be accessible to anyone who wants to learn from it. Learning should never be a chore, but yet it is for many people with learning disabilities. In this research, the writing will include a balance of using technical terminology and plain English. In agreement with Lindsley, in using common wording "we instantly know

their meanings without having to think about them” (1991a, p.450).

HISTORICAL OVERVIEW

LEARNING DISABILITIES

The term learning disabilities is familiar to many people; however, they may not understand how learning disabilities truly affect those who carry this label. In the 2014 National Center for Learning Disabilities (NCLD) comprehensive report, *The State of Learning Disabilities*, it was estimated that “in the U.S., 1.7 percent of the population reports having a learning disability, totaling 4.6 Americans” (Cortiella, C. & Horowitz, S. H., p. 25). While the number of Americans afflicted with this disorder is large, it is also estimated that many other individuals never become aware that learning disabilities are at the root of their lifelong difficulties.

Learning disabilities are with the individual throughout their lifetime, but recent research has discovered that the brain can change or become rewired through the process identified as neuroplasticity. Sheldon H. Horowitz, stated, “learning disabilities are not a prescription for failure. With the right kinds of instruction, guidance and support, there are no limits to what individuals with LD can achieve” (Cortiella, C. & Horowitz, S. H., 2014, p. 3). The hope is that this research expands the literature regarding learning disabilities and adds value to those who are also researching it.

There is no universal definition of learning disabilities. In a report dated 2018/2019, according to the National Association of Special Education Teachers (NASSET), the term itself “learning disabilities” was first used on April 6,

1963 by Samuel A. Kirk who was speaking at the Chicago conference on Exploration into Problems of the Perpetually Handicapped Child. To highlight its complexities, several organizations provide information to confirm that no professional definition currently exists. The National Center for Learning Disabilities (NCLD) stated that “reading, math, written expression” are most affected by this disorder (2014, p. 3). However, the Learning Disabilities Association of America (LDA) wrote that learning disabilities interfere with skills such as “organization, time planning, abstract reasoning, long or short-term memory and attention” (n.d., p. 1). These statements are somewhat different from how the National Joint Commission of Learning Disabilities (n.d.) described learning disabilities saying that learning disabilities effect skills related to “listening, speaking, reading, writing, reasoning or mathematical abilities” (n.d.). While some of these descriptive terms overlap, NASSET further stated that “there is no clear and widely accepted definition of learning disabilities. Because of the multidisciplinary nature of the field, there is an ongoing debate on the issue of definition, and currently at least twelve definitions appear in the professional literature” (National Association of Special Education Teachers, 2018/2019, p.1).

While the term now seems to be widely known, it was only starting to be discovered a little over a century ago. In 1877, neurologist Adolf Kussmual from Germany used the term “word blindness” to describe individuals who had the ability of full sight, intellectual speech but were unable to comprehend the information they were reading. In the 1963 Proceedings of the Royal Society of Medicine, Hinshelwood (as cited in Ingram, 1963) stated

that word blindness was “a congenital defect occurring in children with otherwise normal and undamaged brains, characterized by a disability in learning to read so great that it is manifestly due to a pathological condition and where the attempts to teach the child by ordinary methods have completely failed” (p. 199).

It was not until 1905 that the United States (U.S.) first published a report addressing childhood reading problems. This publication shed light on learning disabilities and led the way for further understanding of the disorder. The term learning disabilities has now been introduced to the public so professionals, parents and students have a name for the academic difficulties learning disabilities cause. It wasn't until 1969, however, that services became available for individuals conflicted with a learning disability through the U.S. Department of Education, Office of Special Education Programs. The 1969 new Specific Learning Disabilities ACT mandated that the federal law must provide students with learning disabilities support services. Today learning disabilities are still supported by the federal government and have evolved into the practice that school educators have the authority to identify students that have learning disabilities and make recommendations that concern these students and their parents.

Strides have been made to secure support for individuals with learning disabilities and over the year's researches have been studying possible causes of this disorder. LD Online timeline reported that in 1996 Dr. Guinevere Eden and her colleagues from the National Institute of Mental Health conducted a study in which a magnetic resonance imaging (MRI) scan was used to map out regions of the brain. Based on the MRI results,

researchers learned that the brain acts in a different manner with individuals having dyslexia (LD Online, 2006, p.1). This historical research has been vital to better understanding the workings of the brain. Additionally, the LD Online timeline reported that in 2005 Dr. Jeffery Gruen and his team of researchers identified a gene that portrayed patterns and variations that were strongly associated with dyslexia (LD Online, 2006, p. 2). With a better understanding of how the brain is directly correlated to learning disabilities, researchers can find the best approaches to helping those with a learning disability.

This study intends to introduce Precision Teaching as a teaching strategy to improve student success for those who have learning disabilities.

PRECISION TEACHING

In 2018, Evans provided a definition of Precision Teaching as “a system for precisely defining and continuously measuring dimensional features of behavior, and graphing and analyzing behavioral data on the Standard Celeration Chart (SCC) to make timely and effective data-based decisions to improve behavior.” She emphasized that Precision Teaching can be misunderstood and may be confused for being a program, a method of teaching or even a curriculum. But it is not any of these. It is a system that has been used to change behaviors including “teaching a learner diagnosed with autism to communicate, to training athletes and surgeons” (Evans, 2018).

Precision Teaching (PT) originated in 1964 when

Ogden Lindsley first applied the principles of functional behaviorism analysis with the use of count per minute measurement (Binder, 1990). Lindsley's background included that he was a decorated veteran of World War II serving the Air Force from 1942-1945 and he later earned an A. B. (Latin for B. A.) degree in Psychology and a Master's Degree in Experimental Psychology from Brown University. Lindsley later enrolled at Harvard University to pursue a Ph.D. in Psychology. During that time, he was approached by B. F. Skinner about accepting a graduate teaching assistantship in Skinner's course, Natural Science. The exposure to Natural Science taught Lindsley about the influence of behavior shaping and impacted him to use behavior analysis principles in his study of psychology. During that time, Skinner was Lindsley's major advisor (Potts, L, Eshleman, J. W., Cooper, J. O., 1993). Lindsley eventually became the director of the Behavioral Research Laboratory at Harvard Medical School and held that position from 1953-1956. While working in the lab at Harvard, Lindsley analyzed the behavior of those who were diagnosed with schizophrenia. This has widely been identified as the first human operant laboratory. By 1965 Lindsley began to shift his interest from laboratory work to that of training teachers in special education. It was about that time when Lindsley coined the term we know today as behavior therapy.

Ogden Lindsley, however, is known best for his contributions in Precision Teaching. Precision Teaching is rooted in free-operant conditioning meaning "students are free to respond at their own pace without having restraints placed on them by the limits of the materials or the instructional procedures to the teachers" (Lindsley,

1990, p. 10). At that time, Lindsley was successful in using specific methods to change the behaviors of children and adults who were psychotic. Lindsley wanted to expand his findings to be used in the school setting to help students who displayed difficulty in learning (Potts et al., 1993). His research showed “frequency to be 10 to 100 times more sensitive than percentage correct in recording the effects of drugs and different reinforcers” (Lindsley, 1990, p.10). During that time researchers were typically using percentages to interpret their outcomes regarding the academic behaviors of school children. To reinforce his discovery, Lindsley invited educators to observe his lab hoping to convince them that for increased accuracy, they should use frequency of response as part of their evaluation. Lindsley’s work was now totally focused on special education teaching and training.

Skinner came to believe there was a new way of understanding a person’s psychological state and that both behavior and the environment contributed to it. Skinner also began to focus on three new ideas to improve measuring and evaluating student progress. These ideas will be mentioned briefly here and explained in more detail in the discussion of the theoretical underpinnings of this research. The first idea was the development and use of the Standard Celeration Chart that would measure student progress correctly. Next, for accuracy, was to show others how to properly chart observed behaviors on the Standard Celeration Chart. Then finally, was the task of how to teach educators to adopt the use of plain English when using Precision Teaching methodologies (Potts et al., 1993).

Precision Teaching as a science has contributed to influential discoveries about human behavior. Precision

Teaching has also brought forth practical means to use it in the classroom for assessing performance and learning changes (Potts et al., 1993). While Lindsley claims to not have developed Precision Teaching, he writes, “it would be accurate to say that I founded and coached it” (Lindsley, 1990, p. 10). Today it is the practice that professionals who use Precision Teaching strategies have a background in learning disabilities and specialized training in how to use Precision Teaching strategies accurately.

THEORETICAL UNDERPINNING

BEHAVIORISM

The theoretical underpinning of this research is behaviorism and Precision Teaching. The founding fathers of behaviorism were Ivan Pavlov, John B. Watson, and B. F Skinner. They took a new approach within psychology that human behavior could be researched in a scientific manner. The New World Encyclopedia (n.d.) explained that this revised approach expanded the theories of learning to include results based entirely on reactions to stimuli in the environment using the process of conditioning. This was a significant turning point in psychology as a scientific discipline. The new discovery led to extensive research in comparative psychology and experimental psychology providing valuable data on how both animals and humans learn appropriate responses to their external environment.

While defining behaviorism, Skinner wrote, “behaviorism is not the science of behavior; it is the philosophy of that science” (1974, p. 208). Behaviorism is objective rather than subjective. Merriam-Webster

defines objective as “expressing or dealing with facts or conditions as perceived without distortion by personal feelings, prejudice, or interpretations” (n.d.). Behaviorism analyzes behavior at a detailed and necessary sequential level emphasizing observability (Moore, J., 2011).

SUBGROUPS OF BEHAVIORISM

In reflecting on the historical information in this research, it is evident that new ideas or concepts grew from previous work. With that understanding, theories that grew through the past works on behaviorism include radical behaviorism, methodological behaviorism and operant conditioning. They will briefly be discussed here because being informed about the various perspectives regarding private events, public events and observation requirements is important to understanding Precision Teaching and how the total person is being evaluated.

B. F. Skinner created the subgroup of behaviorism known as radical behaviorism. The philosophy built around radical behaviorism is to acknowledge the processes on which events are based upon (Cooper, J. O., Heron, T. E., & Heward, W. L, 2007, p. 13.) According to Skinner, behavior is an event that can be observed and that private (inner) events and public events are to be considered. Skinner believed that behaviorism in its own right names the portion of functioning within an organism that includes interactions with its environment (Moore, 2011). Skinner made three assumptions regarding radical behaviorism. First, Skinner believed that one’s inner behavior, such as thoughts and feeling are in fact, a behavior. Second, Skinner made the assumption that “behavior that takes place within the skin is

distinguished from other ‘public’ behavior only by its inaccessibility” (Cooper et al., 2007). Lastly, Skinner stated that private behaviors were influenced by the identical variables as publicly accessible behavior (Cooper et al., 2007). Each behavior is to be observable by an independent observer.

Radical behaviorism relies on the perspective that knowledge is a behavior, not just a logical phenomenon, and is to be understood in terms of contingencies (Moore, 1995b). Skinner’s radical behaviorism demonstrated a relationship between behavior and the environment. As noted earlier, Skinner uncovered that the environment was influential to behavior. His theory included that private events could become public events. This concept is important in regards to Precision Teaching as both types of behavior are to be considered.

In opposition to radical behaviorism, methodological behaviorism was introduced by John B. Watson. Watson’s theory did not include introspective methods (inner events). He believed that only public events could be observed and were, therefore valid. Calkin (2003) shared that methodological behaviorism required there to be two independent observers to substantiate an event.

Finally, another subgroup of behaviorism is operant conditioning, also developed by Skinner. Much of this research was not done using humans, but animals. Vargas (2003) reminds the reader that operant conditioning uses reinforcement or punishment to change behavior. It does not address private and public behavior. In many cases, the reward for improved behavior may be candy. Opposition to operant conditioning included that animals and humans are so different that the results of

the animal experiments may not transfer into human behavior.

Precision Teaching then, attempts to translate tasks into a behavior that can be observed. Understanding the basic differences in these subgroups will assist the researcher in being more informed. It's important to recognize that these differences play an important role to understanding behavior associated with Precision Teaching.

PRECISION TEACHING

Precision Teaching (PT) is a system used to assist children and young adults to be successful learners. Much like radical behaviorism, Chiesa (1994) stated Precision Teaching used an inductive approach instead of approaching research from a deductive stance of proving a hypothesis. The research is founded on the collection of thousands of instances of a specific behavior. Often as data is collected it justifies a successful intervention. This means the “probability diminishes that one instance will be different from the rest and that the inductive, radical behavior approach is erroneous” (Calkin, 2003, p. 87). Like radical behaviorism, Precision Teaching leans toward directly observable behaviors by an independent observer. Lindsley (1992, p. 51) explained that Precision Teaching funnels down to “basing educational decisions on changes in continuous self-monitored performance frequencies displayed on standard celeration charts.” Precision Teaching is not a true method of instruction but is seen more as a precise and systematic approach in which it evaluates instructional tactics and curricula.

White (1986) wrote that it is not the goal of Precision Teaching to dictate what should be taught or even how instruction should proceed. It is meant to be representative of an approach to the “systematic evaluation of whatever instructional tactics and curricula a teacher might employ” (p. 522 / 1). Modifications to one’s instruction won’t be changed unless there is a need for change and in doing so, little to no change will be placed on the teacher’s basic approach to instruction. Precision Teaching demands constant attention to detail and a willingness to accept the fact that change might lead to improved student success (White, 1986).

Precision Teaching is depicted as a discipline that can be summarized by several principles. These guiding principles were laid out by the works of Lindsley (1990), West and Hamerlynck (1992) and White (1986). The guiding principles of Precision Teaching focus on direct observation, frequency as a measure of performance, the Standard Celeration Chart, environmental conditions and the belief that the learner knows best, all discussed here.

DIRECT OBSERVATION

“To form a clear, unambiguous picture of pupil progress it is important to focus on concrete, directly observable behavior” (White, 1986, p.522 / 1). The question becomes how can one take a private event and make it into a directly observable behavior? To avoid ambiguity, Precision Teaching attempts to translate tasks into solid observable behavior to be counted and recorded. With this design there are three prominent issues to consider. It starts with the concept that some

tasks are private by their very nature. An example of a private task is reading silently to oneself. In this situation when a child has deficient silent reading skills the intervention would include making the task public. In the case of silent reading, the child would be asked to read aloud. By creating a private event into a public event, the behavior can be counted and recorded, eventually leading to reading improvement. This improvement can then be generalized to silent reading (White, 1986).

The second issue deals with the problems of inappropriate definitions of a task. An example of this could be about not talking. Collecting and charting data on the behavior of not talking might assume a definition that would lead to difficulties. The solution, however, lies in a concept called The Dead Man's Test. The online site, [behaviorintervention101](#), explained The Dead Man's Test as:

Behavior is essentially anything a person does. The simplest way to determine what qualifies as a behavior is to give the dead man's test. Can a dead man do it? If he can, then it is not a behavior. Can a dead man lay still? Yes. Can a dead man not talk? Yes. Can a dead man not pay attention? Yes. (n.d.)

By invoking this rule, practitioners can determine if a dead man can "not talk" thus leaving the definition of this task useless.

The last issue is to remember to make the distinction between a label and a movement. Labels often tend to be a convenient summary of a performance. Labels, though, lack the information about the movement involved. A label cannot be countable. An example of this is if Jake is labeled as "fidgety." This cannot be counted. For the fidgety movement to be countable, additional

information is needed. It would be more proficient to define the action as “Jake will keep his feet on the ground while seated at his desk” (Grant & Evans, 1994). Worded in this manner using more detail, the task can be counted and recorded.

FREQUENCY AS A MEASURE OF PERFORMANCE

When talking in terms of Precision Teaching, a behavior frequency according to White, is “the average number of behaviors observed during each minute of the assessment period” (1986, p. 523 / 2). This is further defined as counts per minute. Lindsley (1991b), Binder (1996) and West & Hamerlynck (1992) wrote about the advantages that frequency data held over more traditional measurements.

Count is a tally of the number of occurrences of a behavior (Cooper et al., 2007). The count of a behavior can be the primary concern, but it is not often enough to provide the adequate amount of information needed to implement an intervention. When one combines an observation time with count it becomes largely used as a dimension of measurement in applied behavior. The result of this combination is called frequency (Cooper et al., 2007). Frequency is defined as the number of times that a behavior occurs in a standardized observation period. The session time is generally kept consistent allowing for the data to be collected accurately (Bailey & Burch, 2018).

Binder (1996) points to two advantages about the usage of frequency for Precision Teaching. The first advantage was that frequency data was more useful. It was fluent, invoking accurate performance that is not only retained

longer, but is also less affected by conditions that may be distracting. Binder also stated that frequency was more likely to be applied, adapted or combined in new learning situations and this held true in the event of the absence of the instructor. The second advantage was that frequency data provided an overall complete account of how effective the intervention is working (Binder, 1996).

THE STANDARD CELEATION CHART

The standard celeration chart was devised by Lindsley in the 1960's and by his account it was done as a desperate measure (Lindsley, 1990). The goal Lindsley had in mind for revising the chart was to find a way for teachers to save time while making, reading, and interpreting charts. He saw that it was problematic when teachers allowed themselves the lengthy time of making a new chart for each behavior and each learner. This was problematic because as different pictures of progress were formed, the comparison of one program with another was difficult and the evaluation of how well a program was working could be in error (Lindsley, 1990). To offset this problem, the format of the Standard Celeration Chart was standardized so all professionals measured and interpreted data in the same manner. Lindsley trademarked the term Standard Celeration Chart for the purpose of describing the general applications of the chart series (Calkin, 2005).

The Standard Celeration Chart makes two important elements clear. First, the growth of behavior should be calculated best through the process of multiplication rather than addition. This meant the student progress was reported accurately in that it doubles rather than

growing one by one. Second, this revised understanding allowed researchers to capture the frequency of a student's performance, in addition to capturing their growth of learning across time, known as celeration (Calkin, 2005).

Frequency equates to performance and while it can tell what happened during a particular time period, it does not give much information about the learning. In order to determine if the performance had accelerated or decelerated it must be measured across time (Calkin, 2005). Since 1971, this change in learning has been referred to as learning celeration.

In grasping the students' progress, it is important that researchers understand the concept of acceleration and deceleration. Acceleration represents an increase in frequency (learning behavior) and deceleration represents a decrease in frequency (learning behavior). When using the Standard Celeration Chart, frequency equates to performance and is measured in counts per minute. "It tells what happened during one time period, but by itself it tells little about learning" (Calkin, 2005, p. 2). To capture a student's growth, it must be measured across time, referred to as learning celeration (Calkin, 2005). Celeration is then measured as "the count per minute per week" (Calkin, 2005, p. 2). This provides a picture of changes in performance (frequency) showing learning across time.

Calkin wrote, "most graphs give only the frequency at best, and often the graph represents a removal of the original data, replacing it with a percentage or rate. The Standard Celeration Chart displays the original data. Because of its design, the chart[er] plots only frequency so the chart always displays performance within a time

period” (2005, p. 3). Also, percentages can be obtained from the Standard Celeration Chart.

There are four ways to take measurements using the Standard Celeration Chart. Measurements can be taken daily, weekly, monthly and yearly. Each is important and serves a specific purpose.

The daily chart measures an individual’s behavior that happened on a daily basis. “It ranges from .00069, or one time per 24-hour day, up to 1000 per minute” (Calkin, 2005, p. 3).

Viewed at the bottom of the Standard Celeration Chart, the daily chart depicts one behavior per day. The middle of the Standard Celeration Chart depicts one behavior per minute. Then the top of the chart shows up to 1000 behaviors per minute (Calkin, 2005).

The weekly chart is often used to measure the behaviors of an organization when the data can be better summarized on a weekly basis. Performance ranges “from one per week all the way to 1,000,000 per week” (Calkin, 2005, p. 3).

The Standard Celeration Chart can also monitor progress by the month, which is often the case to capture organizational growth or change, such as in school, business or family. The monthly chart shows performance ranging “from one month to 1,000,000 per month” (Calkin, 2005, p. 3). Celeration at this point, is then charted by the half-year (Calkin, 2005).

The last way to capture information on a Standard Celeration Chart is using a yearly chart. Like the monthly chart, the yearly chart often measures changes in business, family and schools, but is also used for political and ecological events. The range is “from one per year up to 1,000,000 per year” (Calkin, 2005, p. 3). Celeration is

measured every five years using the yearly chart (Calkin, 2005).

As readers can see, the Standard Celeration Chart is made up of many components. While all of them deserve to be explored, they are not the main content of this paper and are not discussed here.

In comparing the conventional charting system using addition and subtraction, with the Standard Celeration Chart just discussed, two main advantages come to mind in favor of using the revised Standard Celeration Chart. First, the Standard Celeration Chart was created in order to standardize the measurements and provide an easy display to interpret the information. This means that when looking at each type of chart, it can easily be determined if the behavior has accelerated, decelerated or stayed the same (Calkin, 2005). The second advantage is because the chart is standard, researchers have the ability to read all information on the chart easily. There is no learning curve for each of the different types of Standard Celeration Charts, day, week, month, and year. All are all read in the same manner (Calkin, 2005).

ENVIRONMENTAL CONDITIONS

For an individual to conduct and manipulate a truly effective instructional environment, it is vital to be aware of the elements that are within that particular environment. These elements are all capable of having an influence on the behavior of concern (White, 1986). When classifying elements of the environment, Skinner used labels to define terms dependent on the impact each element had upon the behavior. Positive reinforcement used a label for an event that closely followed a behavior

and was known to increase the frequency of that behavior occurring again. Many times, a reinforcer such as candy was used as a tangible item to affect a behavior in a certain manner.

White shared, “functional definitions continually force individuals to consider an environmental element’s impact on behavior, rather than being sidetracked by behaviorally irrelevant characteristics of the element” (1986, p.525 / 4). White continued that Lindsey tackled the question of what would one call a possible reinforcer before its influence is known (1986). The solution to this problem was solved by Lindsley by creating two parallel systems that described the environment. Lindsley labeled the two systems IS Plan and DOES Plan. The IS Plan was used to describe what “is” in the environment before knowing the effects on behavior, while the DOES Plan was described by Lindsley as the environmental elements that past analysis had shown influenced the learner’s behavior (White, 1986).

THE LEARNER KNOWS BEST

The fundamental guiding principle of Precision Teaching is simply that the learner knows best (White, 1986). If the learner is showing progress, then the program is “correct” for that individual. If and when the program begins to fail, according to Precision Teaching, it is not due to the learner’s faults, but depicts an inappropriate program that must be changed (White, 1986). In Precision Teaching it is the learners actual progress that can be trusted to guide one in the development and continuously refining appropriate programs.

Students are active participants when using Precision Teaching. In this approach it is typical for learners to engage in self-monitoring by keeping count of their movements and recording them daily on a Standard Celeration Chart. Incorporating self-monitoring as part of Precision Teaching enables learners to “see” their learning. Visual aids are often a powerful tool for many individuals with learning disabilities. This tactic can assist students to connect the concepts that are otherwise difficult to manage or understand.

IMPLEMENTATION OF PRECISION TEACHING

According to White (1986), literature contends that the implementation of Precision Teaching is a three-step process of pinpoint behavior, count and chart. However, White (1986) adds that evaluation should be the fourth step. For Precision Teaching to meet its full potential it is not sufficient to only monitor a learner’s performance on the standard chart but is critical that the information be evaluated to make systematic decisions directly concerning how instruction should proceed (White, 1986). The four steps are discussed below.

PinPoint Behavior (Step One)

Movement and repeatability are two qualities that are of great importance when pinpointing a target behavior. White wrote that “any directly observable behavior will involve physical movement of some sort” (1986, p.525 /4). It is not uncommon for the targeted behavior to be one that does not involve movement, but this does lend itself to being unobservable. In these cases, the practitioner should seek a more effective way to define the behavior.

For example, if the target behavior has been pinpointed as “being quiet,” the behavior represents the absence of behavior. For an effective intervention and successful results, it would be more beneficial to focus on a better representation of the problem. This could be accomplished by pinpointing the target behavior as “inappropriate vocalizations the learner makes.”

Every time a behavior occurs, the student is given the opportunity to learn. Repeatability allows for unlimited learner experiences. Therein lies the importance of when determining a target behavior, it should be one that can be repeated multiple times during every instructional or training session. This allows for the establishment of conditions that in turn, encourage the behavior to be repeated (White, 1986). “Ideally, target movements will be selected, and conditions established that allow the behavior to occur at least 10 times during any given instructional or training session” (White, 1986, p.526 /5).

Count (Step Two)

The progress of a learner is monitored by counting the number of times a movement cycle occurs and also on the time spent keeping track of the time spent counting. It is of course more beneficial if the learner has the chance to practice and demonstrate the skills daily (White, 1986). While the learner will be given natural opportunities to demonstrate these skills one can enhance the opportunities through manipulation. Toilet training is a good example. In this task the learner will have natural opportunities for practice simply by nature itself, but the experience can be enhanced by offering the learner more than their normal amount of liquids throughout the day. For count to be the most successful it is stressed that the

length of each assessment should be the same from day to day. This is important because “factors like fatigue and warm-up time will then be reasonably consistent for all the assessments” (White, 1986, p.527 / 6).

Chart (Step Three)

When completing an assessment, the results should be recorded as soon as possible. By waiting too long, even a day can result in the loss of information that is important to the learner’s progress. In reality, and contrary to what some may think, charting is a reasonably quick and simple process. However, it may take practice for educators to become proficient at the task. When new to using a Standard Celeration Chart it can look very daunting and confusing but the chart proceeds much like any other chart does. “The frequency (count divided by assessment time in minutes) is simply-plotted by placing a dot or X on the appropriate day-line of the chart” (White, 1986, p 528 / 7).

Evaluate Learner Progress (Step Four)

Placing dots on a chart and deciphering a pattern is not enough to make Precision Teaching successful. For the full benefit of Precision Teaching to be achieved, the learner’s progress must be carefully evaluated. The daily progress of an individual is what ultimately determines if a program is satisfactory. If not, then changes need to be made within the program to facilitate learning.

In the early years of Precision Teaching there was a very simple guideline that was followed and it involved only two rules. The first rule was if the learner was progressing don’t change anything. The second rule in

opposition, was if the learner hits a plateau then changes need to be made to their program. Over the years teachers who use Precision Teaching have developed some additional formal guidelines. These guidelines were put in place to assist in the process of deciding exactly when and how a change to the program should be handled.

Precision Teaching can be used in many different outlets that pertain to learning. Those details will be discussed in in the next section of this paper, Applications. The upcoming section will demonstrate through scientific studies how Precision Teaching was implemented to enhance student learning.

APPLICATIONS

Precision Teaching has been proven effective to enhance the academic performance of children with learning disabilities. The application section of this research will identify studies that used Precision Teaching strategies related to mathematics and reading as they have been recognized as areas of difficulty for children with learning disabilities. This section also includes how the studies were conducted and the outcome of each study. While Precision Teaching has been used to enhance learning, it is not widely known. The hope of this research is that it becomes more familiar to those who work with children who have learning disabilities. With more exposure, Precision Teaching could become a standard practice within the school systems and assist so many more children to become confident regarding their learning and knowledge.

There is no age, gender, or education level discrimination when it comes to the applications of

Precision Teaching. As noted earlier, Precision Teaching is not a teaching method, instead it is a way of designing a teaching arrangement, measuring the consequences of those decisions, and then, based on the measurement, make changes for improvement (Precision, ABA, 2019). The studies discussed in this research confirm that the Precision Teaching does work to enhance learning, making the opportunities boundless to help students be successful.

As discussed earlier, Precision Teaching begins with pinpointing the behavior that needs to be changed. According to Daniels and Bailey (2014), the behavior must be observable, measurable and reliable. The targeted behavior to be changed should be clearly defined with a strong beginning and a strong end. Also, it should be a process that can be repeated. For example, the pinpointed behavior written as “finishes sentences” becomes stronger when stated as “writes letters.” To make a strong statement, pair an active verb with an object or context in which the verb operates. In the case of “writing letters,” the action verb is “writing” and is paired with “letters” (context) creating a strong pinpointed behavior (Precision ABA, 2019).

Sensitive measures are used with Precision Teaching. These include rate of response, frequency, and count. Skinner proclaimed that rate was one of his most important contributions to science as it records a behavior as it happens in real time (Precision ABA, 2019). Real time measures are critical in Precision Teaching as delays in capturing the data may result in inaccuracy rendering the measure useless.

Recording must occur on a daily basis and is done so with the use of probes. Probing is the measurement of a

skill level of a particular skill set (Chicago ABA Therapy, n.d.). Probing is to be conducted prior to instruction, during instruction, and after instruction for comparison. According to Cooper et al. (2007), a probe that is conducted prior to instruction can produce important knowledge to developing an effective intervention.

In the *Journal of Early and Intensive Behavior Intervention* (2005), Nam and Spruill identified the most common learning channels used in math curriculum as see/say, see/write, hear/say and hear/write. The authors stated, however that “unfortunately, in most classrooms, students are instructed in a see/say or hear/say channel, but they are required to demonstrate learning through another channel” (p. 104). Little is understood regarding the how information is generalized using these methods or if any one of the methods is better than another.

The most comforting aspects of Precision Teaching is that what is taught or how it is taught is not measured by the number of correct answers. This opens many doors for individuals with learning disabilities where traditional teaching styles have failed them. Precision Teaching is invested in the mindset of practice where getting it “right” the first time is not what matters. Precision Teaching is most interested in that the student be willing to try, try again (Precision ABA, 2019). The key to success in using Precision Teaching includes observing the student behavior, encouraging him or her to continue trying, keeping current with charting, and adding or changing interventions when needed.

MATHEMATIC APPLICATIONS

About 7 % of children and adolescents have a

Mathematical Learning Disability (MLD). Individuals with MLD have deficiencies in the understanding and representation of using numbers. There tends to be a discord between reading and mathematical deficiencies resulting in a stronger emphasis on reading deficiencies, when in fact, more people have difficulties with math than reading (Geary, 2011).

A study was conducted by Stromgren, B., Berg-Mortensen, C., and Tangen, L. (2015) with 5th-7th grade students who were developing normally, but falling behind their peers when it came to multiplication and division. Stromgren and colleagues set up two groups of students within the study. One group received the Precision Teaching intervention while the other group was taught using the traditional teachings of the classroom. During the study the students were learning basic mathematical facts.

The individuals in the Precision Teaching group were responsible for keeping their own folder that contained timing charts, Standard Celeration Charts for multiplication and division and a log form. Every practice was timed.

The learning channel set up for the other group of Stromgren's study was see the problem/write the answers (see/write). This meant that each participant would see a math problem and then be required to write the answer on a corresponding answer sheet. Following Precision Teaching protocol, every practice was timed.

The findings were then interpreted by the authors of the study. The group that had received the Precision Teaching intervention overall, had a greater improvement on math testing than did their peers in the other group. Beyond group improvements, further

findings indicate that the Precision participants showed a reliable improvement when it also came to individual results. While this study did not use the term learning disabilities to identify the students, it can be implied that students developing normally but falling behind their peers, if tested, would have likely been identified as having learning disabilities.

In 1993, Koscinski and Gast used Precision Teaching and time-delay to teach elementary students with learning disabilities their multiplication facts. This study also used a learning channel of see/say with the entire group of students. As each student was presented with a multiplication fact, the student would read the problem and say the answer aloud. When an answer was unknown, the student was not permitted to guess the answer. At this point, the instructor would say the answer aloud and in reply, that student would re-read the question and say the answer aloud. The students of this study were able to achieve 100% accuracy and reached mastery level in less than one hour per multiplication set, confirming another success in using Precision Teaching.

Farrell and McDougall (2008) conducted a study and believed it was common for children with learning disabilities to have a difficult time with math fluency, meaning that they could not respond rapidly and accurately when presented with a math problem. Farrell and McDougall also stated that some students have a difficult time “initiating, maintaining, and completing tasks; pacing their responses (e.g., they are quick but error-prone, or accurate but slow); monitoring and correcting errors while responding” (2008, p. 26).

With the combination of Precision Teaching goal setting, and efficient practice along with feedback,

children with learning disabilities can greatly improve upon their fluency of basic math skills. Farrell's study used a behavioral self-management intervention, which included a combination of tactile and visually cued self-monitoring techniques. The intention of this design was to improve math fluency with high school students, all of whom had a learning disability. During each evaluation, the student's self-monitoring often prompted increasing the pace, as needed, to gain the answer to the math problems.

The results of Farrell's study indicated that the use of the multiple component self-monitoring intervention had improved fluency and accuracy. "These findings are important because achieving accurate and fast responses via brief practice sessions promotes automaticity and other educational outcomes" (2008, p. 33). It's important to note that students who cannot achieve fluency at the basic skill level often continue to have difficulty when presented with more complex problems.

The practice of using Precision Teaching is not only used in the United States but also in Great Britain, where they emphasized that it could be used in both mainstream and special education classrooms (Chiese & Robertson, 2000). However, in Great Britain there tends to be more skepticism surrounding Precision Teaching and British researchers continue to conduct studies to expand both theoretical and applied aspects of Precision Teaching to better understand how to use it.

Chiese and Robertson of the University of Paisley, United Kingdom conducted a study of the use of Precision Teaching to a group of five 5th grade students. In a class of 25 students, the five students had been selected by the teacher to receive an intervention. The

other students served as the control group. The five students “although achieving standards comparable with their peers in other aspects of the curriculum... were simply unable to keep pace with their peers in the domain of math” (Chiese & Robertson, 2000, p. 302).

Similar to the Stromgren, Berg-Mortensen, and Tangen study (2015), students in the Precision Teaching group were provided a personal folder that contained practice sheets, time probes, and charts, plus answer sheets correlating to the time probes and a checklist. In addition, the students were given a digital timer. These materials allowed the students to complete the tasks independent of the teacher.

The results from Chiese and Robertson’s study concluded that after the 12-week program, the Precision Teaching group had a dramatic increase in fluency on the composite skill evaluation with rates ranging from 11 to 15 correct-per-minute while in contrast, the control group after the same amount of time, had a range of 0 to 14 correct-per-minute. Chiese and Robertson pointed out that it could be objected to that the Precision Teaching groups superior performance was due to a greater familiarity with the material. However, the Precision Teaching group did not receive more time to engage in the math problems than did the control group. “The crucial difference is in what they did during math periods: worked components; practiced for fluency (speed plus accuracy); and progressed at individual rates through the curriculum” (Chiese & Robertson, 2000, p. 308). It was pointed out that students in the control group who had subpar performance might also have benefited from Precision Teaching to build their math fluency.

The high levels in performance depicted among the

control group, along with the general subpar performance when compared to those in the Precision Teaching group, suggest that not only did the PT students need assistance in the area of fluency building, but there were other students in the classroom who possibly could have benefited from it as well. This lends itself to suggest that many of the students in the control group may experience difficulty with math later when concepts begin to build upon one another and the math itself becomes more difficult (Chiesa & Robertson, 2000).

This brings to light the importance of conducting further Precision Teaching studies. Additional research on the benefits of Precision Teaching will enhance the awareness of its success when working with students of all ages with learning disabilities. In addition, even students who have not officially been diagnosed with LD but are falling behind in certain academic areas can benefit from the strategies used in Precision Teaching.

One of the very important strategies used in Precision Teaching is self-monitoring that can enhance learning to anyone who uses it. Brown and Frank (1990) wrote an article titled 'Let me do it!'- self-monitoring in solving arithmetic problems." The article discussed two experimental teaching models that were used to conduct the study with three students who had been diagnosed with a learning disability. The purpose of the study was to take a closer look not only at the effectiveness of self-monitoring, but to also examine the effectiveness of generic versus individualized checklists. The students were taught two types of problems, subtraction and addition. Each type of mathematical problem was taught independent of the other and each type of problem had its own self-monitoring checklist (Brown & Frank,

1990). They concluded that the application of self-monitoring using the customized checklist resulted in an improvement of the students' performance. It was also shown that the results from the study had been maintained once the procedures had been terminated.

Often in Precision Teaching, the student is provided a customized checklist to help guide him or her through the self-monitoring process. Self-monitoring is composed of two components, measurement and evaluation. When being implemented by a student in a classroom setting, the student will record and measure their own behavior (measurement) and then compare that to a predetermined standard (evaluation). There are a multitude of advantages to the use of self-monitoring in the classroom but one that stands out is the fact that students become an active participant in the intervention (Wright, 2013). Students with learning disabilities often feel left behind and that no matter what they do, they still can't learn what their peers are learning. However, given the chance to be in control of their own learning can help to heighten their self-worth through the use of the self-monitoring process.

Another study regarding self-monitoring was conducted in 1989 by Dunlap and Dunlap. Their goal was to add to the literature that pointed to self-monitoring being a successful intervention to increase academic skills among students with learning disabilities. They evaluated how effective a self-monitoring package would be when presented to learning disabled students.

The students in this study had been identified as having difficulties responding to subtraction problems. Each student had been highly inconsistent and unsuccessful up to this point. Dunlap and Dunlap used a two-phase

baseline with didactic instruction and special incentives. An error analysis was utilized in the development of the individualized self-monitoring checklists. “In the context of a multiple baseline design, the self-monitoring procedures produced immediate gains in correct responding” (1989, p. 309). The checklists were removed during the maintenance phase and an incentive condition was put in place. This resulted in a continued increase in successful responding to the subtraction problems.

When compared to the studies that have been discussed previously, Dunlap and Dunlap’s findings are in line with the results of the previous studies discussed in using Precision Teaching. Each of them adds to the knowledge that the use of self-monitoring and checklist systems are beneficial when set in place for students with learning disabilities. Performance in mathematical skills had been increased in all of them and some studies showed that the learning was maintained after the study was completed. In addition, these teaching strategies can be viewed as cost effective and non-time-consuming procedures.

The achievement of fluency plays a key role in Precision Teaching as the goal is to have a true mastery of content. One way to accomplish mastery is to introduce students to self-study. There are many different types of self-study procedures available for learners but not all are built equally nor will they have a positive effect on individuals with learning disabilities (Kubina, 2018). One of the most widely known and used methods of self-study is the use of flashcards. While flashcards have been proven to benefit learners in a multitude of academic areas and continue to be used, there are limitations. When using flashcards, students generally do not time themselves and may not have specific goals in mind. The

use of flashcards also lacks any type of instructional design element and due to these limitations, Kubina stated that studies have shown that flashcards are less effective (2018). The ability to retain information is also compromised and this can lead to complications when moving forward with more complex content.

These limitations were taken note by Ogden Lindsley and Steven Graf (Kubina, 2018), and to improve this process they created a practice and assessment procedure called SAFMEDS. This acronym stands for Say All Fast, a Minute Every Day, Shuffled. When broken down, the procedure of using SAFMEDS is quite simple, but effective. The learner is to SEE the front of the card and SAY the answer aloud practicing the entire set/deck. During this process, students place correct answers in one pile and incorrect or unknown answers in another pile. When using SAFMEDS, students must go through the set at a fast pace to insure to produce a steep celeration, meaning students learn at a faster rate (Kubina, 2018).

Lindsley and Graf designed SAFMEDS to be practiced using timed units, most often as one minute, but other consistent intervals were acceptable. The learner was responsible for assessing their progress and was expected to practice every day. Also, the set/deck was to be shuffled after every run through and not be learned in a particular order (Kubina, 2018).

The use of SAFMEDS is utilized not only for those with learning disabilities as it is an effective way of learning for any student. A multitude of studies have been conducted regarding SAFMEDS, and regardless of the limitations of flashcards noted earlier, there are several common findings among the limitations. SAFMEDS have been

proven to offer a reliable way to help learners quickly meet competency of their targeted goals and that the learning was retained over time (Kubina, 2018). The facilitation of learning transfer has been recognized within the literature. To sum up the benefits of using SAFMEDS, Kubina wrote, “a performance criterion or frequency aim can signal how fast and accurate participants must respond in order to achieve their goal” (2018, p.7). In addition, the process of having the student analyze their performance results on a Standard Celeration Chart provides the learner with a powerful visual and statistical information about their progress (Kubina, 2018).

In 2012, Cunningham, D., McLaughlin, F. T., & Weber, P. K. conducted a study using Precision Teaching to teach one student who had learning disabilities. It incorporated SAFMEDS regarding the use and evaluation of verbal prompting with see-to-say math problems. The researchers decided on the use of Precision Teaching because “it had been shown to be a data-based and effective teaching procedure” (Cunningham et al., 2012, p. 37).

Unlike the studies that have previously been discussed, this one involved only one subject and was implemented in an ABAC single case design. The baseline was drawn and then the intervention of verbal prompts was introduced. There was a return to baseline before the intervention of verbal prompts and SAFMEDS began. The design of this study showcased and supported the idea that Precision Teaching was an effective intervention. The results of the study showed that during the verbal modeling, the student had a clear increase in correct answers while at the same time errors decreased.

Going back to the baseline, conditions produced a decrease in the correct answers and there was an increase of errors (Cunningham et al., 2012). The last component of the ABAC design was “C.” In the case of this study, “C” was the return of verbal prompting plus the added addition of SAFEMEDS. Once this intervention was implemented “there was a jump for the number of corrects. Both interventions were effective not only in terms of improving the frequency of correct digits written, but also... in accuracy of performance” (Cunningham et al., 2012, p. 38).

The outcomes of this study help to strengthen previous research by providing results that show the positive effects that can be achieved when employing Precision Teaching procedures. Cunningham et al. pointed out that not only was the use of SAFEMEDS productive, but they were also very practical, meaning that once the connection was made, it was easy for the student and the teacher to manage and implement them during daily sessions (2012).

Research shows that students who have a learning disability often revert to using counting strategies when calculating simple addition and subtraction problems. One of the most common counting strategies is counting fingers but this often results in a lack of speed when it comes to solving math problems (Casey, J., Mclaughlin, F. T., & Weber, P. K., 2003). However, when students begin to learn multiplication, they often begin to fall behind because their counting strategy no longer works. The ability to recall math facts immediately is, of course, more productive than the use of a counting strategy. Also, being able to recall facts uses less effort, is faster, and students gain more fluency across settings.

In a study conducted by Casey et al. in 2003, three Precision Teaching techniques were evaluated for their effectiveness on mathematical skills. The techniques to be evaluated were daily timing, modeling at the top of the timed tests, and SAFMEDS on the fluency of see-to-write math facts. The dependent variable of this study was digits-per-minute and the first procedure conducted was a timed drill accompanied by practice math sheets. Data was collected on both correct and incorrect answers-per-minute.

During baseline, the students were allowed to practice five times for five minutes prior to running the session. The practice was conducted using SAFMEDS. Note cards with various math facts were provided to the students to use for practice. Once the student could answer the fact correctly on two consecutive tries, that card could then be placed into a pile for “known” facts. Once the practice times were completed, the students were presented with a math fact sheet to complete within one minute (Casey et al., 2003).

The next phase of the study consisted of the students having an unlimited amount of time to study and practice using SAFMEDS before taking the timed probe math sheet. This was conducted for three weeks within the school setting before returning to baseline. Once returned to baseline, the students had a goal of achieving 80 to 100 correct math responses within one minute with criterion set for three consecutive days with only one to no errors. When the criterion was mastered, the student received a new set of math skills to learn using the same technique (Casey et al., 2003).

This study concluded that the correct rate had increased for both students but there was a greater

increase during the no-time-limit and SAFMED phase. As with most research studies, there are always limitations and it was noted by the authors that their study had some limitations. One limitation was that because of illness and school holidays, in which there was no class, the schedule did not allow for consistent data collection. Also, the “unlimited time to practice with SAFMEDS was always preceded by the SAFMEDS only condition” (Casey et al., 2003, p. 70). It was suggested that by counterbalancing these procedures it could possibly rule out any order of effects. In the end however, the findings by Casey et al. in 2003 replicated a large number of previous articles in which Precision Teaching has shown to be an effective intervention when working with learning disabled students. It has been suggested in previous works that having additional opportunities to respond, coupled with the use of SAFMEDS, has a positive effect on the improvement of student performance.

Mathematics is a four-stage model that was first developed in 1957 (Casey et al., 2003). Using this model, the problem solver must understand the problem at hand, be able to devise a plan of action, have the capability to carry out said plan and be able to go back and verify that their solution made sense. These skills all require the learner to use cognitive and metacognitive processes (1992).

In 1992, Casey and his colleagues conducted a study with elementary school students diagnosed with a learning disability. The focus of the study was specific to solving simple mathematical word problems. While Precision Teaching was not discussed in this study, it did follow similar strategies to achieving student success.

These students had a history of making mistakes when working on word problems due to the fact that they executed the wrong operation. The method of teaching involved strategies on how to better understand the problem and then to devise a plan of action before solving it. The process involved first reading the math problem, then finding the important words and circling them, and lastly, students were taught to draw a picture and write an equation of the word problem (Casey et al., 1992). The procedures were taught by the self-regulated strategy development procedures as described by Case, L. P., Harris K. R., and Graham, S. (1992). The authors emphasized the necessity for developing prerequisite skills needed, along with the importance of helping the students to learn how to self-regulate. The students had been taught not only how to find key terms, but also the meaning of those terms and phrases along with organization skills to use in applying the strategy, but also to the evaluation of their progress. These tools along with self-instruction, self-assessment, and graphing, set the students up for success in which all of them achieved.

The teaching method resulted in improved performance along with a reduction in the amount of incorrect errors that were due to performing incorrect order of operations. While the performance of the additional word problems was shown to have a large increase in learning and remained high even after instruction, it was the results of the subtraction word problems that was most impressive. When applied to subtraction word problems, the students' scores increased dramatically. Once the study had concluded, the teacher noted that she had observed the students who participated in the study using the strategy on their own

in the classroom and they had even begun to generalize it in other learning situations (Casey et al., 1992).

In concluding the discussion regarding Precision Teaching and mathematics, many studies have been discussed here. Each of them showcased strategies to assist students in improved learning. Whether it was understanding word problems or the more familiar problems of addition, subtraction, multiplication and division, students in the Precision Teaching groups continually showed improvement over the control groups. This is a confirmation that Precision Teaching should become a standard teaching strategy of all students, but especially for students with learning disabilities.

READING APPLICATIONS

Research has proven that 80% of individuals with learning disabilities also have difficulty reading and comprehending materials (Antoniou, F. & Souvignier, E. 2007). This fact leads to illiteracy. Reading is a complex process and is broken down into two skill areas of decoding and comprehension. “Under the decoding and comprehension umbrella a multitude of behaviors exist” (Kubina & Starlin, 2003 p.14). In order for a reader to decode words, he or she must be able to use phonics, structural and contextual analysis skills.

Decoding is often referred to as “phonological recording.” It is the process in which the written alphabetic letters are translated into sounds. Those sounds are then matched with the pronunciation of a word that the reader has learned. Within this process, the reader changes printed words into a spoken format

(Kubina & Starlin, 2003). It is beyond the scope of this paper to explore all of the components that are involved in decoding and comprehension, instead the focus is on how Precision Teaching could provide improvement of these skills.

Fuchs, Fuchs, and Hosp (as cited in Kubina & Starling, 2003) wrote a literature review based on their own research. They found that Oral Reading Fluency (ORF) was the best predictor of reading comprehension when compared to questioning, retelling and cloze (a test of reading comprehension). Oral reading fluency measures the recording of the number of words read aloud correctly and incorrectly per minute (Kubina & Starlin, 2003). Oral reading fluency has received much attention in literature, and Precision Teaching is a means to further enhance its usefulness when it encompasses performance standards. "Precision teaching defines performance standards as performance frequencies empirically associated with retention, endurance, and application" (Kubina & Starlin, 2003 p. 14).

While research points to word decoding and fluency as being major components of reading, when it comes to individuals with learning disabilities, reading comprehension often hinders their success. For one to be successful at understanding written words, they have to first meet certain prerequisite skills (Antoniou & Souvignier, 2007). Reading comprehension is composed of both knowledge and text orientated constructs, meaning "it is the result of a systematic reading process that integrates basic as well as higher-order reading skills" (Antoniou & Souvignier, 2007, p. 42).

When searching for methods to help individuals with learning disabilities to have better reading and

comprehension skills, it is important to remember that these difficulties are due to multiple deficits. When someone has a learning disability “they fail to recall strategies needed for comprehension, they do not control their progress, nor do they adjust or regulate specific behaviors associated with successful comprehension” (Antoniou & Souvignier, 2007, p. 42).

For someone with a learning disability, the deficit of not comprehending reading materials is discouraging. Whether self-reading or being read to, it may still be a problem depending on their deficit. These students are fully aware that learning is hard, and to them sometimes it seems easier to simply give up. In these situations, students know they have completed the required passage but hope the teacher does not call on them. It’s devastating for them to know that they cannot reiterate the written words they had just read.

When searching for interventions to help those with reading difficulties, studies have demonstrated that Precision Teaching is a highly effective tool for reading improvement. One such study conducted by Mercer, C. D., Campbell, K. U., Miller, M. D., Mercer K. D., and Lane, H. B. in 2000 developed a fluency-reading intervention that was used to supplement reading instructions of students who had been diagnosed with mild learning disabilities. The focus of the study was to create and evaluate a reading fluency tutorial that could be easily delivered by nonteachers to students with learning disabilities. The study took into consideration phonics, sight phrases and oral reading. The students participated in the intervention five to six minutes each day which included repeated readings that were practiced until the student had achieved mastery (Mercer et al., 2000).

Students were asked to read as many phrases as they could within a one-minute timeframe. During that time the instructor would offer correct pronunciation of any incorrect readings. If the reader was not able to meet the criteria by either finishing the reading in time or had errors, he or she would continue with the same phrase until the criteria was met (Mercer et al., 2000). The findings of this study showed students had a significant growth in their reading levels and their reading rate. Research has shown that students who have a learning disability within the realm of reading will benefit from “explicit fluency-based reading instructions on phonics, sight words, and oral reading stories” (Mercer et al., 2000, p. 187).

Oral reading fluency, the ability to quickly read connected text accurately and with expression, is a critical element for student success regarding reading comprehension (Rasplica & Cummings, 2013). When an individual can read with the ability of automaticity along with speed, accuracy and expression, they are more likely to comprehend what they are reading. The reason that comprehension is increased with this criterion is due to the fact that when all of those components are met, the reader can focus on the meaning of the text. “The goal of fluency practice is intended to focus on the strategic, integration of decoding, fluency, and comprehension tasks” (Rasplica & Cummings, 2013, p. 2).

Daly & Guldswog, 1992 stated that fluent oral reading is important for three reasons. First, students who have better reading skills are more capable of comprehension. Second, reading orally along with rereading can uncover instructional and remedial information to the teacher about a student’s “word attack skills, strategies, and word

acquisition frequencies” (Daly & Guldswong, 1992, p. 34). The third reason is that oral fluency, when reading is considered a tool for learning, has a wide applicability to other complex skills. As stated previously, there is a high percentage of students with learning disabilities who have trouble with reading. Lovitt (1989) stated, “the inability to read and learning disabilities are synonymous to many educators” (as cited in Daly & Guldswong, 1992, p. 34).

Lolich, E., McLaughlin, T. F., and Weber, K. P. in 2012 conducted a study to increase the reading of K-2 core sight words of a 12-year-old student who had exhibited a low reading rate and a high error rate. The student otherwise displayed average recall and comprehension skills. The intervention strategy included “model, lead, test, and retest” and used Direct Instruction procedures of “timed reading, fluency building, probe sheets, and student self-charting” (Lolich et al., 2012, p. 245). These are all components of Precision Teaching, plus the study used token reinforcement. These strategies were then used in a procedure called Reading Racetracks (Lolich et al., 2012).

Timing, error correction, feedback, and performance plotting are all employed by the Reading Racetrack. The racetrack is an oval which contains anywhere from 24-28 cells in the shape of a square. Imagine a game of Candyland, but instead of the cells going from one end of the board to the other, the cells are never ending and go around and around (Lolich et. al., 2012). Within the cells of the track are sight words, letters or even math facts that may be familiar words or new sight words (Travis, J., McLaughlin, T. F., Derby, M. K., & Carosella, M., 2012).

When teaching the student, the process typically begins

with the teacher using flashcards and then proceeds to the student independently practicing with the racetrack. Once independent practice is concluded, the student is timed for one to two minutes while they orally read the sight words as fast as they can, with the number of correct and incorrect words charted by the student (Lolich et al., 2012). Four rounds of racetrack are to be completed before a review track is used. The racetrack review provides the student an opportunity for additional practice and maintenance.

The results for the 12-year-old student indicated that his correct reading rate had increased and the number of errors had decreased. The student was also very motivated by a token reinforcement when using the racetrack and often stated how much he liked the racetrack. Also, he thought plotting his data was important, plus he enjoyed the process (Lolich et al., 2012). When students enjoy a learning experience, they are generally more motivated to learn.

A similar study was conducted by Travis et al. in 2012 in which the use of a Reading Racetrack was employed with the goal of increasing the fluency and accuracy of saying a letter and then its sound. Two first-grade students participated in this study. Student A was a six-year-old girl who had been diagnosed with a learning disability, and student B was a seven-year-old boy who had developmental delays and learning disabilities. “Both students had deficits in the areas of spelling, reading, writing and math” (Travis et al., 2012, p. 343). The results indicated that student A exhibited a functional relationship between the increase of both speed and accuracy of letters while decreasing errors in letter recognition (Travis et al., 2012). It was noted that student

A was full of energy and ready to work during session time. Student B's results showed a gradual increase in letter recognition; however, he was frequently disappointed and stated he didn't need the help because he already knew the letters. Student B also was out sick and on vacation during a portion of the study which could have impacted the final results. Travis et al., (2012) added that student B might have shown more improvement if the addition of the cover, copy, and compare procedure had been implemented resulting with more powerful consequences.

Limitations are always a part of research and research on previous limitations may lead to more effective findings on future studies. The 2012 Travis et al. study demonstrates that not all methods are meant for every learner. This is important to know and gives reasons to use the individualized intervention of Precision Teaching. This study strengthens the case for Precision Teaching to be recognized as an effective means to increase students learning capacity.

Spelling can be a nightmare for students with learning disabilities. The majority of the time students do not recognize that words are misspelled. That means having a student check for spelling errors is useless. Technology has attempted to reduce spelling errors with the assistance of spellcheck when using a computer or autocorrect when texting on a phone. While technology might appear to be the perfect solution, in reality it is not. These technologies may reduce some errors, but for students having learning disabilities, they may be unable to "choose" the correct answer when given the opportunity. Arkoosh, M., Weber, K. P., and McLaughlin, T. F. (2009) addressed the important role that spelling

plays, not only for the student but also in communicating with others. The authors said that “not only does spelling impact a child’s clarity of expression in writing, but it can influence another person’s perception concerning the child’s competence in writing (2009, p. 17). Spellcheck and autocorrect are great band-aids, but students still need the skills to spell properly.

Arkoosh et al. (2009) conducted a study where the use of motivational/reward reinforcement and a spelling racetrack were implemented. The intervention also incorporated the use of drill and practice and it was hypothesized that the student would reach mastery in spelling. The method of Arkoosh’s study was typical of a racetrack intervention and was implemented much like the previous studies. The results corresponded with the hypothesis of gaining a mastery in spelling. The student had an increase in his spelling performance including an increase in correct spellings while also attaining a decrease in errors. A cause and effect relationship between the motivational system and the spelling racetrack procedures also became evident resulting in the fact that the student was eager to earn a mini-car and worked diligently in the entire process (Arkoosh et al., 2009).

A large number of the adult population also struggles with a lack of necessary reading skills. Adult illiteracy affects 18 million to 31 million people while the exact number of the reading disabled is unknown. This problem however, presents an obvious opportunity for interventions (Sweeney, W. J., Omness, C, K., Janusz, K. L., & Cooper, J. O., 1992). While the focus of this paper has been on the use of Precision Teaching for school aged students, it is equally effective with adults. Many college

students use SAFMEDS as a tool to study for exams. Precision Teaching, as noted earlier, has no age limits for participants. The individualized strategies can also benefit adults who struggle with reading.

The improvement of reading alone is not sufficient when it comes to adult literacy. Instruction needs to also include communication and language skills such as spelling and written expression. In the Sweeny et al. study, the authors wanted to demonstrate how Precision Teaching could be an effective means to improve both reading and spelling fluency with an adult who had a severe reading disability (1992). The use of repeated readings and see-cover-write spelling practice were part of the intervention as well.

The study occurred over a one-year timeframe and during that year the learner would self-count and self-chart his performance. The results of the study indicated that the learner improved on his oral reading fluency and written spelling during his time with the tutor. He met and exceeded the oral reading fluency with an aim set at 180 to 200 words-per-minute. During the see/cover/write spell performance, he too met or exceeded his aims (Sweeny et al., 1992). The authors believed that the data they collected had “convincingly demonstrated the effectiveness and efficiency of using Precision Teaching” (Sweeny et al., 1992, p. 10). The authors agreed that Precision Teaching was both a powerful and efficient intervention and it would benefit many instructional settings.

In concluding the application section of this research, the studies presented here showcase that Precision Teaching has many applications for people with learning disabilities. The studies are evidence that Precision

Teaching is a strong tool to use when teaching math and reading for various age groups, including female and male participants. The application of Precision Teaching has been defined here, in addition to demonstrating how it works, and where it can be used. Admittedly, there are limitations to this research. The most obvious one is that not every study created has been included in this paper. However, there is enough substantial evidence here to support the use of Precision Teaching among the learning-disabled population.

The following section in this report focuses on ethical conduct in research.

ETHICAL CONSIDERATIONS OF BEHAVIOR ANALYSTS

In 1953, The American Psychological Association published its first code of ethics. With the ever-changing nature of the field, there have been eight revisions of the codes between 1953 and 2000. In 1988 the Association for Behavior Analysis first adopted the codes set by the American Psychological Association (Cooper, et al., 2007).

Currently, the Behavior Analyst Certification Board (BACB) Professional and Ethical Compliance Code for Behavior Analysts, governs this profession. The Professional and Ethical Compliance Code for Behavior Analysts is more commonly referred to as PECC. As of January 1, 2016, all BACB behavior analysts are required to follow the most current code. However, for the purpose of this paper, this section covers six ethical

standards set by BACB in 2014 regarding Code One, titled Responsible Conduct of Behavior Analysts.

The ethical standards discussed here are: Reliance on Scientific Knowledge, Boundaries of Competence, Maintaining Competence through Professional Development, Integrity, Professional and Scientific Relationships and Multiple Relationships and Conflicts of Interest. This report concludes with the limitations of this study and future directions for upcoming research.

Code 1.01: Reliance on Scientific Knowledge means that behavior analysts must be knowledgeable of the scientific research that provides the foundation for making responsible and accurate decisions when working in the profession (BACB, 2014). This pertains to Precision Teaching because without this code, behavior analysts could become limited in how they practice Precision Teaching. By being informed of new research and findings the uses of Precision Teaching can be expounded upon.

Code 1.02: Boundaries of Competence ensures that behavior analysts have the proper education and training to work in this profession. The training may also include their supervisory experience (BACB, 2014). Regarding the practice of Precision Teaching, it is important to be trained extensively in order to serve the client in the best way possible. In addition, it is just as important for the behavior analyst to understand the boundaries of their profession. Just because an individual can drive a car does not mean they can also drive an 18-wheel semi-truck. Having a firm foundation of the boundaries will eliminate inadequate service to clients.

Code: 1.03: Maintaining Competence through Professional Development discussed the importance of

staying current in the profession. In part, suggestions to remain current included attending workshops and conferences; reading current journal articles; taking new coursework or; earning additional credentials (BACB, 2014). As in all professions that follow standards, behavior analysts must be on the cutting edge of their profession to best serve others. Due to Precision Teaching being individualized for each student, it is imperative to take part in continuing education to stay current. This code is similar to Code 1.01 but takes it a step further. Code 1.03 encourages behavior analysts to stay engaged in the learning of their area of expertise.

Code 1.04: Integrity as a behavior analyst includes behaving in an honest and truthful manner at all times. They must follow through with commitments and other obligations and never behave in a fraudulent or dishonest manner (BACB, 2014). The integrity of collecting data is important to the practice of Precision Teaching and student success. This is because serving the client in the best way possible relies heavily on the process of using accurate individualized interventions.

Code 1:05: Professional and Scientific Relationships refers to many issues including not to discriminate against individuals or groups, not to harass or demean others, only use understandable language in explaining anything, and do not let personal problems or conflicts effect interactions with others. This conduct is critical to follow as a behavior analyst because it impacts everything they do (BACB, 2014). For those who have a deep understanding of Precision Teaching, it may be tempting to use technical terms when speaking with a client. However, using such terminology may intimidate the client and could possibly cause conflicts or

misunderstandings. It is best to speak plain English so that the clients and behavior analysts are understanding from the same perspective.

Code 1:06: Multiple Relationships and Conflicts of Interest means, in part, that behavior analysts must not develop multiple relationships as they can be harmful. They must not accept or give gifts as this creates a multiple relationship. In addition, should multiple relationships develop, they must resolve it. It is sometimes difficult to know exactly when a multiple relationship exists, such as someone offering a behavior analyst tickets to a popular sports game as a gift of gratitude. However, it is critical to know what is or is not allowed (BACB, 2014). Regarding the use of Precision Teaching, clients may want to show their gratitude to those providing their services. While this kindness can seem harmless, it really can lead to a slippery slope of unprofessional and illegal actions. While it might be difficult to explain this to the client so they are not offended, it is important to be vigilant to this code.

This thesis focused on students with learning disabilities and how Precision Teaching might assist them to be successful learners. However, the ethical codes for the profession of behavior analysts do not simply apply to this audience alone. Every aspect of life encountered by this profession should be guided by the codes of Responsible Conduct of Behavior Analysts. That includes not only actions within the profession but these codes can also serve as guidelines within the behavior analysts' personal lives.

When using Precision Teaching strategies, implementing an intervention must always be based on empirical evidence. Furthermore, functional

relationships between behavior and environmental events must be monitored and evaluated using a systematic approach and on a continuing basis (Cooper et al., 2007). Following the codes will ensure that this happens.

The individuals served by behavior analysts have the right to expect professional excellence, and it is the analyst's duty to be aware of the latest research in the field. Behavior analysts must practice due diligence to be familiar with the most up-to-date methods and procedures in order to provide students or clients an effective education (Bailey & Burch, 2016).

It is important to remember that keeping up with and being familiar with the newest methods does not mean a behavior analyst is efficient enough to use the new procedure. It may take time and practice to become competent when learning new approaches. In this case, it may be advisable to discuss the new approach with another colleague who is more knowledgeable with the new procedure. This might also lead to a positive mentoring experience.

Precision Teaching supports the guidelines set by the Behavior Analyst Certification Board. It has been discussed throughout this paper that one key to success with Precision Teaching is the involvement of the students with their learning. Precision Teaching requires that clients (or parents of students) consent to the plan being developed for learning success. In addition, through self-monitoring and the use of celeration charts, students are able to monitor their progress. In agreement with the Behavior Analyst Certification Board, these practices allow the student to be involved with their own learning.

On a final note regarding the ethical codes, these codes have been put in place not to confine what a behavior analyst is allowed to practice, but to allow all behavior analysts to succeed in their field of expertise while making sure their clients are always in the best of care. By following the codes, it makes clear to all behavior analysts' what is expected of them when entering into and practicing in this profession.

LIMITATIONS

Limitations of a study are not necessarily a negative aspect of the study. They are a notation of how someone else might continue with the research topic and add to the literature. For instance, Kubina (2018) noted that when using flashcards, students generally do not time themselves and may not have specific goals in mind. The use of flashcards also lacked any type of instructional design element. This later prompted Lindsley and Graf (Kubina, 2018) to improve on this short-coming and they created a practice and assessment procedure called SAFMEDS. SAFMEDS have been proven to offer a reliable way to help learners quickly meet competency of their targeted goals and the learning was retained over time (Kubina, 2018).

Admittedly, there are limitations to this research. The most obvious one is that not every study created has been included in this paper. However, there is enough substantial evidence to support the use of Precision Teaching among the learning-disabled population. However, as this study focused on students who had been diagnosed with learning disabilities and had experienced

Precision Teaching, it did not research Precision Teaching with students without learning disabilities.

Another limitation of this study is that it did not consider ways to increase the knowledge and positive outcomes about Precision Teaching to teachers or staff who work with students having learning disabilities.

Both of these limitations leave room for other researchers to conduct studies to determine if Precision Teaching leads to other benefits for behavior analysts or others, such as teachers, to know.

FUTURE DIRECTION

Precision Teaching is greatly under-utilized and more behavior analysts and teachers should become aware of its effectiveness. This might be accomplished by researchers submitting short articles to professional publications or offering to present a breakout session at a professional conference. In addition, professionals might ask permission to attend teacher institutes at local or state schools to share the information of this study.

It is important to continue to grow the research on the topic of Precision Teaching so it can be recognized as a positive means to help individuals with learning difficulties. For those already working with Precision Teaching, it is imperative that they share their outcomes and knowledge. As noted already, teaching others of the benefits can be accomplished through publishing articles or hosting conference sessions. In the end, the future direction of any behavioral approach, intervention, or treatment is to focus on those we can help and provide them the very best services to ensure they become more

self-sufficient, self-confident and happy individuals that know that they matter.

In conclusion, the research presented in this paper offers the reader a thorough understanding of the practice of Precision Teaching including the positive results that can occur when using it with students who have learning disabilities. This research can advance the visibility of Precision Teaching so that it becomes more widely known and adopted by those who work with students having learning disabilities.

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CHAPTER 10.

**USING ACCEPTANCE COMMITMENT
THERAPY TO HELP PARENTS COPE WITH
CHILD'S DIAGNOSIS OF AUTISM SPECTRUM
DISORDER**

Salimi et al. (2019) reported that developmental delays and the uncertainty that often comes with an unclear or poor prognosis can lead to intense psychological pressure on family and friends of the child. The stress this causes is significant for the entire family system, but it is reportedly more intense for mothers who often feel shame, depression, grief, and guilt. Salimi et al. (2019) note that the stress this causes a family changes over time as



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challenges pop up and advocate that professionals need to help families by preparing them for the challenges they will undoubtedly face. Acceptance Commitment Therapy (ACT) is a behavior therapy that can help these mothers with building a better relationship with their thoughts and emotions, allowing them to focus on the components of their life that are most important and valuable to them.

Acceptance Commitment Therapy (ACT) is based on the assumption that the connection between internal human language, or thoughts, and behaviors can lead to psychological suffering. Just as the thought and behavior interaction can lead to psychological suffering, these thoughts and behaviors can be altered to instead create psychological flexibility and move people toward their

values. Psychological flexibility can be obtained by following the six principles in ACT: defusion, acceptance, being in the present moment, the observing self, values, and committed action (Harris, 2008). Harris (2008) who experienced having a child diagnosed with autism spectrum disorder (ASD), reported that ACT can be used when dealing with the grief of a diagnosis. Using these principles can help parents and families manage the cyclical thoughts and feelings associated with stress and grief, which hinder their ability to continue engaging in behaviors that are aligned with their values (Martinez, 2018).

HISTORICAL OVERVIEW

In 1885, Sigmund Freud discovered, under the influence of a colleague and physician, Josef Breuer, that he could get patients' symptoms to occasionally subside by having the patient engage in talking about the earliest occurrences of symptoms. Josef Breuer found that this treatment – “the talking cure” – was cathartic and allowed the release of hidden emotions allowing for work on pathological behaviors. (Jay, 2019). When working with Breuer, Freud's objective was to have his patients engage with traumatic thoughts, feelings, and memories which previously were beyond their consciousness (Thornton, n.d.). This led to Freud's theory of levels of consciousness, and how one experiences sensations and experiences – conscious (aware), preconscious (can be retrieved), and unconscious (pushed away). His theory stated that the unconscious is where emotions, and memories which are threatening to the conscious mind are pushed (Sharf, 2007 p.31). While the idea of pushing

thoughts away and not focusing on them is the opposite of the ACT principles, these ideas guided early social science to think about things on a deeper level (Plumb, 2011).

In 1945, B.F. Skinner introduced the idea of radical behaviorism as a new method to conceptualize human behavior. Skinner denoted this new form of behaviorism as radical to contrast it to methodological behaviorism. Like former behaviorism characteristics, Skinner did find that overt behavior was an essential variable. However, he also recognized that private and unobserved behavior, such as thoughts, were also worth acknowledging (Ahearn, 2010). Skinner was interested in understanding and fostering a more naturalistic perspective. He viewed behavior as an evolving system, and strove to find a pragmatic sequence to behavior within the current context of behavior. He argued that a fundamental understanding of a person's psychological state was less important than the person's behavior and environmental considerations. He was interested in the antecedent, behavior, and consequence contingency as a unit that drives behavior (Plumb, 2011).

Cognitive therapy, a system by Aaron Beck, sought to find more ground as clinicians became frustrated with the Skinnerian approach of radical behaviorism, as it was unclear how to approach language and cognition (Sharf, 2007). Clinicians using cognitive therapy assessed the way individuals perceived a situation and how their reactions connected to it (Plumb, 2011). Beck found great importance in treating clients by having them pay attention to their thoughts – especially those in which the individual may be unaware of and are important to their belief systems (Sharf, 2007). Moreover, Beck

acknowledged the importance of clients being able to distance themselves from their thoughts – being able to observe their thoughts from the perspective of the listener – connecting it to the later founding of ACT. After cognitive therapy gained ground, cognitive behavior therapy (CBT), a form of psychological therapy that helps clients learn skills to change thinking and behavior to achieve lasting improvement in mood and functioning and a sense of well-being, became more popular. CBT principles state that unhelpful ways of thinking and unhelpful learned behaviors lead to psychological problems. According to CBT, people suffering from these problems can learn better ways to cope to live more effective lives free of symptoms (APA Division 12).

Another treatment approach that had considerable influence on, and made many contributions to, ACT methodology is Relational Frame Theory (RFT). The core of verbal behavior – both internal and external – is the learned and “contextually controlled ability to arbitrarily relate events mutually and in combination, and to change functions of specific events based on relations to others” (Hayes, et al., 2006, p. 5). There are three important aspects of RFT. These include human cognition which is a specific kind of learned behavior; behavioral processes and their effects, which are altered by cognition; and contextual features of situations regulate cognitive relations and functions. RFT research implies that one should not focus on the context of thoughts when providing treatment; rather, instead, one should look at the functions of these thoughts.

In the 1970s, Steve Hayes looked to address clinical issues with the application of Skinner’s work in rule-

governed and verbal behavior. Hayes researched thinking as a behavior, due to Skinner's view of self-control, noting that it could have a controlling aspect in the behavior relationship. This relationship was further built when cognitive control was reconceptualized. It was found that, in the context of therapy, verbal behavior (i.e., reason-giving) could support dysfunctional behavior and be problematic; however, it was possible to weaken control by thinking other thoughts. These ideas were the beginning of building the foundations of ACT (Zettle, 2005)

THEORETICAL UNDERPINNINGS

PSYCHOLOGICAL FLEXIBILITY

The unified model used in ACT is the model of psychological flexibility, which was “derived largely from laboratory science” and used for human functioning and behavior change (Hayes, 2012, p. 62). This model has a basis in psychopathology, psychological health, and psychological intervention. If people are psychologically flexible, they display the six core processes – showing awareness of values; living life through committed action; attending to the present moment; demonstrating acceptance; and engaging in defusion. On the other hand, if one is said to be psychologically inflexible, he or she is inflexible in attention; engaging in inaction or impulsively; attaching to conceptualized self; fusing to his or her thoughts; engaging in experiential avoidance; and has disrupted values. The psychological flexibility model shows that pain is natural, but when verbal and cognitive processes affect one's repertoire in crucial areas through fusion and experiential avoidance, it causes unnecessary

suffering (Hayes, 2012). When the behavioral repertoire is affected in this manner, it prevents people from changing when strategies do not work. It can also create aversive control causing them to attempt to engage in experiential avoidance – the act of avoiding and escaping thoughts, feelings memories, and/or body sensations. According to the psychological flexibility model, it is important to understand and work to uphold the six core processes (all of which interact with each other) – defusion, acceptance, attention to the present moment, self-awareness, values, and committed action – otherwise it leads to psychological rigidity, which Hayes (2012) reported leads to unnecessary human suffering (Hayes, 2006).

Defusion is the process of seeing private events – thoughts, memories, images, feelings – as simply verbal behavior (Hayes, 2012). Harris (2008) defines thoughts as, “words inside [one’s] head”; images as “pictures inside [one’s] head”; and sensations as “feelings inside [one’s] body” p. 38. Harris (2008) notes that the ability to distinguish between all three is important, as one uses different methods to deal with these private events. These distinctions that Harris defines are all in one’s mind, or, as Hayes (2012) more behaviorally explains, in one’s repertoire of verbal or cognitive activities (p. 68). Hayes (2012) explained that not taking private events as literal, or factual information, but rather verbal behavior, it can “weaken the functional dominance” of rule-based responding (Hayes, 2012, p. 65). In other words, private events have less behavioral impact (Harris, 2008). When one is not experiencing defusion, he or she is experiencing cognitive fusion. This means that he or she is in a state where, “verbal events exert strong stimulus control over responding,” to the extent that he or she

responds to their private event verbal behavior, as though he or she is responding to physical or environmental situations directly (Hayes, 2012, p. 69).

Another of the six processes is acceptance. This is achieved when one no longer engages in experiential avoidance by trying to control or suppress unwanted private events, but by “mak[ing] room for” them (Hayes, 2012, p.65). Harris (2008) refers to acceptance as expansion; if given enough space, the private events no longer cause one to strain. Hayes (2012) does acknowledge that some experiential avoidance in certain contexts is not toxic, and can be adaptive, but in most instances, this is not the case. Once started, strategies one uses to seek to avoid aversive internal states are difficult to extinguish, and often result in the return of those undesired private events. Even when experiential avoidance is adaptive, it is often over-generalized to other contexts in which it is not adaptive, and possibly harmful. Also, socially-mediated positive reinforcement is often provided by social partners (family, friends, spouses, etc.) when one can suppress and control their private events and socially-mediated positive punishment is often provided by these social partners when one is not able to suppress and control their private events; this can make acceptance more difficult to achieve (Hayes, 2012). However, one can achieve this by not thinking about their emotions, but rather, observing them (Harris, 2008).

In addition to acceptance, attention to the present moment is another important process within the psychological flexibility model of ACT. Harris (2008) sometimes refers to attention to the present moment as “connection” – meaning being fully aware of one’s here and now experience, allowing one to engage with the

thoughts, feelings, and experiences that are current. Hayes (2006) explains that the goal of being present is for one to be more directly present with his or her environment, so that their behavior is flexible, and closer to matching their values. Hayes (2012) states that it is important to not be too focused on past events and memories, or imagined future events, but rather, on the present moment. When one is not in the present moment, it impacts his or her ability to engage in other psychological flexibility processes, such as defusion and acceptance.

Self as context, or the observing self, is another one of the six processes of psychological flexibility. This process is a perspective of pure self-awareness, not a thought or feeling (Harris, 2008). Perspective and sense of self are gained by human language. It is this side of human language that functions as empathy, theory of mind, perspective-taking, and sense of self. Mindfulness exercises foster a sense of self as context. The goal with this process is that one is aware of his or her experiences, with no regard to them; however, the limits and extents of self as context is unknown. (Hayes, 2006).

Values are another process of psychological flexibility. Values are, “chosen qualities of purposive action that can never be obtained as an object but can be instantiated moment by moment” (Hayes, 2006). One’s values can be utilized to motivate him or her to engage in behaviors that match these values (Harris, 2008). These values should not be imposed by others, but rather, be freely chosen (Hayes, 2006). While values should not be socially forced, the value can be social in nature (ex: friendship) (Hayes, 2012). Values are an “ongoing process of verbal relating” meaning that even if one value seems to counter another

value, they can be related and serve each other well (Hayes, 2012, p. 93). For example, as Hayes (2012) explained, one could, “initially not see the connection between having a fulfilling work career and being an effective parent, however, examining what the client would like to model for their children as part of promoting long-term life satisfaction” might show that these values are verbally related, and have a constructed link (Hayes, 2012, p. 93). It is important to differentiate that values are not goals. Values are a “direction we desire to keep moving in– an ongoing process that never reaches an end” (Harris, 2008, p. 169).

Committed action is one of the six processes that is very connected to the values process of psychological flexibility. Committed action is a “values-based action designed to create a pattern of action that is itself values-based” (Hayes, 2012, p. 93). Committed action does not mean that one will not occasionally take actions that are not based on values; rather, it means that even when they engage in action that is not matched with his or her values, that they take action to get back on track to form a behavioral repertoire (Harris, 2008). While values are focused on the consequences, committed action focuses on the behaviors and patterns of behavior that one takes to sustain purpose.

While ACT has become a more popular approach in the field of ABA, there are still criticisms emerging. Powers (2009) carried out a study to determine if ACT was as effective as a treatment as other common treatment approaches. Results of his study showed that ACT was more effective than waiting lists and placebos, but not as effective or more effective than other common treatment approaches. Levin and Hayes (2009) found that the data

Powers used in his study was inaccurate. When these inaccuracies were fixed and recalculated, the results showed that ACT was superior to other treatments (Levin and Hayes, 2009). Another criticism of ACT is that it is not distinctive, and is comparable to CBT (Arch & Craske, 2008). Hayes (2008) counters this criticism by noting that there are significant distinctions in the history and development of ACT versus CBT. He explains that ACT has “specific processes, principles and theories” while CBT is based on “tribal traditions” (Hayes, 2008, p. 286).

ACT is a treatment that must be used in a certain manner to meet all the dimensions of ABA and remain an ethical approach for BCBAs to utilize with clients. These dimensions include applied, behavioral, analytic, technological, conceptually systematic, effective, and generality. For a treatment to be considered applied, it must target socially significant problems. ACT has been used across many target behaviors and problems that are considered socially significant (e.g., grief, anxiety, anger, depression, eating disorders, chronic pain, addiction, post-traumatic stress disorder, and all the related behaviors that go along). Another important dimension is that the treatment must be behavioral, which means that the treatment must change behavior. While ACT is a treatment that may not directly target the behavior, it can be used to change thought processes that predict and lead to behavior change. This means that if one uses ACT treatment, and the client reports that his or her thoughts have changed, but there is no behavioral change and no follow-up modifications to bring about behavioral change, then one cannot consider it behavioral. Analytic is another dimension of ABA that states that we analyze behavior and demonstrate that the treatment has a

functional relation to the behavior change. To maintain this dimension of ABA when using ACT, one must collect data to ensure that change is happening, and that it is due to treatment, and not do other variables. The next dimension is technological. While ACT may be interpreted differently by various providers, behavior analysts must be precise in their procedure describing how ACT will be utilized, so that others can read and replicate it. Conceptually systematic is another dimension of ABA that must be in place. This means that the procedures must reflect ABA principles. This is of utmost importance in ACT. Without connecting the pieces back to behavioral principles and terminology, one could easily get lost in more mentalistic language and drift far away from meeting this dimension. The next dimension is effective, meaning that it must produce socially significant results for those impacted by the intervention. The last of the seven dimensions is generality. It is important that treatment produces a change in multiple settings, and can be maintained by the natural environment. When done correctly, ACT techniques and strategies can be utilized across settings, and maintained by the natural environment.

PSYCHOLOGICAL FLEXIBILITY AND GRIEF

Harris (2008) explains that ACT and psychological flexibility can be used during times of loss and grief. He references Dr. Elisabeth Kubler-Ross's "five stages of grief", which was initially created for death and dying. However, Harris (2012) explains that the stages she described can be applied across trauma, loss, crisis, and shock – they are not just reserved for death and dying.

He also explains that when one experiences grief, he or she does not necessarily experience every stage of grief or each stage of grief in a specific order. Martinez (2018) explains that it is a “continual process that lasts a lifetime”. Moreover, these stages can be experienced multiple times and even sometimes simultaneously. After the shock of an event (loss, trauma, crisis, shock, etc.), one’s environment often suddenly shifts; the environment that is desired may look vastly different than the one he or she is having to live in. The larger the difference between these two, the more likely one will experience some form of the grief stages. When this occurs, Harris (2012) explains how to use ACT strategies to be able to accept life’s circumstances and continue moving forward.

Harris (2012) explains that an important initial component is practicing self-compassion. Compassion is something people may use with other people, but less often – sometimes not at all – with themselves. He recommends that people work on building up their repertoire of compassion responses so they can use them during times of grief. Some examples of a compassion response may be validating pain (“I can see you are in terrible pain”), allowing time to observe the pain being experienced, and taking care of oneself by practicing some form of self-care (Harris, 2012).

Martinez (2018) noted that it is important to remember that psychological flexibility is still the goal when it comes to dealing with grief. He explains that our behavioral repertoire breaks down when we have a loss. While this is normal, if this prevents one from people from engaging in committed action which aligns with their values. If the grief being experienced is due to a death of a loved one, Martinez (2018) recommends doing

an ACT matrix specific to this topic to help those struggling choose values they admired about their loved one that they can add to their values and live out by engaging in committed action. Harris (2012) explains that connection or attention to the present moment is important to keep engaged in the current environment necessary tasks. Rather than continuing to allow thoughts of the past and/or future control behavior in a way that is not productive or helpful, he encourages to push forward with engaging in behaviors that have toward movement. After describing connection, Harris (2012) explains the process of defusion. When experiencing grief, people can focus on thoughts that are unhelpful such as those revolving around denial, anger, despair, and unfairness. While these are normal thoughts to have during times of grief, when experiencing fusion, these thoughts impact behavior by preventing them from engaging in behaviors that have toward movement. However, by viewing these thoughts as simply verbal behavior in which one does not have to allow to influence behaviors, one can experience defusion and continue engaging in behaviors that have toward movement, despite having these thoughts. Next, Harris (Harris, 2012) explains the importance of acceptance; if one is entirely consumed by his or her thoughts and feelings, they may be unable to do engaged in toward moves. This person would be in a state of fusion and unable to engage in committed action through toward moves. If one holds their emotions and thoughts so far away, trying to not come into contact with them, then he or she is not in the present moment or engaging in the observing self. All these processes impact one's ability to engage in acceptance (Harris, 2012).

APPLICATIONS

ACT APPLIED TO PARENT AND CHILD RELATIONSHIP

When looking at how ACT impacts the parents of children diagnosed with ASD, it may benefit to first look at how ACT affects parents of typically developing children. Whittingham et al. (2016) explained, “the parent-child relationship is important to all children, regardless of individual characteristics,” and impacts child outcomes and development (p.2). The parent and child relationship are interconnected and cyclical, meaning that if the parent has mental health issues, it impacts the child; as well as if the child has a disability or mental illness, this impacts the parent. Parent et al. (2010) explained that parent depression can affect the child, leading to an increase in problem behaviors. Fluja-Conteras and Gomez (2018) reported that maladaptive parenting behaviors, or styles, often increase in the number of problems their child ends up experiencing, such as depression, stress, aggression, and impulsivity. Brassell et al. (2016) explained that, due to the likelihood of psychological flexibility of an individual impacting others within the family system, it is important to examine the effects of parenting psychological flexibility on child outcomes.

Parent et al. (2010) reported that mindfulness has been said to help parents focus on the present moment and reduce ruminative thinking, which can play a role in parent depression, affecting the parent and child, as they often do not use positive parenting strategies. Parent et al. (2010) sought to determine if parent mindfulness would

be negatively correlated with parent depression. They used data of 145 mothers, 17 fathers, and 211 children. Parents completed the Beck Depression Inventory-II (BDI-II), the Mindful Attention Awareness Scale (MASS), and the Child Behavior Checklist (CBCL). In addition, children completed the Youth Self-Report (YSR). The parents and children participated in submitting two videos of their dyadic interactions. Results showed that parent depressive symptoms were related to child externalizing problems due to lack of positive parenting (Parent et al., 2010).

Flujas-Conteras and Gomez (2018) reported that development of experiential avoidance behaviors, as a strategy to self-regulate, are a risk factor of family conflicts. When parents become fused with their thoughts, often they are not able to maintain their behavioral repertoires, which leads to them engaging in behaviors – possible maladaptive ones – that result in experiential avoidance. Since maladaptive parenting behaviors can be changed through acceptance and defusion, Flujas-Conteras and Gomez (2018) sought to provide a guide for using ACT in family interventions, that result in parental psychological flexibility. They did a functional assessment with a 43-year-old mother, Maria, who engaged in experiential avoidance behaviors that impacted her son's private events, which turned into behaviors such as suicidal ideation. In order to determine a function of the behavior, a functional assessment was conducted, using specific variables which impacted behavior. They found that Maria was engaging in these behaviors to avoid the thoughts and feelings that occurred when around her family. Flujas-Contera and Gomez (2018) used the Valued Living Questionnaire

(VLQ) to determine her values, as well as a Psychological Flexibility Sheet at the beginning and end of treatment. They did not use a session-by-session protocol, but used ACT components, including use of several metaphors and other exercises, within sessions, with the goal of promoting psychological flexibility within her role as mother, as well as increase committed action. The first session targeted creative hopelessness; the next 2 sessions targeted values and barriers. The following 4 sessions looked toward engaging in committed action. In session 9, Maria reported that she was engaging in more committed action and less experiential avoidance. She reported that her son also had an increase in psychological flexibility. According to the results of the Psychological Flexibility Sheet, she had much higher scores on all the processes of psychological flexibility. Experiential avoidance decreased and acceptance increased, and was maintained at the four-month follow up (Flujas-Contera and Gomez, 2018).

Brassell et al. (2016) reported that, while increased psychological flexibility greatly impacts the individual's well-being, there is less research on how this impacts those within the individual's family system. They reported that there is some research on parent psychological flexibility and outcomes on child's well-being, but it is still unclear which mechanisms are causing this relationship. Brassell et al. (2016) sought to determine the effects of psychological flexibility through three steps. The first step was examining if psychological flexibility had an effect on parenting psychological flexibility. Brassell et al. (2016) discussed the importance of this distinction, as psychological flexibility is very context specific. Therefore, psychological flexibility that

is parent specific looks at the parent's ability to accept unhelpful thoughts and feelings that are prompted by parenting stress. The next step Brassell et al. (2016) examined was if increased parenting psychological flexibility resulted in an increased use of positive parenting strategies. They hypothesized this would occur due to the fact that increased parenting psychological flexibility being likely to result in the parent's ability to stay in the present moment, in a state of defusion, and more able to engage in committed action of engaging in those strategies. The last step in Brassell et al. (2016) study was to look at child outcomes from the increased use of adaptive parenting in the form of using positive parenting strategies. Moreover, they created their study using children within 3 age ranges (3-7 years, 8-12 years, and 13-17 years of age) of 615 parents, to account for childhood developmental differences in the outcomes portion. Parents completed the AAQ-II, to determine their psychological flexibility as an individual, and the Parenting-Specific Psychological Flexibility Scale (PSPF), which Brassell et al. (2016) created from the AAQ-II, but focused each item on parenting. Adaptive parenting was assessed using the Multidimensional Assessment of Parenting Scale (MAPS). The child outcomes were assessed using the Brief Problem Checklist (BPC). Results of these assessments showed that parent's psychological flexibility in the parenting role was associated with parent's psychological flexibility as an individual. It was also found that positive parenting strategies were more often used when parent had higher psychological flexibility in the parenting role. Moreover, higher levels of parent's psychological flexibility was associated with

lower levels of youth internalizing and externalizing problems (Brassell et al., 2016).

ACT APPLIED TO PARENTS OF CHILDREN DIAGNOSED WITH ASD

One of the settings and situations in which ACT can be utilized is with parents of children diagnosed with ASD. When coping with their child's diagnosis, parents will often cycle through at least some of the stages of grief outlined by Dr. Elisabeth Kubler-Ross. Grief is something that can occur when one experiences any kind of loss such as "divorce, death, disability; illness injury, or infirmity; depression, anxiety, or addiction: they all seem to be very different, but beneath the surface, they are all very similar" (Harris, 2012, p. 10). Moreover, having a child with ASD means increased pressure, and often means increased time restraints and limitations as parents have to take them to and from various therapy appointments. Parents may also struggle when their child does not meet milestones in which they expected him or her to meet within a certain timeline. This is where ACT can be utilized to support parents.

Gould et al. (2018) noted that parents who have a child with chronic challenges, such as a diagnosis of ASD, often experienced high levels of psychological suffering. Hahs et al. (2019) stated that a major financial burden is placed on parents, as children diagnosed with ASD require effective treatments, which can be expensive. Sairanen et al. (2019) also reported that parents of children with a disability have increased stress, depression, and anxiety. Mothers of children diagnosed with ASD have a greater level of stress, depression, guilt, and even shame (Salimi et

al, 2019). Although this can cause problems in the whole family system; some fathers report the stress, depression, guilt, and shame that is experienced by mothers in these situations is more damaging to the family system than the diagnosis of ASD (Salimi et al. 2019). Due to problem behaviors that children with ASD often engage in, parents often isolate themselves as they worry about potential embarrassment leading to limiting social engagement, which ultimately impacts their psychological well-being (Hahs et al., 2019). The increases in the challenging thoughts and feelings and their impacts on behaviors parents engage in can impact the entire family system. These researchers determined that parents need treatment to help them handle their thoughts and feelings through the challenges they experience (Sairanen et al, 2019).

Sairanen et al. (2019) chose to look at web-based treatment due to parents of children with disabilities often having limited time and not being able to always be face to face. The web-based treatment approach they chose was ACT due to promising results having been found in previous studies when people struggle with stress, anxiety, chronic pain, and depression. Sairanen et al. (2019) sought to evaluate the effects of web-based ACT intervention vs. control on burnout and psychological symptoms of depression, anxiety, and stress. There were 74 parents (37 in ACT group and 37 in the control group), who participated in this study had children with either diabetes or functional disabilities, and scored on the Shirom-Melamed Burnout Questionnaire (SMBQ) 2.75, indicating that had significant burnout. The SMBQ measures emotional exhaustion and physical fatigue, listlessness, tension, and cognitive weariness. The

researchers used the AAQ-II to measure experiential avoidance, Five Facet Mindfulness Questionnaire (FFMQ) to measure mindfulness, and Cognitive Fusion Questionnaire (CFQ) to measure cognitive fusion. Sairanen et al. (2019) provided a “10-week intervention to teach parents skills and strategies to prevent and handle stress and worries in everyday life” that was guided by a personal coach (p. 96). Personal coaches were undergraduate psychology students who received a 4-hour training in ACT and web coaching before the start of the intervention. They also received 2 hours of supervision and continued supervision as needed. The personal coaches provided semi-structured feedback to parents. The researchers also tracked adherence to programming by tracking login times and actions. Parents were able to log in and complete modules during the 10 weeks of intervention. Results showed that while before treatment there were no significant differences between the ACT group and control group, there were significant differences during intervention which were maintained at follow-up. Improvements in depression symptoms were made when couples participated in the treatment together; when spouses or significant others did not participate, this improvement was not seen. They did not find significant differences across mindfulness questionnaires. While they found a significant impact on burnout and depressive symptoms, this was not the case for anxiety and stress symptoms. Limitations included a short follow-up period (4 months), the number of participant dropouts, the number of patients who were female, and the use of self-report measures. Overall significant differences indicate that web-based ACT

intervention can be an effective approach to supporting parents of children with disabilities (Sairanen et al., 2019).

Blackledge & Hayes (2006) reported that parents of children who have ASD “experience high levels of chronic stress, even more so than parents of Down Syndrome and psychiatrically diagnosed children” (p. 2). It can cause parents to experience unhelpful feelings and thoughts and cause marital problems. Despite these effects, parents’ mental health is often ignored as parent training originally only focused on the child. Since ACT has been used to address many mental health issues, they chose to determine the effects of two 14-hour days of intervention on stress and depression experienced by parents who have children diagnosed with ASD. Blackledge & Hayes (2006) recruited 20 parents (15 mothers and 5 fathers) of children diagnosed with ASD to be participants in this study. They used the Global Severity Index (GSI) to measure psychological distress symptoms, the Beck Depression Inventory II (BDI) to measure depression, the General Health Questionnaire-12 (GHQ-12) to screen for psychiatric problems, the Parental Locus of Control Scale (PLOC) to measure parenting ability, the Acceptance and Action Questionnaire (AAQ) to measure psychological flexibility, and the Automatic Thoughts Questionnaire (ATQ) to measure automatic negative statements. These assessments were filled out three weeks prior to treatment, one week prior to treatment, one week following treatment, and three months following post-treatment assessment. The intervention started with a creative hopelessness exercise, followed by cognitive defusion, self-as context, and values exercises. Results showed statistically significant changes, but the average changes were not large. From pre to post-testing, the

ATQ-B improved. From pre-test to follow up, the AAQ and ATQ-B showed significant improvement. Overall, this study showed that ACT can produce beneficial outcomes for parents who have children diagnosed with ASD (Blackledge & Hayes, 2006)

Gould et al. (2018) studied how parents of children of ASD respond to acceptance and commitment training. When it comes to implementing behavior plans and managing their child's behaviors, parents often struggle to meet treatment fidelity due to the psychological distress they experience (Gould et al., 2018). Gould et al. (2018) defined psychological distress as "experiencing high levels of aversive private events evoked by environmental stressors" p. 81. These private events are "any covert stimulus (e.g., thought, image, physical sensation, emotion) or response (thinking, visualizing, remembering)" (Gould et al., 2018, p. 81). Hayes (2018) noted that one's behavioral repertoire is often narrowed when he or she is under a great deal of stress. This can cause parents to behave in inflexible ways, often rule-governed, such as social disapproval, questioning of parenting abilities, or inability to face the challenge, instead of based on environmental contingencies. Cognitive fusion, opposite of defusion and explained earlier, makes these rule-governed responses stronger and decreases the likelihood that parents will respond in a way that is needed to decrease their child's maladaptive behaviors. This often leads to parents engaging in experiential avoidance of the thoughts and feelings they find aversive. Continuing to engage in experiential avoidance at a frequent rate is associated with higher levels of mental health issues and parent stress. Another process to moving away from experiential avoidance and

toward committed action is identifying parent's values. Gould et al. (2018) defined values as "verbal statements that alter the degree to which consequences function as reinforcers or punishers" (p.82). The goal when working on values is to use rule-governed behaviors that are oriented toward the bigger goal, which leads to positive reinforcers, resulted in committed action. The researchers defined mindfulness as action "intended to reduce contingency insensitivity and control by previously established verbal rules, by strengthening one's repertoire of attending to stimuli in the present moment environment" (p. 82). They defined the last process, acceptance, as "an approach response and/or the absence of an escape response in respect to aversive stimulation – unconditioned, conditioned, or derived" (p. 82). Gould et al. (2018) used a multiple-baseline design across participants to assess how these processes could be utilized in an ACT protocol and affect parent behavior. The study had three participants, all mothers of children who had a diagnosis of ASD, and who were already receiving in-home ABA services, but had no exposure to ACT. All sessions took place in the participant's home. The researchers had each parent take data on "frequency of values-directed parent behaviors (any action resulting in a tangible outcome directly related to an individual parent-identified value) per calendar day" (p. 83). The researchers used the Acceptance and Action Questionnaire-II (AAQ-II), Self-Compassion Scale (SCS), and Family Impact of Childhood Disability Scale (FICD). Interobserver agreement was found by using a third party such as a friend or significant other. Training was conducted in six 90-minute 1:1 sessions to allow for individualization. Each session provided a summary of

one of the six ACT psychological flexibility processes. Sessions consisted of “lecture, discussion, modeling, role-play, and practice” with supplemental homework activities assigned to be completed between sessions (Gould et al., 2018, p. 84). The first parent was engaged in zero values-directed behaviors in baseline or training and this increased in post-training and follow up. The second parent engaged in zero values-directed behaviors in baseline, engaged in some values-based directed behaviors during training, and engaged in higher levels of values-based directed behaviors post-training; the researchers did not follow-up on this case. The last parent had zero value-directed behaviors in baseline, low frequency of value-directed behaviors during training, and low frequency during post-training; in follow up, this parent had a significantly higher frequency of values-directed behavior. Some limitations these researchers noted included parent recording self-report data; however, the researchers attempted to offset this by ensuring that behaviors were discrete and well-defined, which made it easier to recognize and record (Gould et al, 2018).

Despite the need to support parents, Hahs et al. (2019) also reported that few treatments have targeted the needs of the parents directly. Findings in his research proposed that ACT could be utilized to help parents of children with ASD. Participants included 18 parents of children diagnosed with ASD who received 150 to 300 minutes of ABA per week. Participants completed eight self-report measures, including AAQ-II, White Behar Suppression Inventory (WBSI), Internalized Shame Scale (ISS), Cognitive Fusion Questionnaire (CFQ-13), Frieberg Mindfulness Inventory (FMI), Mindful Attention

Awareness Scale (MAAS), Personal Values Questionnaire-II (PVQ-II), and Beck Depression Inventory-II (BDI-II). Hahs et al. (2019) used between-subjects pre-test and post-test experimental design, with matched assignment into treatment, and control groups were used. Nine participants were in the ACT group and nine participants were in the control group dependent on their scores on the BDI-II and AAQ-II. The control group completed the pre-test and a week later returned to complete the post-test. The ACT group completed two 2-hour training sessions during the workshop; these trainings were held one week apart. The first 3 processes (values, self-as-context, and cognitive defusion) were discussed in the first session and the second 3 processes (acceptance, present moment, and committed action) were in the second session. Results showed that there were statistically significant changes between groups for six of the eight measures and these differences indicate that brief ACT interventions “could be effective for increasing elements of psychological flexibility and mindfulness as well as decreasing reports of depression and shame” (Hahs, 2019, p. 157).

Salimi et al. (2019) cited research that due to ever-changing challenges that families face, it is important that professionals prepare families by teaching cognitive-emotional regulation. Cognitive emotion regulation can be utilized during stressful events. It was noted that some of these strategies fall into experiential avoidance behaviors, which is associated with emotional problems. Salimi et al. (2019) sought to determine if ACT has any influence on cognitive emotion regulation strategies in mothers of children with ASD. Participants in this study were 30 mothers of children diagnosed with ASD.

Researchers used the Cognitive Emotion Regulation Inventory to assess cognitive emotion regulation looking at seven factors: self-blaming, blaming others, positive reevaluation, rumination, considering a situation as disastrous, reception, and planning. Salimi et al. (2019) held eight 2-hour group sessions during treatment. These sessions allowed practice and tasks were assigned at the end of each session. No treatment occurred in the control group. Results showed there were significant statistical differences between the experimental group and the control group. These meaningful differences occurred for self-blaming, blaming others, positive reevaluation, considering a situation as disastrous, reception, and planning (Salimi et al., 2019).

Corti et al. (2018) reported that past research shows that parents are better equipped to respond to behavior problems and lessen stress levels when provided with behavioral parent training (PT). Through behavioral parent training, parents learn various strategies to use when engaging and teaching their child to use at home. However, thus far, behavioral PT does not take any psychological aspects into account. Since parents' behavior is a direct result of environmental factors – public or private events – it is important to take the private events into consideration. If parents are depressed or in a state of fusion, this may impact their ability to engage and interact with their child as frequently or for longer duration. Since it is clear that private events also play a role in parent behavior, any barriers in this area should be addressed in order to produce optimal PT effects. Moreover, a good parent and therapist relationship with good communication is essential for PT. For example, if a therapist is too direct

and does not show appropriate affect or empathy, this could impact parents' willingness and comfortability with PT. Corti et al. (2018) proposed that the use of ACT could fill the gaps of traditional PT as it addresses both private and public events, as well as providing therapists who are often nonjudgmental and open-minded. In addition, ACT works to help parents be responsive rather than reactive. Parent psychological flexibility is associated with psychological adjustment and responsiveness to child behavior. This allows parents to respond with validation and acceptance, resulting in a reduction in child problem behavior. Corti et al. (2018) sought to evaluate the effectiveness of ACT PT for parents with a recent diagnosis of ASD. This training was designed to address parent stress, cognitive fusion, and experiential avoidance. Since all the children in the study were receiving early intensive behavioral intervention, they used an ACT-PT (21 participants) and a control group that only received EIBI (22 participants). This study included parents of children ages 2-4 years, with a diagnosis solely of ASD. Each series was conducted across 6 months and coincided with early intensive behavioral intervention. It consisted of 12 hour and a half long sessions every two weeks. Every session was preplanned with content and exercises, as well as with assigned homework. The series was conducted in a group format so that parents could give and receive support to other parents that are having similar difficulties. Corti et al. (2018) used pre-treatment post-treatment self-report questionnaires, as well as the Parenting Stress Index-Short Form (PSI-SF), Mindfulness Attention and Awareness Scale (MAAS), and Cognitive Fusion Questionnaire (CFQ). Results showed that psychological

suffering and inflexibility are issues that parents of children with ASD experience. Corti et al. (2018) found that there were not significant differences between the ACT-PT group and the control group. In fact, there was a decrease in mindful awareness and no change in cognitive fusion. They note this could be due to the self-report measures not being reliable.

Poddar et al. (2015) also wanted to evaluate the effects of ACT on parents of children and adolescents with ASD. They explained that parents of children with ASD often report to feeling overwhelmed, blame, and guilt, as well as having high levels of chronic stress. Parents of children with ASD often have anxiety and depression, or depressive symptoms. Due to ASD being a diagnosis that often stays for a lifetime, with changing challenges, Poddar et al. (2015) explained it is important to work toward accepting the diagnosis rather than constantly challenging, which is where ACT comes in. The study included five mothers of children and adolescents with diagnoses of ASD. Since the researchers wanted to assess just state anxiety that is likely caused by the diagnosis, rather than trait anxiety, they used the State-Trait Anxiety Inventory (STAI) to make the distinction. In addition to the STAI, they use the BDI to assess depression, the AAQ to assess psychological flexibility and the World Health Organization Quality of Life Assessment-BREF (WHOQOL-BREF) to assess areas such as physical and psychological health, social relationships, and the environment. The intervention included ten sessions across two months. The first six sessions focused on the diagnosis and accepting the diagnosis, as well as teaching metaphors, paradoxes, and experiential exercises used in ACT. The following

sessions focused on values, goals, and future behaviors. Results showed that there was a significant decrease of state anxiety at post-assessment. There was also a significant decrease in levels of distress at post-assessment. Moreover, there was a significant change in psychological flexibility and quality of life.

Fung et al. (2018) reported that there are few interventions that help parents of children with ASD. They found that most parent interventions can do the opposite of the intention and add to parent stress by adding another obligation onto their plate. They stated that mindfulness-based training may be an effective approach to help parents as it has been found to “reduce stress and increase well-being” (Fung et al., 2018, p. 2740). Since parents are able to not be controlled by their thoughts and feelings they describe as being distressing through psychological flexibility, Fung et al. (2018) sought to help parents by targeting psychological flexibility, fusion, and values. Participants were 33 mothers of a child under the age of 22, with a diagnosis of ASD. They agreed to participate in a hour and half long day group, followed by a refresher course a month after. They found two mothers (a registered nurse and a social worker) to train to be facilitators of the group. Fung et a. (2018) used ACT group activities followed by debriefing. They did sessions in the community in a setting with candles and music to increase participant comfortability. The researchers used several measures to determine if the intervention was effective. They used the AAQ-II to assess overall psychological flexibility, CFQ to assess fusion, the VLQ to assess values, and the Depression Anxiety Stress Scales (DASS-21) to evaluate perceived stress and depressive symptoms. Results of the AAQ-II

showed that there was a significant improvement in psychological flexibility post-intervention and at follow up. The CFQ results showed that there was a significant decrease in cognitive defusion post-intervention and at follow up. The results of the VLQ showed that there were significant changes across all areas except for fun (family, marriage, parenting, friends, community life, and self-care). It was found that the change in the scores on the VLQ was a mediator for changes at post-intervention and the CFQ at follow-up. Corti et al. (2018) discussed that the effects of these improvements may improve parenting skills based on previous research. Some of the mothers reported that when they used their ACT skills, they were able to engage in behaviors that were more aligned with their values when in difficult situations with their children. Overall, mothers reported improvements in psychological flexibility, cognitive fusion, and values.

ETHICAL CONSIDERATIONS

Ethics is an essential component within the field of behavior analysis. Considering that behavior analysis is based on the science of behavior, the Professional and Ethical Compliance Code (PECC) for Behavior Analysts becomes even more important when addressing private events as they are not observable and are only measurable by self-report. While it benefits the field of ABA to take these private events and their effects on behavior into consideration, several PECC codes become even more important when using ACT as a behavior analyst. All the codes are pertinent to ACT, however, the ones that are most important exclusively to providing ACT as behavior analyst are 1.01, Reliance on Scientific Knowledge; 1.02,

Boundaries of Competence; 2.09, Treatment/ Intervention Efficacy; 3.01, Behavior Analytic Assessment; 4.01, Conceptual Consistency; 4.07, Environmental Conditions that Interfere with Implementation; 6.0, Behavior Analysts' Ethical Responsibility to the Profession; 6.01, Affirming Principles (Behavior Analysis Certification Board, 2014).

Reliance on scientific knowledge (code 1.01 in the PECC) describes the need for behavior analysis to be dependent on scientific evidence (Behavior Analysis Certification Board, 2014). It calls that behavior analysts stay objective by basing decisions on collected data. This is an area that is called into question when using ACT due to it highly relying on self-report data. There are several ways behavior analysts can ensure they are still relying on scientific knowledge when using ACT (Bailey & Burch, 2016). One way is by measuring overt behaviors that are said to occur in the presence of the target covert behaviors. Sometimes this may not be a possibility, in which case the covert behaviors must be described in measurable and objective terms. It may be helpful to use self-report assessments that have clear rating scales where each number is associated with an example to ensure clarity in responding. This can be done by using Behaviorally Anchored Rating Systems (BARS) to increase consistency, accuracy, standards, clear and independent dimensions of measurement, and feedback (Behaviorally Anchored Rating Scale (BARS) Definition, Advantages, Example, Steps, & Overview, 2020).

Another PECC that is important to consider is 1.02, boundaries of competence (Behavior Analysis Certification Board, 2014). This code requires that behavior analysts only work within areas in which they

have demonstrated competency. If there is a service that they are not competent in, they must seek appropriate levels of support before providing said service or be at risk of violating this code. Some ways to receive support include training, relevant coursework, or mentorship, supervision, and consultation with another behavior analyst that is competent in that area. ACT is an area that one is not competent in just from going to school and learning about ABA. There are some trainings on ACT, but this alone is not sufficient. While it is possible to become a certified ACT therapist, the methods of becoming one are somewhat unclear and may not match the necessary components within behavior analysis. It is important to note that the way ACT is approached may be different depending on the type of provider (ex: counselor/psychologist vs. behavior analyst). While the processes being discussed are the same, behavior analysts must approach it from the behavioral lens. Therefore, one would need to seek mentorship and consultation from a behavior analyst that has experience in using ACT. If all of these are followed, then it is possible to stay within the boundaries of competency (Bailey & Burch, 2016).

Treatment and intervention efficacy (code 2.09 in PECC) describes that clients have the right to effective treatment (Behavior Analysis Certification Board, 2014). This code requires that behavior analysts educate their clients about evidence-based treatment procedures. Treatments that behavior analysts use must come from research and literature that is peer-reviewed and within behavior analytic journals. While there has been considerable ACT research, not many articles exist within the behavior analytic journals and much of the research is not single-subject design. Therefore, there is no way

to evaluate if the treatment was effective by the ways behavior analysts typically would (visual inspection of graphs – level, trend, variability – and various single-subject designs which allow functional relations) and rather look at statistical significance results. More single-subject design research is needed to ensure that this code is not violated (Bailey & Burch, 2016).

Another area that behavior analysts need to be mindful of when using ACT is ensuring the use of behavior analytic assessments (PECC 3.01) to support treatment and programming (Behavior Analyst Certification Board, 2014). Behavior analysts using ACT should perform a functional behavior assessment (FBA) or functional analysis (FA) to determine the function of the behavior. This allows for the treatment package to match the function of the behavior, increasing the likelihood of success. This needs to remain the same with ACT. When possible, FBAs and FAs should be done with overt behaviors; however, these can be modified to address covert behaviors through environmental manipulation and client self-report data. If behavior analysts proceed to treatment before using behavior analytic assessment, they are at risk of violating this code (Bailey & Burch, 2016).

Maintaining conceptual consistency (PECC 4.01) is another area that could easily be violated. In order to be conceptually consistent, behavior analysts must follow the principles of ABA. It coincides with affirming principles (PECC 6.01) which state the 7 dimensions of behavior analysis (explained in theoretical underpinnings) must be maintained, which includes being conceptually systematic (Behavior Analyst Certification Board, 2014). This is an area that even if behavior analysts go into using ACT maintaining those

affirming principles, they can easily experience behavioral drift and not continue providing assessment and treatment that is conceptually consistent with ABA. It would likely benefit behavior analysts to create a checklist that they use to run through with their treatment plans to ensure that they are conceptually consistent and not at risk of violating the code (Bailey & Burch, 2016).

The next code to consider is 4.07, environmental conditions that interfere with implementation (Behavior Analyst Certification Board, 2014). This states that behavior analysts must provide alternative referrals for other services if environmental conditions prevent implementation. It also states that if environmental conditions hinder implementation, behavior analysts seek to eliminate these constraints or put it in writing. As stated before, it can be a bit of a slippery slope when using ACT to go beyond the scope of ACT with behavior analysis. In an instance where this is the case and the environment is not lending to behavior analysis being able to be implemented, then the behavior analyst must refer out to another professional, such as a counselor, psychologist, family therapist, etc. It is important to note that environmental constraints may be different. When using ABA, behavior analysts often try to put in proactive strategies to make the environment less likely to cause target behaviors from occurring – making it more likely for the client to respond appropriately; sometimes they may build up a tolerance for non-preferred situations, but proactive strategies often remain in place. However, when using ACT, behavior analysts work on helping clients build up their repertoire of behaviors to be able to be in those challenging contexts while continuing to

engage in behaviors that align with their values. Understanding the environmental conditions that truly constrain the ability to provide ACT in a behavior analytic manner is important to try to avoid the risk of violation of this code (Bailey & Burch, 2016).

The last code to consider when doing ACT as behavior analysts is 6.0, behavior analysts' ethical responsibility to the profession (Behavior Analyst Certification Board, 2014). This code states that behavior analysts have an obligation to the field of behavior analysis rather than any other field. For example, if someone from another profession, like a Speech and Language Pathologist becomes a BCBA, he or she would be obligated to follow the science of behavior even if it was in direct contradiction to something that he or she learned before becoming a behavior analyst. In turn, this also applies to behavior analysts that provide ACT. If there was a new process, strategy, exercise, etc. within ACT is contradictory to ABA and/or was not evidence-based, then behavior analysts would not be able to recognize that process or use those strategies and exercises. If behavior analysts start to veer into non-ABA or non-evidence-based territory, they are at risk of violating this code (Bailey & Burch, 2016).

FUTURE DIRECTIONS

As always, more research is needed. One major need is for more researchers to do more single-subject design studies with ACT. This is a missing component that makes it difficult to determine effectiveness when reviewing articles as a behavior analyst. Behavior analysts view clients as individuals and the ability to see the

outcomes at an individual level is more helpful than seeing the group effects when choosing treatments.

Another area that needs more research on evidence-based methods of approaching data collection on private events. While private events will always be hard to measure as it is self-report based, there are likely ways that data could be collected to ensure data is clearer and more accurate. For example, using very discrete terminology, descriptions, and examples. Most research on scales such as the BARS have been in the area of Organizational Behavior Management (OBM). More research on the most effective scales to use when using self-report data in ACT would be helpful.

Further research is also needed in the most effective settings and modalities in which ACT is used. More specifically, research looking if ACT most effective in individual or group settings, as well as web-based or face-to-face. In addition, research to determine if providing ACT via a couple of sessions in a more concentrated form or shorter sessions further spaced apart is most effective.

Another area needing more research are the effects of self-care within ACT. Self-care has become a buzz word that many push as something people need to maintain their mental health. Behavior analysts often mention to clients' parents to make sure they are taking care of themselves or engaging in self-care as they notice the emotional toll that their child's ABA treatment can take on the parent. However, identifying true self-care can be difficult for some. For example, watching a movie may be stress relieving for certain people and they feel better after, while others feel good while watching it but are back to the same level as soon as the movie is over. It could be argued that when self-care is used incorrectly,

it is more of an experiential avoidance strategy rather than as an activity that rejuvenates them. More research is needed to determine if self-care, when used correctly, shows significant benefits in reducing parental stress for parents of children with a diagnosis of ASD.

Future research should also look at training therapists to use ACT in a behavior analytic way. Based on the research in this paper, ACT is helpful for parents of children diagnosed with ASD. This calls the need for more behavior analysts to use this approach to support parents. However, without an effective basis on teaching ACT to others within a company, it is challenging to ensure that they can effectively use ACT to truly help clients. It would be beneficial to evaluate the effects of various training programs in teaching the use of ACT to behavior analysts.

Another area to research is the impacts of ACT on others in the family when parents participate in ACT. Specifically researching the child outcomes when his or her parents participate. In addition, looking at if parents participating in ACT affects their ability to follow through with behavior reduction and behavior acquisition protocols. The use of ACT to help parents may have effects beyond just the benefit to themselves. Further research is needed for ACT to be used to its full benefit to support parents of children with a diagnosis of ASD.

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CHAPTER 11.

**ABA AND PERSONAL SAFETY: PREVENTING
ABDUCTION AND ABUSE OF INDIVIDUALS
WITH DEVELOPMENTAL DISABILITIES**



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According to the Suzy Lamplugh Trust, personal safety is defined as “an individual’s ability to go about their everyday life free from the threat or fear of psychological, emotional or physical harm from others”(Suzy Lamplugh Trust, n.d.). While ‘threat of harm’ is something many individuals are free from

in their regular day-to-day, certain groups of people are more likely to experience risks to personal safety. For example, Adults with disabilities are 1.5 times more likely to be a victim of violence (Jones et al., 2012). Additionally, children are more likely to be exposed to violence than adults, and children with disabilities are 3.44 times more likely to be a victim of abuse than their peers without disabilities (“Facts about Children and Violence”, 2017; Davis, 2011).

Abduction is one type of threat to personal safety, particularly when it comes to the personal safety of children and children with disabilities. While most child abductions are committed by family members, child abductions by strangers are more dangerous and often result in more serious consequences such as abuse or even death (Kurt & Kutlu, 2019). According to the

National Center for Missing and Exploited Children (NCMEC), over 1,300 cases (known to the NCMEC) of attempted or successful abduction occurred between January 1st, 2019 and December 31st, 2019 (The National Center for Missing and Exploited Children, n.d.).

While there are not many statistics available on what percentage of abductions involved a child with a disability, the NCMEC has published data on children with disabilities who have gone missing. According to the NCMEC, 952 children who were reported to have autism or Asperger syndrome as a medical condition, a mental health condition, or a special needs condition were reported missing between January 1st, 2007 and December 31st, 2016 (Missing Children on the Autism Spectrum, 2016). The NMEC report did not list the reasons the children went missing; however, most missing cases were likely caused by wandering. While this paper does not directly address wandering, it should be noted that according to Ledbetter-Cho (2016) states that 50% of children elope from safe places which could potentially increase abduction risk.

While less at-risk than children, adults with disabilities are still 1.5 times more likely to be victims of violence than non-disabled adults. The likelihood of experiencing violence varies based on different types of disabilities (Jones et al., 2012). Jones et al. found that adults with intellectual disabilities were 1.6 times more likely and adults with mental illness were 3.86 times more likely to experience violence than non-disabled adults.

As with any survey data on controversial topics, the results from the above study may not capture the full extent of exposure to violence for individuals with disabilities. Finding statistics on violence towards

individuals with disabilities has proven to be challenging. According to Sullivan (2002), children with disabilities are typically not reported in any crime statistic systems in the U.S., making it difficult to determine the risk of abuse for these children. Jones et al. (2012) conducted a meta-analysis of 17 studies to find pooled estimates of the prevalence and risk of violence against children with disabilities. Findings from Jones et al. (2012) indicated that one in four children with a disability will be a victim of violence. Of those children, 20.4 % will be a victim of physical violence and 13.7% will be a victim of sexual violence. Results of the meta-analysis also showed that children with intellectual or psychological disabilities are more likely to be victims of sexual assault than individuals with physical disabilities.

Many factors may contribute to why children with disabilities have an increased risk of victimization. According to Davis (2011), a potential reason that persons with disabilities may be more vulnerable to abuse than others is due to society's response to the abuse. Davis (2011) states that adults may be less likely to report the abuse due to the individual's disability status, making it more likely for abuse to continue. Parents may not report abuse occurring at a group home due to fear their child may not have other options for living arrangements, or parents or caregivers may not report abuse due to fear of legal ramifications.

For individuals with disabilities, the person being abused might not report the abuse due to not understanding what abuse is, or due to communication deficits (Davis, 2011). Watson (1984) suggests that deficits in social skills and judgment may be the reason for increased vulnerability to abuse. Additionally,

communication deficits such as the inability to report abuse or seek help may increase risk (Lang & Frenzel, 1988). Lack of knowledge on how to defend against abuse and lack of education regarding appropriate sexual behavior has also been cited as potential reasons for increased risk (Sobsey & Varnhagen, 1988).

Individuals with disabilities are more likely to face risks to their personal safety such as those of abduction and abuse. This paper will cover the research in the field of behavior analysis on promoting personal safety behaviors, with a focus on individuals with developmental disabilities. Much research has been done within the field of behavior analysis on increasing the personal safety of individuals with disabilities, however there are still areas which warrant further research (Godish, Miltenberger, & Sanchez, 2017). This paper will analyze the current body of literature on personal safety in a hope to evaluate the progress made, gaps in the current body of research, and suggestions for future research.

The first section of this paper will cover the historical overview of teaching personal safety to children and adults with developmental disabilities. The second section of this paper will focus on the topic of personal safety skills as it relates to the seven dimensions of applied behavior analysis. After going over the background of this topic, the third section of the paper will review some of the applications regarding promoting personal safety skills. The fourth part of this paper will discuss ethical guidelines and decision making relating to teaching personal safety skills. The final part of this paper will discuss future directions regarding personal safety for individuals with disabilities. For this paper, the

term personal safety will mainly be used to refer to the prevention of abuse and abduction.

HISTORICAL OVERVIEW

Some of the earliest prevention applications originated when the field of applied behavior analysis was instead referred to as behavior modification. According to Miltenberger (2008), behavior modification procedures have been applied to many areas to help people change a vast array of problem behaviors; one such application is 'Prevention'. Behavior modification and now applied behavior analysis have been used to address many societal problems through teaching preventative skills. Physical abuse, sexual abuse, abduction, and neglect are some prevention areas that have been addressed in the behavior modification and behavior analysis literature (Miltenberger, 2008).

Behavior analytic preventative approaches to abduction or abuse before the 1980s are scarce (Poche, Brouwer, and Swearingner, 1981). Research on child abuse has historically focused on the characteristics of child molesters and treatment of sexual deviance after the fact (Forgione, 1976; Groth, 1980; Groth & Birnbaum, 1978; Panton, 1978). One of the first empirical studies published on the topic of abduction prevention was Poche, Brouwer, and Swearingner (1981). In this study, preschool children were taught how to respond to lures from strangers using modeling, behavior rehearsal, and reinforcement. Poche, Brouwer, and Swearingner (1981) demonstrated that through modeling, rehearsal, and reinforcement that preschool children could be taught to appropriately respond to lures for strangers.

Several years after Poche, Brouwer, and Swearingen (1981), Haseltine and Miltenberger (1990) demonstrated that adults diagnosed with mental retardation were able to learn and demonstrate abduction prevention skills. Haseltine and Miltenberger (1990) used behavioral skills training to teach abduction prevention skills to eight adults diagnosed with mild mental retardation. Results of their study found that seven of the eight participants learned the safety skills and maintained them at 6-month follow up. Additionally, a side-effects questionnaire found no evidence of emotional or behavioral side effects, which was one of the major concerns of conducting research in the area of abuse and abduction prevention. The positive outcomes of this study and previous abduction prevention studies opened the doors for more applied research to be done in the area of teaching personal safety skills to individuals with disabilities.

Haseltine and Miltenberger (1990) pointed out the need for future research to address the difficulties in assessing sexual abuse prevention skills. However, studies evaluating the effectiveness of programs for preventing sexual abuse of persons with developmental disabilities did not come about until 1998. Lumley and Miltenberger (1997) addressed the need for research in this area and outlined the necessary skills for preventing sexual abuse as well as how to assess the effectiveness such a program. The suggestions made for research in this area were based on previous research done in the area of abduction prevention and sexual abuse prevention studies done with children (Lumley & Miltenberger, 1997). Following the suggestions laid out in Lumley and Miltenberger (1997) Lumley et al. (1998) evaluated the effectiveness of behavior skills training on sexual abuse prevention skills

of women diagnosed with mental retardation. This study incorporated naturalistic, in situ assessments in which participants were debriefed after. Most of the behavior-analytic applications that followed Lumley et al. (1998) focused on the prevention of sexual abuse. There continues to be very little behavior analytic research on preventing physical abuse of persons with disabilities (Doughty & Kane, 2010).

Many studies focusing on prevention of abuse or abduction utilize behavioral skills training, or most of its components, in order to teach safety skills to study participants (Lumley et al., 1998; Miltenberger & Thiesse-Duffy, 1988; Wurtele et al., 1986). Behavioral skills training involves providing instructions, modeling, rehearsal, and feedback for the behavior being taught. The use of behavioral Skills training emerged in the late 1960s and early 1970s, although it is unclear where the combination of instruction, modeling, rehearsal, and feedback first originated (Erhard, Falcomata, & Harmon, 2019). Some of the early applications involved variations of these main components but were not termed behavioral skills training. Early studies on these components have demonstrated their effectiveness in teaching people social skills. Braukmann et al. (1974) demonstrated that the use of instructions, rationale, demonstration, behavior practice, and feedback was effective to teach adolescents interview skills. Some studies have also looked at video-modeling, constant time delay, or in-situ training, in combination with BST, to help individuals gain safety skills and prevent potentially dangerous situations (Gast et al. 1993; Gunby, Carr, & LeBlanc, 2010; Gunby & Rapp, 2014; Miltenberger et al., 1999;).

Some studies have focused on teaching abuse and abduction prevention skills to individuals with autism or other developmental disabilities; many of these studies used behavioral skills training as their method of teaching (Fisher, Burke, & Griffin, 2013; Gunby, Carr, & Leblanc, 2010; Gunby & Rapp, 2014; Ledbetter-Cho et al., 2016; Lumley et al., 1998). There is not much literature that focuses on the use of other behavioral procedures to teach personal safety and even less which focuses on methods to teach these skills to individuals with developmental disabilities (Godish, Miltenberger, & Sanchez, 2017; Kurt & Kutlu, 2019). Kurt and Kutlu (2019) found the use of social stories to be effective in teaching children with autism abduction prevention skills. Godish, Miltenberger, and Sanchez (2017) found the use of video modeling to be effective in teaching children with autism how to respond to lures from strangers. Other approaches, such as the use of commercially available training programs, have been ineffective at teaching children the intended safety skill (Beck & Miltenberger, 2009).

While the procedures of these studies may differ, nearly all studies on preventing abuse or abduction measure their effectiveness using naturalistic or “in situ” assessments. For abuse prevention studies, naturalistic assessments typically took place in an environment where abuse could potentially occur (e.g. a group home). In these assessments, a confederate posing as a staff member made an inappropriate or sexual request to the study participants. The participants’ responses were scored according to how many components of a safety response they emitted. In abduction prevention studies, a naturalistic assessment is typically conducted by leaving

the client alone somewhere (e.g. outside school, a grocery store, outside their home) where they are then approached by a confederate posing as a stranger. Confederates then deliver a lure for the child to come with them. After the lure, the child's response is scored based on how many components of the safety response the child performed. In all naturalistic probes, the confederate either left the situation or another individual intervened if the participant agreed to the confederates' lure or request.

According to Johnson et al. (2005), there are four lure types identified by researchers which are commonly used by abductors; simple, authority, and incentive were the three identified by Poche, Brouwer, and Swearingen (1981) and the assistance lure was identified by Holcombe, Wolery, and Katzenmeyer (1995). The simple lure is when the confederate requests a person to come with them for no particular reason (e.g. "Do you want to go for a walk with me?"). The authority lure occurs when the confederate tells the child that someone with authority (typically a parent or teacher) said it was okay to leave with him (e.g. "Your mom asked me to pick you up from school"). Incentive lures involve the confederate promising the child a reward for leaving with him or her (e.g. "If you come with me, you can play on my iPad"). Finally, in an assistance lure, the confederate asks the child for help with something (e.g. "I lost my puppy, can you help me find it?"). The use of behavioral skills training and in situ assessments are key components seen throughout behavior analytic personal safety literature.

THEORETICAL UNDERPINNINGS

For those practicing in the field of behavior analysis, certain criteria should be met when conducting behavior analytic research or treatment. These criteria are known as the seven dimensions of ABA and were first defined by Baer, Wolf, and Risley (1968). Baer, Wolf, and Risley (1968) stated that applied behavior analysis should be applied, behavioral, analytic, technological, conceptually systematic, effective, and should produce appropriately generalized outcomes (generality). These seven dimensions are what practicing behavior analysts should use to guide all treatment decisions. Each of the seven dimensions will be discussed below in relation to the topic of prevention of abuse and abduction.

Applied: The *applied* dimension states that applied behavior analysis should be practiced in the real world to solve real, socially significant problems. Baer, Wolf, and Risley (1968) state that the applied dimension focuses on problems that are important to people and society. Abuse and abduction are significant problems faced by our society today, as highlighted by the statistics presented in the introduction. Prevention of these events can increase an individual's sense of personal safety, quality of life, and can even be lifesaving. Safety skills and prevention are a well-established applied area of behavior analysis. Many studies focusing on abuse or abduction prevention have also included questionnaires for caregivers or participants to indirectly assess the value and acceptability of interventions (Beck & Miltenberger, 2009; Kurt & Kutlu, 2019; Lumley et al., 1998).

Behavioral: The *behavioral* dimension involves focusing on behaviors that are observable and measurable. The

behavioral dimension is composed of three main points. First, the behavior chosen for study must be the behavior in need of improvement. Second, the behavior must be measurable. Third, when changes in behavior are observed, it is necessary to ask whose behavior has changed.

Bandura (1977) asserted that skill-enhancing approaches that evaluate the actual performance of the skill are superior to those in which symbolic modeling is used. In research regarding abduction and abuse prevention, many of the articles directly measure the behavior in need of improvement through in situ assessment. Studies focusing on abduction prevention measured the child's response to lures in rehearsal and in test situations designed to imitate an abduction attempt (Beck & Miltenberger, 2009; Lumley et al., 1998; Miltenberger et al., 2013). Research has shown that there is often a lack of correspondence between a participant's knowledge and skills, making it important not to rely solely on knowledge measures (Carroll-Rowan & Miltenberger, 1994; Lumley & Miltenberger, 1997). The use of direct assessment of skills is what qualifies these studies as behavioral.

How the researchers measure the target response relates to the second point of the behavioral dimension; the behavior must be measurable. In most studies looking at the prevention of abuse or abduction, the target response is typically measured using a points system. The participant scores a range of points depending on whether they correctly emitted part or all of the target response. Haseltine and Miltenberger (1990) rated participants safety response on a 0- to 3- point scale: 0 = participant went with the abductor, 1 = participant did

not go with abductor but did not move away or verbally refuse, 2 = participant either verbally refused, told a staff member, or moved 6.5 m away, and 3= the participant refused, left, and told a staff member.

The final point, “Whose behavior has changed?”, is evaluated by not only ensuring the last two points but by evaluating the observer or implementers’ behavior. This is often done in study and practice through thorough training of implementers, integrity checks, and measures of inter-observer agreement. Some studies not only took treatment integrity data for training sessions to ensure all training components were implemented, but also took treatment integrity data on the naturalistic assessments. Kurt and Kutlu (2019) took integrity data on these assessments by looking at whether (a) the participant was left alone, (b) the stranger delivering the abduction lure waited in a convenient position, (c) the lure was presented appropriately, (d) the participant was reinforced for correct responding by the second author, and (e) stranger delivering lure moved away when the participant responded incorrectly. Only after ensuring that procedures were implemented with fidelity can we presume that behavior change was a result of the intervention.

Analytic: In applied behavior analysis a study is analytic when a functional relationship has been demonstrated between the independent variable and the targeted behavior. In single study research, a study can be demonstrated as being analytic by the design used. One common design used in single-subject research is a reversal design. A reversal design demonstrates functional relation by showing consistent changes in the target behavior to the independent variable being added,

changed, or removed. However, when looking at studies done on safety skills, it is usually not possible to use a reversal design. The reason for this is that once a skill is taught there is no way to “unteach” the skill. In cases such as these, a multiple baseline design can be used to demonstrate a functional relation. A multiple baseline design involves replicating the results of the intervention across multiple participants, settings, or behaviors. Much of the literature focusing on abduction and abuse prevention uses a multiple baseline across participants design to demonstrate a functional relation (Godish, Miltenberger, & Sanchez, 2017; Gunby, Carr, & LeBlanc, 2010; Vanselow & Hanley, 2014).

Technological: The technological dimension of applied behavior analysis refers to all procedures being defined in enough detail so that the reader could replicate the methodology and achieve the same results. Baer, Wolf, and Risley (1968) state that it is insufficient to state what should be done when the client emits the target response, but also what should be done if the client makes any alternative responses. In studies on abduction and abuse prevention, many methodologies not only list what to do when the client emits the target safety response, but what to do when they do not emit the safety response or only parts of it.

Conceptually Systematic: In behavior analytic research, procedures should be described in terms of the relevant basic principles from which they were derived, which is known as being conceptually systematic. The purpose of this is to allow those reading the research to derive other, similar procedures from the same principle and to become an integrated discipline that can be expanded, learned, and taught (Cooper, Heron, & Heward, 2007).

As previously stated, much of the research on abuse and abduction prevention is taught using behavioral skills training. Erhard, Falcomata, and Harmon (2019) explain each of the components of behavioral skills training, instruction, modeling, rehearsal, and feedback, in a manner that can be tied to the basic principles from which they were derived.

Instruction involves telling the client each step of the behavior, the circumstances in which the behavior should be emitted, and the reinforcers which will be provided contingent on completing the target behavior (Erhard, Falcomata, & Harmon, 2019). Instructions can be tied to basic principles in that they serve to operationally define the target behavior, be a task analysis of the steps involved, define the relevant environmental variables that should be present when performing the target behavior, and define the contingency for performing the target behavior.

Modeling involves demonstrating the skill to the learner, which can be done live or symbolically (Cooper, Heron, & Heward, 2019). Symbolic models can include pictures, videos, audio, or a mixed media presentation of the desired behavior. For modeling to be effective, the client must already be able to imitate others. Studies have shown that symbolic modeling such as video modeling can be effective for teaching skills to children with autism and may potentially be more effective than live modeling (Godish, Miltenberger, & Sanchez, 2017; Kurt & Kutlu, 2019).

The third component of behavioral skills training, rehearsal, is when the client performs the target behavior so that instructors can confirm the acquisition of the target behavior, determine whether the behavior or

components are incorrect, and/or provide feedback. While modeling helps demonstrate the behavior to participants, skill acquisition is achieved by performing the behavior (Bandura, 1977). Performing behavior in role-play helps to shape participants' performance until criterion responding is achieved.

The final step, feedback, ties to the basic principles of reinforcement. Praise or other reinforcers are provided for the client when they correctly perform or attempt to perform the target behavior. Reinforcement in these studies is often provided in the form of verbal praise. The instructor also provides feedback on areas performed incorrectly. Clients often are provided corrective feedback in the form of additional instruction, modeling, and/or rehearsal until the client has demonstrated they can correctly perform the target behavior.

Effective: Another dimension of applied research is its effectiveness. The effectiveness of an intervention can be demonstrated by the extent to which it produces socially significant behavior change. Behavior analysis has produced significant behavior change in the area of abuse and abduction prevention. Other methods, such as commercially available training programs, have been demonstrated to be ineffective in creating behavior change when administered without additional training (Beck & Miltenberger, 2009; Miltenberger et al., 2013; Poche, Yoder, & Miltenberger, 1988; Wurtele et al., 1986). Many studies also indirectly looked at the social significance of the intervention by surveying participants, parents, or caregivers on whether they felt the intervention was effective and beneficial (Egemo-Helm et al., 2007; Ledbetter-Cho et al., 2016).

Generality: Generality in applied behavior analysis

refers to the ability for behavior change to last over time, appear in a variety of environments, and/or spread to other behaviors not directly targeted by the intervention. Many applications in these areas have struggled with promoting generality despite training with multiple exemplars of lures and strangers (Collins, Schuster, & Nelson, 1992; Lumley et al., 1998). Research has found that in-situ training may be a necessary component to promote generalization of safety skills for some participants. In studies that have demonstrated generality across settings, participants were assessed on their ability to perform the same target response in a variety of untrained environments or locations (Beck & Miltenberger, 2009; Kurt & Kutlu, 2019; Poche, Yoder, & Miltenberger, 1988). Studies that have demonstrated generality over time typically conduct follow-up assessments several weeks to several months after the initial training to see whether the participant is still able to demonstrate the correct target behavior (Beck & Miltenberger, 2009; Poche, Yoder, & Miltenberger, 1988; Wurtele et al., 1986). Generality is extremely important in abuse and abduction prevention. It is unlikely that clients who are unable to generalize skills to untrained environments would demonstrate the safety response in a real abuse or abduction attempt.

As discussed, the seven dimensions of behavior analysis are present in much of the research on personal safety. Before Poche, Brouwer, and Swearingen's 1981 article much research on this topic was not behavior analytic. By taking the seven dimensions and applying them to the study of personal safety, the field of behavior analysis has been able to make great strides in teaching these skills. While much has already been done to improve how we

teach personal safety to children, the seven dimensions should also be applied moving forward with future research and applied work.

APPLICATIONS

Since Poche, Brouwer, and Swearingen's 1981 article, many advancements in personal safety research have been made. Many researchers have analyzed how best to address this societal problem of personal safety. Research has assessed a variety of interventions such as behavioral skills training, social stories, video modeling, and in situ training. Participants have also varied in terms of age, sex, and diagnoses. Research has also been done in a variety of settings such as group homes, schools, and various community settings. This section of the paper will evaluate, compare, and contrast applications in the area of personal safety for those with developmental disabilities. These applications will be reviewed in terms of the participants, methods, and results to summarize the findings of this body of research and bring up issues for future research.

Research on personal safety has achieved socially significant results using a variety of teaching methods. More recently in the literature, these methodologies have been examined in terms of their effectiveness in teaching personal safety skills to individuals with disabilities. Although teaching abduction prevention and abuse prevention skills may differ in methodology and response definitions, they are both evaluated in this paper since they both can be considered personal safety skills. Additionally, methods for assessing and teaching abuse-prevention skills, as discussed in Lumley and

Miltenberger (1997), were largely based on the research done on abduction prevention for individuals with developmental disabilities.

ABDUCTION PREVENTION

Behavioral skills training.

As previously mentioned, behavioral skills training is one of the most common methodologies for teaching abduction and abuse prevention. Multiple studies have found behavioral skills training to be effective in teaching abduction prevention skills to individuals with disabilities. Collins, Shuster, and Nelson (1992) found that behavioral skills training with the use of constant time delay procedures was effective in teaching adults with disabilities abduction prevention skills during role-play. Constant time delay involves immediately prompting the response after the instruction when first teaching a skill. Once the learner becomes more proficient in the skill, the time delay from the instruction to the response prompt is gradually increased. The authors stated that the purpose of constant time delay is to help minimize errors and promote rapid acquisition of skills. Despite trying to train for generalization through using multiple strangers, lures, settings, times, and trainers, these skills did not consistently generalize to in situ assessments.

Gast et al. (1993) expanded on the findings of Collins, Schuster, and Nelson (1992) by evaluating the effectiveness of behavioral skills training with constant time delay, with the addition of in situ training for teaching preschool children with disabilities abduction-prevention skills. Gast et al. (1993) used in situ training

to help improve skill generalization, which was not demonstrated in Collins, Schuster, and Nelson (1992). Results of Gast et al. (1993) found that the safety response was quickly acquired in training but did not fully generalize to naturalistic probes. In situ training was then implemented to help promote generalization. Following in situ training three of four children met the criterion. The fourth participant continually exhibited the critical motor response but not the vocal protest. Those who participated in maintenance assessments all maintained the previous level of responding for two months in follow-up probes. These results replicated previous findings that behavioral skills training is effective in teaching safety skills but do not always promote generalization, even when trained with multiple exemplars. The use of constant time delay may have increased the efficacy of the training program. However, this study does not evaluate whether constant-time-delay procedures are more effective than other teaching or prompting methods.

Gast et al. (1993) demonstrated the effectiveness of adding in situ training after an intervention. In situ training is training done in the natural setting where the behavior is supposed to occur. During in situ training, the behavior is often practiced using instruction, modeling, and rehearsal this practice typically is done after the client emits an incorrect response on a naturalistic assessment. As demonstrated in Gast et al. (1993) in situ training may help to promote generalization and maintenance of skills. Several other studies have used in situ training as part of their intervention for this reason (Bergstrom, Najdowski, & Tarbox, 2014; Fisher, Burke, &

Griffin 2013; Gast et al., 1993; Gunby, Carr, & LeBlanc, 2010; Gunby & Rapp, 2014).

Gunby, Carr, and LeBlanc (2010) evaluated the use of behavioral skills training with in situ training to teach abduction-prevention skills to three boys diagnosed with autism. Gunby, Carr, and LeBlanc (2010) found that behavioral skills training was effective in teaching the skills for one participant, but in situ training was necessary for skill acquisition for the other two participants. All participants maintained the skills at follow-up which occurred to three to seven weeks after posttraining. The results of Gunby, Carr, and LeBlanc (2010) raise the question of whether initial behavioral skills training was a necessary component for an effective intervention or if in situ training alone would have been equally effective in teaching all participants abduction prevention skills.

Fisher, Burke, and Griffin (2013) also evaluated the use of behavioral skills training and in situ training in teaching abduction prevention to young adults with disabilities. This article sought to address some of the methodological limitations of in situ research. One such limitation is that during in situ training, the trainer often makes repeated interruptions during naturalistic assessments. Fisher, Burke, and Griffin (2013) state that these interruptions can lead to the participant anticipating the arrival of the instructor, putting the participant at risk of failing to respond appropriately to an actual abduction lure. Another weakness this study addressed was that in situ assessments typically only occurred at baseline and posttraining rather than throughout training. Continual assessment of skills can demonstrate whether generalization is occurring during

training. Fisher, Burke, and Griffin (2013) addressed both of these limitations in their study and found in situ training helped participants acquire the skills, but not all participants were able to maintain criterion responding. However, all participants met criterion responding for most follow-up sessions which occurred once per month for three months.

Gunby and Rapp (2014) evaluated the effects of behavioral skills training and in situ feedback on teaching abduction-prevention to three participants diagnosed with autism ages five and six. The purpose of this study was to further evaluate the effectiveness of behavioral skills training and in situ feedback on teaching abduction prevention skills to children with autism. However, this study also used a high-p request sequence before each lure. High-p request sequences involve asking the participant to complete several easy demands they have a history of complying with before presenting a more difficult demand. Authors state the purpose of the high-p request sequence was to simulate a grooming or recruitment process often used by abductors. Results of Gunby and Rapp (2014) found that BST alone did not produce criterion responses during posttraining, but all participants met criteria after in situ training.

Bergstrom, Najdowski, and Tarbox (2014) built off the findings of Gunby, Carr, and LeBlanc (2010) and Gunby and Rapp (2014) by replicating the use of behavioral skills training and in situ training to teach children with autism abduction-prevention skills. Bergstrom, Najdowski, and Tarbox (2014) addressed two weaknesses of these studies by using male abductors and focusing on stimulus generalization to untrained environments and abductors. The use of male abductors is an important component

since 95% of nonfamily abductions are perpetrated by males (Finkelhor, Hammer, & Sedalk, 2002). Another thing that made this study different from previous research is that only the incentive lure was used. Indirect assessments were used to identify preferred items to use in the lure for each child. Bergstrom, Najdowski, and Tarbox (2014) found that all participants acquired the skills relatively quickly (3-7 sessions) during training. In situ training needed to be conducted for one participant during posttraining. However, during posttraining, this participant became very excited to see the therapist during in situ training. To avoid the therapist's presence reinforcing incorrect responding, an incentive was added for correct responding for this participant. After the incentive, his performance returned to the criterion and the incentive reminder was faded.

Ledbetter-Cho et al. (2016) evaluated the effectiveness of behavioral skills training on improving the abduction-prevention skills of children with autism. Participants in this study were four males with autism, ages nine to eleven. The behavioral skills training included a rationale, instructions, video modeling, rehearsal, praise, and feedback. Behavioral skills training improved all four participants' abduction-prevention skills which generalized to post-training assessments in new settings for three of four participants. Two participants maintained the skills at four weeks follow up. While most participants learned and demonstrated the skills during training sessions, few participants demonstrated the skills during generalization probes and follow-up.

Fisher (2014) demonstrated that individuals with Williams Syndrome could be taught abduction-prevention skills using behavioral skills training. Before

intervention, one-third of all 21 participants agreed to go with the stranger and only three participants said no and walked away. After behavioral skills training participants were able to correctly perform 96% of steps during role play. In situ assessments found that intervention increased the use of safety skills, but they were not consistently demonstrated for all participants. This reiterates past findings which suggest little generalization between self-reported behavior or role-play and in situ probes.

Video modeling.

Godish, Miltenberger, and Sanchez (2017) took a different approach and evaluated the effectiveness of video modeling for teaching abduction prevention skills to children with autism. Although video modeling was used in Gunby, Carr, and LeBlanc (2010) it was part of a larger behavioral skills training treatment package. Godish, Miltenberger, and Sanchez (2010) aimed to look at the use of video modeling alone, with the use of in situ training as necessary. The results of this study found video modeling to be effective at teaching all four participants abduction prevention skills. Variable results were seen for one participant during follow-up. This variability persisted despite in situ training and added incentive. The authors state that this was likely due to the reactivity of the participant being aware he was being assessed.

Godish, Miltenberger, and Sanchez (2017) was one of the first abduction-prevention studies to find an antecedent-only approach to be effective at teaching safety skills. Previous studies such as Beck and Miltenberger (2009) and Miltenberger et al. (2013) found

video programs intended to teach stranger safety skills ineffective. Godish, Miltenberger, and Sanchez (2017) state that one difference between this study and previous studies was that the participants were children with autism. Based on evidence from previous studies using video modeling it may be that video modeling is an effective intervention for children with autism. It may also be the video content that accounted for these different results. The authors state that the specificity of the video and robustness of the multiple exemplars may be what made video modeling an effective intervention in this case.

Social stories.

Kurt and Kutlu (2019) is another application that found an antecedent approach effective in teaching abduction prevention skills to children with autism, this time using social stories. Kurt and Kutlu (2019) read three- to five-minute-long social stories and asked comprehension questions prior to a naturalistic probe. Once the child emitted the correct response after a session, fading occurred to increase the length of time between reviewing the social story and the naturalistic probe. Additionally, these safety skills were maintained at one- and four- weeks follow-up. The use of social stories may be preferred to behavioral skills training due to the use of less intrusive prompts, less training time for practitioners, and less expertise needed for implementation.

ABUSE PREVENTION

Behavioral approaches.

Following Lumley and Miltenbergers (1997) article, “Sexual Abuse Prevention for Persons with Mental Retardation”, which pointed out the lack of behavioral studies on sexual abuse prevention. Lumley et al. (1998) conducted the first empirical study on directly teaching and assessing sexual abuse prevention skills. In this study, six adult women diagnosed with mental retardation were taught sexual abuse prevention skills through behavioral skills training. Following behavioral skills training, these women were able to demonstrate the skills during knowledge assessments, verbal reports, and role-play, but failed to generalize the skills to the naturalistic probes. One year later a follow up to Lumley et al. (1998) was conducted by Miltenberger et al. (1999). Miltenberger et al. (1999) sought to enhance the generalization of these safety skills by following behavioral skills training with in situ training. The results of this study found that the behavioral skills training resulted in participants gaining the skills, while in situ training helped generalize the skills to naturalistic assessments.

Egemo-Helm et al. (2007) expanded on the research of Lumley et al. (1998) and Miltenberger et al. (1999) by evaluating behavioral skills training in combination with early in situ training to teach abuse prevention skills to women diagnosed with mental retardation. The results of this study found that, for most participants, the addition of early in situ training led to faster skill generalization relative to the results from Miltenberger et al. (1999). The use of early in situ training increased the efficiency and effectiveness of intervention for most participants,

therefore decreasing the participants' amount of exposure to simulated sexual abuse scenarios during assessment.

Kim (2016) found that the components of behavioral skills training, in combination with other teaching methods, were effective in teaching sexual abuse prevention skills to three elementary-aged girls with intellectual disabilities. While Kim (2016) did not directly refer to the training as behavioral skills training, the intervention was comprised of all the necessary components. Kim (2016) found the intervention to be effective at teaching the skills which also generalized to in situ assessments and was maintained for 10 weeks. However, due to the use of other teaching strategies (e.g. posters and story cards) we cannot be sure what components of the intervention were most effective for teaching the skills.

Cognitive approaches to physical abuse.

Very few applications can be found on prevention of physical abuse in the behavior analytic research. Most of the behavior analytic research available on abuse prevention focuses more on abduction and sexual abuse prevention. Doughty and Kane (2010) reviewed past studies on abuse prevention and pointed out the work being done in other fields on prevention of physical abuse such as the research of Dr. Khemka which utilizes a cognitive approach to abuse prevention. The work of Khemka and colleagues has focused on applying a cognitive decision-making approach to the areas of sexual, physical, and verbal abuse prevention skills.

Studies conducted by Ishita Khemka and colleagues demonstrate that a cognitive decision-making approach

and related curriculum is effective in increasing participants independent decision making in regard to situations of abuse (Hickson et al. 2015; Khemka, 2000; Khemka & Hickson, 2000; Khemka, Hickson, & Reynolds, 2005). Outcomes of these trainings were measured by presenting short video vignettes demonstrating a situation of abuse and measuring participants verbal responses to a structured interview questionnaire on what the “decision maker” in the vignette should do or what they should do if they were in the scenario. Results of these studies demonstrate that a cognitive decision-making approach was effective in increasing appropriate, independent decision making. However, these studies only measure participants’ verbal reports of what they or the “decision maker” should do. Future studies should evaluate whether these skills can be demonstrated in role-play or in-situ assessments. Combining a cognitive intervention approach with behavioral assessment strategies could help further abuse prevention research.

SUMMARY OF FINDINGS AND GAPS IN CURRENT RESEARCH

Most of the major findings in the areas of abuse and abduction prevention for individuals with disabilities have been outlined above. However, there are certain weaknesses to this body of literature that must be addressed. Firstly, behavior analytic research on prevention of physical abuse is scarce. Additionally, the number of studies using interventions other than behavioral skills training are limited. The more recent studies done by Godish, Miltenberger, and Sanchez

(2017) and Kurt and Kutlu (2019) have found other interventions to be effective in teaching safety skills. While behavioral skills training is an effective treatment when combined with in situ training, it can be time-consuming and difficult to apply to many settings. Programs utilizing social stories and video modeling may be more efficient and easier for parents and other caregivers to implement.

While other methods of teaching personal safety skills are less common in the literature, this may be due to publication bias. Most all the articles reviewed resulted in the client gaining some level of knowledge or skills. It is possible that many other studies were conducted but not published due to the intervention being ineffective. Publication bias is a factor that should be considered when judging the efficacy of an intervention. Although publication bias could be at play, variations in interventions and methodology should still be explored in future research.

One suggestion that repeatedly appeared in many articles was the need to conduct a component analysis of intervention packages. Behavioral skills training contains multiple intervention components, some of which may not be necessary to achieve effective results. Previous studies utilizing behavioral skills training to teach abduction prevention found that giving a rationale is not a necessary component for effective intervention and may lead to negative side effects, such as fear, for participants (Poche, Brouwer, & Swearingner, 1981). Other elements of these treatment packages may also not be necessary. For example, Miltenberger et al. (2013) found that in situ training alone was effective in teaching abduction-prevention skills to children. By figuring out

which components are necessary to produce significant results, we can come up with treatments that are efficient and effective. In addition to analyzing which components of behavioral skills training are effective, future research should focus on analyzing the long-term maintenance of these interventions and increasing this maintenance by providing booster sessions.

Another way that future research can be improved is by using approaches such as Gunby and Rapp's (2014) in which a high probability request sequence was presented before the lure. Future studies could focus on ways to simulate the participants having a relationship with the abuser or abductor. Poche, Yoder, and Miltenberger (1988) pointed out the need to take the emphasis off the word "stranger" when teaching abduction prevention skills. This is important since many child abductors are somewhat known to their victims. By using high-probability request sequences or pairing the confederate with the participants' daily activities, we may get a better indication of how the child would respond to a real abuse or abduction scenario. Future research should focus on a way to ethically simulate previously established relationships the participants may have with potential abusers or abductors.

Participant demographics are another area in which gaps can be seen within the literature. Findings of these studies need to be extended to participants of certain sexes, age groups, and ability levels. Studies focusing on abuse prevention have all recruited individuals diagnosed with mental retardation or intellectual disabilities. In all four studies, participants were stated to have mild to moderate intellectual disabilities. Most of these studies, 3 of 4, recruited adult participants while the fourth study

focused on children ages 11-13. All abuse prevention studies recruited female participants. Future research in this area should focus on expanding research by recruiting male participants, teens, and younger children. While studies show that women are more likely to be victims of abuse than men, men and boys can still be victims of abuse. While current research on rates of abuse among males with disabilities is scarce, studies have shown an overall increased likelihood of abuse for persons with disabilities (Hughes et al., 2012; Jones et al., 2012). Additionally, a brief published by Vera Institute of Justice reported that men with disabilities and deaf men were twice as likely to experience violent victimization such as sexual assault, robbery, and aggravated assault (Hastings & Harrell, 2017).

Of the applications teaching abduction-prevention skills: six studies focused specifically on children with autism, one focused on children with disabilities characterized as having “developmental delays”, one study focused on adults with intellectual disabilities, and one study on adults with Williamson Syndrome (a developmental disability characterized by intellectual disability as well as increased sociability towards strangers). Ability level was difficult to gauge from these studies, since many different measures and criteria were used to assess this. Many participants in these studies either did not have significant intellectual or language impairments or were classified as having mild-moderate intellectual disabilities. Some studies, such as Godish, Miltenberger, and Sanchez (2017), directly state the ability level of participants. Other studies indicate this through requirements for participation. For example, Bergstrom, Najdowski, and Tarbox (2014) required that

participants be able to exhibit an extensive vocal-verbal repertoire, knowledge of the definition of a 'stranger', ability to follow instructions and rules, and ability to learn through role-play.

Abduction prevention studies have focused on a variety of ages. However, a gap existed for children ages 12-16; which is a group that may be more susceptible to abduction. According to NCMEC's "Analysis of Attempted Abduction Trends" data from 2005 to 2019, child abduction was most common with children between the ages of 10 to 14 (The National Center for Missing and Exploited Children, n.d.). Additionally, the NCMEC's data found that abductions of older children were more likely to include a sexual component such as indecent exposure or sexual assault (The National Center for Missing and Exploited Children, 2016). Future studies should focus on applying interventions to this adolescent age range or evaluate how interventions at younger ages maintain over the years.

While both sexes were represented in the abduction-prevention literature, sexes in these studies tended to reflect diagnosis demographics. Studies focusing on individuals with autism recruited all or mostly male participants. Recent studies have found that there likely exist marked differences between males and females diagnosed with autism spectrum disorder. Due to these differences, questions have been raised as to whether intervention technologies studied with male participants can or should be applied to female participants. Future studies should focus on seeking out female participants for inclusion in these studies (Shefcyk, 2015).

Although teaching personal safety skills is an area that applied behavior analysis has worked to address for

several years, gaps in the literature still exist. The current gaps in the literature include few behavioral studies on physical abuse prevention, few studies utilizing interventions other than behavioral skills training, the need for component analyses for package interventions, more applications focusing on familial abductions/known abductors, as well as gaps related to participant demographics (particularly age, sex, and ability). Future research should work on addressing the previously mentioned gaps in the literature.

ETHICAL CONSIDERATIONS

The previous section looked at teaching personal safety skills to individuals with disabilities in the context of applied research. These applications went through institutional review boards for approval before being implemented to ensure the studies were ethically sound and that precautionary measures were in place. Prevention of abuse and abduction, while important, can be a sensitive skill area to teach in the applied setting. While there is no formal review process for everyday applied practice, ethical concerns will likely arise when teaching skills relating to sensitive topics. Practitioners have ethical obligations in relation to teaching these skills in a manner that benefits the client and reduces possible risks of harm. These ethical obligations will be discussed in relation to the Professional and Ethical Compliance Code for Behavior Analyst's (PECC), cost-benefit analyses, and ethical decision making.

Behavior Analysts must follow the ethics code set forth by the Behavior Analyst Certification Board (BACB) which is the presiding code for ethical decision making

the field of behavior analysis (Behavior Analyst Certification Board, 2012). The code consists of many items designed to promote ethical practice in the field, many of these items can be directly related to teaching personal safety skills in the applied setting. However, when reviewing the code in relation to teaching personal safety skills, many items seem to contradict each other. Ethical decision making, based on the PECC, should be used to determine whether teaching personal safety skills is necessary for that client and what is the best way to approach intervention. The following PECC codes should be considered when teaching personal safety skills: 1.04 Integrity, 2.09 Treatment/Intervention Efficacy, 2.15 Interrupting or Discontinuing Services, 4.02 Involving Clients with Planning and Consent, and 4.05 Describing Behavior Change Programs and Objectives.

Code 1.04, Integrity, is an important code to consider when teaching personal safety skills. This code has several subsections describing how behavior analysts maintain integrity in practice. Section A of code 1.04 states, “behavior analysts are truthful and honest and arrange the environment to promote truthful and honest behavior in others” (Behavior Analyst Certification Board, 2012). This code can come in contradiction with teaching personal safety skills due to the use of deceit during assessment. Practitioners may choose to avoid the use of deceit altogether by only assessing these skills during role-play or verbal reports. However, these methods do not always accurately reflect how a client would react in response to a real abuse or abduction lure, indicating that deceit may be necessary for assessing the effectiveness of intervention.

Although the use of deceit seems to contradict code 1.04. Code 2.09 (a) states that clients have the right to effective treatment (Behavior Analyst Certification Board, 2012). Treatment should be based on effective applications and individualized to that client. In applications on teaching personal safety skills, most all the studies assessed treatment efficacy using naturalistic assessment. While codes 1.04 and 2.09 seem to contradict each other in this case, it is important to note that in such an assessment, deceit is not being used for any malicious purposes. Finding ways to mitigate the use of deceit, such as gaining consent before implementation and debriefing the client after each assessment, are some options for ways to maintain integrity while analyzing the effectiveness of the intervention.

Another portion of the ethics code to consider when planning to teach abuse and abduction prevention is 2.15 Interrupting or Discontinuing Services (Behavior Analyst Certification Board, 2012). Part D of this code states that behavior analytic services should be discontinued when the client no longer needs the service, is not benefitting from the service, is being harmed by continued service, or when the client requests discontinuation (Behavior Analyst Certification Board, 2012). This code is important in relation to safety skills due to potential negative outcomes that could occur, such as developing a fear of strangers. Several applications used side effects questionnaires to assess any negative outcomes of intervention and discontinued services in cases where negative side effects were seen (Godish, Miltenberger, & Sanchez, 2017; Kim, 2016). Due to the sensitive nature of abduction and abuse it is important for clinicians to develop a way to monitor for negative side effects and

discontinue or modify intervention should these side effects develop.

Code 4.02, Involving clients in planning and consent, is a necessary step with all intervention programs but is especially important in the creation of interventions addressing sensitive topics (Behavior Analyst Certification Board, 2012). With topics such as abuse and abduction it is possible that clients have endured past traumas that need to be considered when planning an intervention. Also, as discussed previously, there is the potential for the client to develop new fears from the intervention, so gaining parent consent and client assent before each session is an especially important aspect of such interventions.

Along with gaining consent, it is important to describe intervention and assessment objectives, which are addressed by code 4.05 of the PECC (Behavior Analyst Certification Board, 2012). This code states that program objectives should be described in writing for the client before beginning to implement. Another important part this code mentions is the need to conduct a risk-benefit analysis of the procedures to be implemented. A risk-benefit analysis looks to see whether the benefits of intervention would outweigh possible risks. This is an important step to take before implementing abduction and abuse prevention skills due to the potential side effects that could occur.

None of the applications discussed conducted a formal cost-benefit analysis. However, the following are some factors to consider when determining whether to teach personal safety skills to a client: abuse and abduction risk factors, potential negative side-effects, and potential positive outcomes. One of the first considerations before

conducting a cost-benefit analysis should be caregiver or client interest in a program that teaches personal safety skills. After the caregiver or client indicate this as an area of concern, it is then the job of the behavior analyst to determine whether learning personal safety skills is appropriate for the client, which skills to teach, and how to teach them.

Client demographics are one way to determine whether the client would benefit, more than most, from safety skills knowledge. People with disabilities are more likely to be victims of abuse than individuals without disabilities; however, other demographics may also increase their risk of abuse or abduction. Factors such as age, sex, living arrangements (e.g. group home or with parents), and level of independence are all factors that should be assessed in a risk-benefit analysis. A list of risk and protective factors for various forms of abuse can be found on the Center for Disease Control's website under violence prevention (Center for Disease Control, 2020).

After determining risk factors for that client, potential benefits should be compared to potential risks of intervention. Positive intervention outcomes and prevention of future abuse and neglect should be compared against the probability of developing negative emotional responding. After conducting a risk-benefit analysis and considering the mentioned variables, behavior analysts should then determine which personal safety skills this client would benefit from and how they should be taught. It may be beneficial for some clients to receive general sex education, while for others, a behavioral skills training program for prevention skills may be needed. It is up to the behavior analyst to analyze

potential risks and benefits and decide what is best for that client.

Rosenberg and Schwartz (2018) proposed an ethical decision-making process to help behavior analysts decide the most ethical route when addressing grey areas in the code or contradictions between multiple codes. As previously mentioned, when planning an intervention to teach abuse and abduction prevention multiple codes should be taken into consideration, some which seemingly contradict one another. According to Rosenberg and Schwartz (2018) ethical conduct is a skill that behavior analysts must regularly practice. The ethical decision-making process is one way to guide this practice. This model contains a series of steps to help behavior analysts identify and resolve ethical dilemmas.

There are 6 steps to ethical decision-making which are: (1) identify why this triggers your ethical radar, (2) brainstorm solutions, (3) evaluate possible solutions, (4) identify an acceptable solution or brainstorm more solutions, (5) implement the solution with fidelity and document all actions, and (6) reflect upon the results of your decision. Previously, it was explained how codes 1.04 (a) 'integrity' and 2.09 (a) 'right to effective treatment' may contradict each other when assessing abuse and abduction prevention skills. Following the ethical decision-making model for dilemmas like this and other possible ethical concerns can help a practitioner arrive at an ethical solution which benefits the client.

Many PECC codes apply when designing abuse and abduction prevention interventions, and it is important that practicing behavior analysts thoroughly know this code and apply it to all behavior analytic practice. Integrity, intervention efficacy, considerations for

discontinuing services, client consent, and describing behavior change objectives are critical codes areas when teaching personal safety skills due to the sensitive nature of the topic and the potential for negative side effects to develop. Behavior analysts who plan to teach these skills to their client(s) should take these codes into consideration, conduct a risk-benefit analysis, and practice ethical decision making when designing and implementing intervention procedures.

FUTURE DIRECTIONS

Personal safety has long been an area of focus for behavior analytic research. Despite many years of study, there still exist limitations in the literature which should be addressed. Conducting component analyses of behavioral skills training packages, evaluating other interventions to promote personal safety, addressing familial abuse or abduction, and teaching skills to various age groups and sexes are all areas in which future research could expand this body of literature.

Not only should these gaps in the literature be investigated, but the topic of personal safety should regularly be revisited by researchers, since trends in abuse and abductions statistics change over the years. In the NCMEC's "A 10-Year Analysis of Attempted Abductions and Related Incidents" it was reported that force was the top method used against children in child abductions (NCMEC, 2016). However, past abduction prevention literature cites the use of lures as the common method used against children, and is the method which was used in teaching abduction prevention skills throughout the literature (Bergstrom, Najdowski, &

Tarbox, 2014; Fisher, Burke, & Griffin, 2013; Gunby, Carr, & LeBlanc, 2010; Gunby & Rapp, 2014). Future studies focusing on abduction prevention should take more recent findings into account and modify interventions accordingly. For example, since studies show that force is often used to abduct children, it may be more beneficial to have the target response to an abduction attempt to simply be to run away quickly or to yell loudly.

Two large gaps in the literature are the lack of applications focusing on physical abuse prevention and the lack of applications using participants with significant intellectual or communication impairments. The lack of applications in these areas may be caused by the difficulties faced in designing effective interventions. This section of the paper will discuss why these gaps in the literature may exist and potential ways to address these problems.

Doughty and Kane (2010) reviewed relevant empirical studies (behavioral and cognitive) on abuse-prevention for people with intellectual disabilities from 1997 to 2010. Their search only found six empirical studies that took place during this time frame (Lumley et al., 1998; Miltenberger et al., 1999; Egemo-Helm et al., 2007; Khemka, 2000; & Khemka et al., 2005). Of these studies, only Khemka (2000) and Khemka et al. (2005) addressed physical abuse in their study utilizing a cognitive decision-making training approach. Doughty and Kane (2010) noted that no studies used a behavior analytic approach to address physical abuse prevention of individuals with intellectual disabilities. Despite Doughty & Kane (2010) addressing this gap in research, still in 2020 it is difficult to find empirical research on physical

abuse prevention for individuals with developmental disabilities. A search of several databases and journals relating to behavior analysis or developmental disabilities did not result in any empirical studies on the topic. Future research should address this apparent gap in the literature. If empirical studies have been done on this subject, better dissemination of this information is needed as evident by the difficulty in finding these studies.

Another gap in the literature is the lack of empirical studies on teaching personal safety skills to participants with significant intellectual or communication impairments. Doughty & Kane (2010) noted this as a gap in the abuse-prevention literature, however this is also true of studies addressing abduction prevention. Individuals in the above applications typically fall in the mild to moderate range of intellectual impairments and many studies note the participants as having relatively good communication skills. Doughty & Kane (2010) noted that these studies may recruit participants with efficient communication skills, since the assessment and teaching procedures are verbally mediated and that teaching these skills through verbal means may be easiest. However, individuals with more severe impairments likely face greater risks to personal safety due to difficulties in recognizing and communicating potentially dangerous situations. Future research should work towards designing simplified interventions that can be delivered through non-verbal means. Due to the communication difficulties many individuals with developmental disabilities face, alongside with more recent findings that most abductors use physical force against their victims, it may be beneficial to focus on

the non-verbal components of a safety-response such as leaving the potentially dangerous situation (NCMEC, 2016).

The need for behavioral analytic approaches to physical abuse prevention and the need for appropriate techniques to teach personal safety skills to individuals with severe impairments were limitations pointed out by Doughty and Kane (2010). Despite Doughty and Kane (2010) pointing out these limitations, little headway has been made in these areas over the past 10 years. This leads to one of two conclusion(s): either additional attention needs to be brought to these gaps in the research, or researchers in these areas are confronted with significant barriers to addressing these gaps. Future research on the topic of personal safety should focus on filling in the gaps to the literature previously mentioned and beginning to identify the significant barriers that will need to be overcome in order to do so. To tackle such a large societal issue, collaboration with other fields, such as those using a cognitive approach, may be necessary. In addition to tackling the problem on an individual level, behavior analysis will likely need to take a social-ecological approach to prevention and intervene on the relationship, community, and societal level as well.

CONCLUSION

Much progress has been made in the behavior analytic literature on teaching personal safety skills to individuals with disabilities. However, despite finding socially significant interventions to teach such skills, barriers remain. The generality of this body of research can be improved by addressing the previously mentioned gaps

in the literature regarding age, sex, and ability. Methods to teach personal safety skills to individuals with severe intellectual and/or communication impairments still need to be further researched. Breaking down behavioral skills training using component analyses, evaluating other teaching methods, and working towards finding non-verbal ways of teaching these skills are all ways in which these applications may potentially be adapted to benefit learners. Additionally, ethical ways to teach and assess skills related to physical abuse prevention still must be explored. Outcomes demonstrated by Khemka and colleagues should be evaluated behaviorally through using role-play or in-situ assessments.

Victimization of individuals with disabilities continues to be a problem in our society, and research should continue to evaluate how to prevent this from occurring. Lack of progress in recent years suggests this problem may need to be approached from a different lens. The barriers encountered within this research need to be identified. Identifying these barriers, collaborating with experts in other fields, and taking a holistic social-ecological approach to personal safety are all ways in which our field may come closer to ensuring the personal safety of the at-risk individuals we serve.

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CHAPTER 12.

BEHAVIORAL SPORTS PSYCHOLOGY: A BEHAVIOR ANALYTIC APPROACH TO IMPROVING SPORTS PERFORMANCE

Behavioral sport psychology (BSP) is defined by the use of behavior analytic principles and techniques to enhance the performance of athletes, coaches, and others associated with sports (Martin & Tkachuk, 2000). The purpose of this chapter is to provide a brief history of the subspecialty known as BSP, to identify the main components of BSP, and to provide an overview of applications of BSP across a variety of domains. For a more detailed review of individual topics within BSP, readers may turn to Behavior Sport



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Psychology: Evidence-Based Approaches to Sports Performance (Luiselli & Reed, 2011). For a more thorough review of BSP applications, readers would benefit from the systematic review written by Schenk and Miltenberger (2019). Although physical fitness behaviors (e.g. exercise and nutrition) are important to sports performance, the analysis of this literature is outside of the scope of this chapter. A comprehensive review of existing literature for these topics within the context of behavior analysis is not currently available. However, a brief review of exercise assessment and intervention is available (Van Camp & Hayes, 2012).

HISTORY OF BEHAVIORAL SPORTS PSYCHOLOGY

Sports psychology was established in the 1960s and was crystallized by the founding of several peer-reviewed journals, most notably the *Journal of Sport Behavior* and *Journal of Sport Psychology*. These journals centralized academic resources for clinicians interested in sports psychology. In 1972, Rushall and Siedentop published *The Developmental and Control of Behavior in Sport and Physical Education*. This book was written from a behavior analytic perspective and presented evidence-based teaching methods of sport-specific skills within an operant framework. Specifically, Rushall and Siedentop focused on behavioral strategies to optimize practice skills and generalize them to competitive settings. In 1974, McKenzie and Rushall published the first sport-specific article in the *Journal for Applied Behavior Analysis*, which demonstrated the efficacy of a self-monitoring package for improving practice performance

of competitive swimmers. Many view this publication as the seminal article in BSP (Reed and Luiselli, 2015).

From the late 1970's through early 1980's, single-subject designs were incorporated into research targeting the improvement of athlete performance across a variety of sports including football, baseball, basketball, soccer, gymnastics, tennis, swimming, figure skating, and volleyball (Martin, Thompson, & Regehr, 2004). In addition to targeting athlete performance, BSP targeted improvements in coaching strategies (e.g., see Martin & Hrycaiko, 1983; Rushall & Smith, 1979; Smith, Smoll, & Curtis, 1979; Smoll, Smith, & Curtis, 1978). By changing the teaching strategies employed by coaches, researchers improved athlete behavior across the entire team rather than with individual athletes. Research was also expanded from contingency only applications to include cognitive-behavioral strategies for improving athletic performance (e.g., Desiderato & Miller, 1979; Gravel, Lemieux, & Ladouceur, 1980), while retaining the core features of BSP. The publication of BSP articles in sport journals increased from one article per year from 1974-1983 to 17 per year from 1994-2003, while the number of these articles published in behavioral journals remained between five and seven per year during that same timeframe (Martin et al., 2004). According to a recent review (Schenk & Miltenberger, 2019) a total of 101 articles have been published in BSP. Authors identified 23 intervention procedures across 21 different sports. This publication history demonstrates the growth of BSP as a discipline and also the acceptance of core BSP principles within more mainstream sports science.

CHARACTERISTICS OF BEHAVIORAL SPORTS

PSYCHOLOGY

BSP contains five main characteristics, some of which overlap with traditional sports psychology, many of which are points of differentiation. Key features include; 1) the identification and operationalization of behaviors related to sports performance, 2) a focus on modifying antecedent and consequent variables, 3) contingency only and cognitive-behavioral applications, 4) reliance on single-subject design, and 5) socially validity (Reed and Luiselli, 2015). This section will define each of the five characteristics and provide examples of their importance to BSP.

IDENTIFICATION AND OPERATIONALIZATION

The development of clear and concise operational definitions is essential to the study of any phenomenon (Skinner, 1945). Without clearly defined terminology, scientists are left to accept vague and ambiguous uses of the topic of interest. In the field of BSP, it is critical to identify target behaviors that will improve athlete and/or coach performance, to define those behaviors in a manner that allows reliable measurement, and to use changes in behavior as the primary indicator of success (Martin and Thomson, 2011). Sport-specific skills such as hitting a baseball or shooting a three-point shot are complex behavior repertoires that require operationalization to be appropriately assessed, to design effective interventions, and to track progress over time. Sports analytics represent one method of operationalizing and measuring such behaviors. The next sections will discuss the operationalization of sport-specific skills followed by an overview of sports analytics.

DEFINING SPORT-SPECIFIC SKILLS

One way that behavior analysts understand a complex behavioral repertoire is by breaking it down to discrete observable components. This is known as a task analysis. Task analysis procedures are used to operationally define, measure, and teach a multi-step skill (Cooper et al., 2009). Once the task analysis is created, a chaining protocol is utilized to teach the discrete skills and link them together. Chaining refers to the procedure by which one learns to perform a series of behaviors in sequence following the presentation of a discriminative stimulus and ending with reinforcement (Alberto & Troutman, 2003). Completion of each behavior in the sequence (i.e., link in the chain) serves two functions: (a) as a discriminative stimulus for executing the next behavior in the chain and (b) as a conditioned reinforcer for executing the previous behavior in the chain. Several methods for teaching chained responses have been reported in the literature and include backward chaining (teach behaviors in reverse order from the terminal response), forward chaining (teach behaviors in sequence starting with the initial response), total task presentation (teach all behaviors each trial; Cooper et al., 2009). Task analysis and chaining procedures have a long history in behavior analysis and have been utilized to teach adaptive, social, and communicative skills. They have also been utilized to teach sport-specific skills.

In the context of BSP, a sport-specific skill can be broken down into smaller, teachable components. A relatively simple task such as throwing a baseball includes gripping the ball with the laces in particular orientation, separating the hand/ball from the glove hand, rotating

the throwing arm to at or above shoulder level, extending the glove hand then tucking it into the hip, driving off the throwing side leg, planting the glove-side leg, rotating the hips, swinging the throwing arm through to the opposite side hip while releasing the ball on a desired plane, and following through with the throwing side leg. As exemplified by the pitching example, even a relatively straight-forward sport-specific skill requires chaining a set of discrete steps together to achieve optimal outcomes.

One example of the use of task analysis procedures to teach sport-specific skills to individuals with developmental disabilities (DD) was published by Luyben and colleagues (1986). First, the sport-specific skill, in this case a soccer pass, was broken down into a nine-step task analysis. Each component of the pass was operationally defined and taught using a forward chaining procedure. All three participants acquired this skill and maintained it with minimal reinstruction at follow up almost a year later. The next example highlights the use of task analysis and chaining procedures to teach shooting a basketball. Kladopoulos and McComas (2001) operationally defined five component skills required to shoot free throws with the appropriate form to three NCAA Division II women's basketball players. Dependent variables included the percentage of shots made without touching the backboard and the percentage of shots executed with correct form. Following a chaining protocol, the percentage of shots taken with correct form and the percentage of shots made increased for all three participants. This provided evidence that a) component skills could be appropriately taught using the protocol outlined by the authors and b) that performing the

component skills resulted in the desired outcome (i.e. increased shot accuracy). Task analysis and chaining procedures have also been implemented to teach martial arts skills. The studies discussed above demonstrate how complex sports-specific skills can be operationalized into smaller subskills, linked together, taught, and progress monitored to assess efficacy.

SPORTS ANALYTICS

In *Psychology as a Behaviorist Views It*, Watson (1913) described the fundamental goals of behaviorism as prediction and control. Behaviorists must understand the behavior of interest to the extent that it could be explained, reproduced, and modulated with reliability. Sports analytics may be defined as operationally defined complex sport-specific skills used to measure athlete behavior, evaluate the effects of these behaviors on athlete performance, predict future behavior of the athlete or team, and to create environments that yield the greatest magnitude of reinforcement, in this case: winning. For example, at its most basic level a baseball manager may need to decide whether to keep a left-handed pitcher in the game to face a right-handed hitter. The manager knows in general, right-handed batters hit with a higher average (e.g. higher rates of reinforcement) against left-handed pitchers than right-handed pitchers. Thus, sports analytics enables the manager to make a data-based decision.

Several behavior analytic studies have analyzed sports performance through the concept of matching law. The generalized matching law describes the phenomenon in which response patterns match the reinforcer delivery

when presented with concurrent behavioral options (Herrnstein, 1961; Baum, 1974). It has been conceptualized by behavioral scientists as the mechanism of choice. The generalized matching law explains variance in a wide variety of behaviors evaluated in applied settings including conversation (Borrero, et al., 2007), teen pregnancy (Bulow & Meller, 1998), and classroom conduct (Billington & DiTommaso, 2003). The increasingly analytic focus of sports has emphasized the importance of making data-based decisions, which has opened the door for the use of behavioral economic principles. Using an approach that quantifies athlete behavior with operant reinforcement offers advantages for those interested in analyzing and improving athletic performance.

Football play calling offers a convenient evaluation of the matching law. During a football game, the offense has up to four plays (i.e., downs) to advance the ball 10 or more yards. If this criteria is met, the offense is allotted an additional set of four downs to advance 10 additional yards, to advance the ball down the field towards the opposing team's end zone. If the ball crosses the plane of the end zone, the offense is awarded six points. To advance the ball, the offense has two options: (1) pass the ball by throwing it to a receiving player or (2) rush the ball by handing it to a player who runs towards the opponent's end zone. Given this simple two-choice arrangement, as well as the clear identification and quantification of reinforcement (i.e., yards gained), the matching law offers a lens through which play selection can be analyzed.

Three studies have been published that analyze play calling in football games through the lens of the matching

law. The selection of rush or pass plays by coaches in the National Football League (NFL) was examined for sensitivity to reinforcement, bias, and variance across different game situations (Stilling & Critchfield, 2010). Generally speaking, their analyses indicate that sensitivity to reinforcement remains stable across downs, yards to the goal line, and score (i.e., whether winning, losing, or tied). However, their analyses revealed that teams became more sensitive to reinforcement as the end of the half approached and decreased as the number of yards needed for a first down decreased. Reed and colleagues (2015) examined the offensive play calling of elite football teams to determine if the relative proportion of passing to rushing plays approximated the relative proportion of yards gained passing to yards gained rushing. Indeed, these researchers found that the matching law did an excellent job in explaining offensive play calling across numerous elite football leagues (e.g., National Football League [NFL], Arena Football League, National Women's Football Association [NWFA], several large NCAA conferences, etc. Additionally, data indicated that the degree to which NFL teams conformed to the matching law was significantly correlated with winning percentage –that is, teams that “matched” relatively better according to the matching law won more games than teams that did not.

Similar analyses have also been used to evaluate shot selection in basketball games. Vollmer and Bourret (2000) analyzed the allocation of two-and three-point shots by 13 male and 13 female National Collegiate Athletic Association (NCAA) Division I basketball players. In NCAA basketball, an arc designated with a painted line extends from the center of the hoop with a radius of 6.02

m (19 ft 9 in). When a player makes a shot from beyond this line that the player's team is awarded three points. Shots (not counting free throws) made within the line are rewarded only with two points. Thus, at any given point during gameplay, a player with the ball has the choice to take a three-point shot, or advance closer to the basket for a two-point shot. Researchers examined the proportion of two-and three-point shots and compared this against the proportion of the number of points obtained for each shot type using the matching law. As predicted, the proportion of shots taken nearly perfectly matched the proportion of reinforcement the players obtained for making those shots. In addition to simply capturing molar shot selection–reinforcement relations (that is, summarizing large amounts of data collectively, rather than looking at game-to game performance), Vollmer and Bourret (2000) also sought to determine whether they could predict future shot selections. Toward this end, Vollmer and Bourret calculated the running aggregate allocation of shots from all previous games following each game to make a prediction about the allocation of shots for the next game. These researchers found their predictions became more and more accurate across the course of the season. Thus, not only does analyzing data at the molar level (i.e., analyzing data at the end of the season) within a matching framework describe shot selection as an operant behavior, but this analytic approach may also be translated to game-by-game data to predict future behaviors.

In a major extension of matching theory to understand factors affecting shot selection in basketball, Alferink and colleagues (2009) sought to determine the extent to which matching law accounted for the variance in 320 Division

I college basketball teams. From these results, Alferink et al. demonstrated that their large sample resembled shot selection patterns similar to those reported by previous researchers (e.g. Vollmer and Bourret, 2000), further suggesting that matching theory is a robust phenomenon in basketball. Alferink and colleagues then investigated the difference in matching between Division I, II, and III teams. Their research indicated that more elite teams (i.e., Division I or II) conformed to matching theory to a greater extent than less elite teams (i.e., Division III). Moreover, Alferink and colleagues then compared regulars and substitutes from these teams, and found that regulars better conformed to matching theory than did substitutes. In these examples, Alferink et al. demonstrate that a relationship between matching and success exists –that is, there appears to be advantages to conforming to matching expectations. Nevertheless, it remains unclear whether better teams select players who conform to matching, or whether matching itself makes a team successful.

ANTECEDENT AND CONSEQUENT INTERVENTIONS

The second characteristic of behavioral sports psychology is the identification of antecedent and consequent variables that impact sports performance and the modification of these variables to improve performance. This section will discuss the impact of antecedent and consequent manipulations on important sports performance variables.

ANTECEDENT INTERVENTIONS

Antecedent-based interventions are defined as a behavior change strategy that manipulates contingency-independent stimuli (Cooper et al., 2009). In BSP, antecedent procedures include any manipulation that occurs prior to the onset of the targeted sport specific behavior. Examples of antecedent interventions used to improve sports performance include instruction, goal setting, modeling (expert, video, etc.), and prompting. Antecedent interventions in BSP often include multiple components (e.g. instruction and modeling) and may include both antecedent and consequence-based interventions (e.g. goal setting plus reinforcement contingent on goal attainment). Examples of each are highlighted below.

INSTRUCTION

Verbal instruction is a form of rule governed behavior in which the instructor takes the place of the speaker and the performer takes the place of the listener. Specifically, the instructor provides a set of verbal rules that specify (explicitly or implicitly) contingencies for target behavior. In the context of BSP, the instructor (often the coach) provides a set of verbal rules regarding sport specific targets and specifies the contingency that achieving these targets will lead to increased access to reinforcement in the form of improved sports performance. A total 22 BSP studies implemented an instruction procedure (Schenk & Miltenberger, 2019). For example, Anderson and Kirkpatrick (2002) implemented a treatment package consisting of instruction, TAGteaching, and graphical feedback with four speed skaters. Results demonstrated

that this treatment package increased skaters form but results were not maintained following a six month follow up.

GOAL SETTING

The concept of goal setting can also be described as rule governed. A behavior analytic account of goal setting includes two functionally separate but related events: the verbal behavior (overt or covert) of setting the goal and goal directed behavior. Talking about goals is one functional class of behavior, and behavior under the influence of such talking is another functional class. It is thus a behavior-behavior relationship (Hayes & Brownstein, [1986](#)). If a person states a goal and then acts to achieve it, he or she is interacting with his or her own behavior in the moment, not with a future object. Lerner and colleagues (1996) implemented an intervention consisting of either goal setting (n=4), imagery training (n=4), or both (n=4) on free throw shooting performance with female collegiate basketball players. Three participants in the goal setting group improved free throw performance. Additionally, a strong positive correlation was identified between the goal and actual number of free throws made during the session.

MODELING

Video modeling is defined by the review of performance through digital medium. Boyer, and colleagues (2009) examined the effects of combining video modeling by experts with video feedback in the performance of gymnastic skills by female youth gymnasts. Following skill performance, the gymnast

viewed a video segment showing an expert gymnast performing the same skill and then viewed a video replay of her own performance of the skill. Each gymnast was told to try to match her performance to the expert performance. The gymnast then returned to practice. The intervention was successful for all four gymnasts in the study.

PROMPTING

Stimulus prompting has been used to improve hitting performance with college baseball players. Osborne, Rudrud, and Zezoney (1990) studied curveball hitting proficiency of five college baseball players under baseline and two intervention conditions in an alternating treatment design (ATD). Before intervention, the players practiced hitting against a pitching machine that was adjusted to simulate a curveball thrown at a standard speed. The interventions consisted of marking the seams of baseballs with either 1/4 inch or 1/8 inch orange stripes. Each of these marked-ball conditions was compared to the unmarked-baseball condition during two batting practice sessions each day. The ATD showed that curveball hitting proficiency improved with the marked-ball intervention.

CONSEQUENCE-BASED INTERVENTIONS

A reinforcement procedure is any programmed consequence delivered or removed contingent on behavior intended to increase the likelihood of that behavior occurring (Cooper et al., 2009). BSP procedures were categorized as consequence procedures when some stimulus was introduced contingent on performance and

was clearly described to function as reinforcement or punishment. Authors identified four separate procedures as consequence interventions: positive or negative reinforcement, auditory feedback, token reinforcement, and chaining.

POSITIVE OR NEGATIVE REINFORCEMENT

BSP studies met criteria for using positive or negative reinforcement if they explicitly stated that programmed reinforcement was a component of the intervention, or if praise, positive feedback, or specific social positive statements (e.g., “great job,” “well done,” etc.) were provided by the behavior change agent contingent on a correct target response. Twenty-three studies implemented a positive or negative reinforcement procedure (Schenk & Miltenberger, 2019). For example, Heward (1978) provided monetary reinforcement to professional baseball players contingent on successful at bats. At the end of each week, the three players with the highest efficiency average were given monetary reinforcement, resulting in efficiency averages increasing for most of the participants.

AUDITORY FEEDBACK

One procedure that uses auditory feedback is referred to as Teaching with Acoustical Guidance (TAGteach; Quinn, Miltenberger, & Fogel, 2015). This procedure involves providing auditory feedback (e.g. a click from a clicker) when a subject correctly performs a step in a specific behavioral sequence. The auditory feedback has been shown to function as a form of reinforcement as it increases correct performance of multiple skills (Quinn,

Miltenberger, James, & Abreu, 2016). Seven studies implemented an auditory feedback procedure. For example, Quinn et al. (2015) used TAGteach to enhance the performance of competitive dancers. Each time a student engaged in correct performance of a step in a dance move, the dance teacher provided auditory feedback with a click from a clicker.

TOKEN REINFORCEMENT

Token economies are generalized conditioned reinforcement systems in which tokens (e.g. stickers, poker chips, tally marks) are provided contingent on the demonstration of target behaviors. Over the past 50 years, token reinforcement systems have been utilized to increase myriad target behaviors including academic (Jenkins and Goraffa, 1974; Mattson and Pinkleman, 2020), social (Abrams et al. 1974; Sleiman et al. 2020), and adaptive skills (Atthowe, 1972). Token reinforcement has also been utilized in the context of sports performance. For example, a token reinforcement procedure was used by Reitman et al. (2001) and was shown to be more effective than medication at decreasing disruptive behavior and increasing attentive behavior for students playing kickball.

CHAINING

Chaining is a method used to teach a complex behavior by breaking it into a number of steps and teaching the steps one at a time (through prompting, fading, and reinforcement) starting with the last step or with the first step and proceeding sequentially until the entire sequence of behaviors occurs together. For example,

O'Brien and Simek (1983) used a backward chaining procedure with mastery criteria to improve shot accuracy of golfers. Once each golfer mastered the easiest and closest shot, shot difficulty and distance were increased until the golfers reached all mastery criteria.

SECOND AND THIRD WAVE APPLICATIONS

Cognitive Behavioral Therapy (CBT) and Mindfulness and Acceptance approaches are both behavior-based therapies, but they differ primarily in the view they take around thoughts. Whereas CBT works by helping participants identify and change negative or destructive thoughts, mindfulness and acceptance approaches are founded on the belief that pain and discomfort are a necessary part of life. This therapeutic approach relies on the recognition of such thoughts while creating the space to act in service with one's values (Hayes et al., 1999).

COGNITIVE-BEHAVIORAL APPROACHES

Second wave applications of behavioral strategies are exemplified by cognitive-behavioral approaches. Martin and Pear (2011) suggested that emotions have three important characteristics relevant to sports performance: 1) the internal autonomic reaction that an athlete experiences, which is influenced by respondent conditioning, 2) the way that one learns to express an emotion overtly (such as swearing and throwing things when angry), which is influenced by operant conditioning, 3) the way that one becomes aware of and tacts one's emotions (e.g., "I'm a little excited," as opposed to "I'm really nervous"), which is also influenced by operant conditioning. Intervention targets focus on

teaching athletes strategies to decrease excessive nervousness or fear that negatively affects athletic performance.

Strategies that have been applied by behavioral sport psychologists to help athletes cope with excessive nervousness or fear include teaching athletes to recognize and change negative thinking that might cause the fear or nervousness, restructure the environment to “tune out” and prompt relaxing thoughts, practice a relaxing breathing technique called deep center breathing, practice progressive muscle relaxation by alternatively tensing and relaxing various muscle groups and paying close attention to how the muscles feel when they are relaxed, teaching athletes strategies to overcome excessive anger and aggression. Such studies commonly follow a four-step strategy including helping the athlete to identify anger-causing situations, teaching the athlete to perform substitute behaviors to compete with the anger, prompting the athlete to practice the substitute behaviors using imagery and/or simulations and/or role-playing, encouraging the athlete to use the coping skills in competitive situations and to receive feedback. A related area of research has examined the relationship between physiological arousal and athletic performance.

Using self-talk and/or imagery to maximize athletic performance is another area that has been utilized by behavioral sports psychologists. Applied behavior analysts consider private behavior to include saying things to oneself (i.e., self-talk) and imagining (e.g., visualizing a clear blue sky), and assume that behavioral principles and procedures apply to private as well public behavior. Regarding self-talk, research has indicated that athletes can use self-talk to improve performance in a

variety of areas, including controlling their emotions and/or mood, stopping negative thoughts, improving their focusing or concentration skills, problem solving or planning, and improving skill acquisition and performance (Zinsser et al., 2006). Maximizing confidence and concentration for peak performance during competitions. Questionnaire studies with athletes have reported that the factor that most consistently distinguishes highly successful athletes from less successful ones is “confidence” (Weinberg & Gould, 2007; Zinsser et al., 2006). The ability to concentrate effectively has also been identified as a key ingredient of peak athletic performance (Nideffer & Sagal, 2006). A behavioral interpretation of the term concentration suggests that two behavioral processes are involved (Martin, 2011). First, concentration includes behavior commonly referred to as observational, orienting, attending, or focusing behavior that puts the individual in contact with important cues for further responding. For example, a batter in baseball who is “concentrating” is likely to focus on the pitcher, rather than attending to the first baseman. Second, following appropriate attending or focusing behavior, concentration refers to the extent to which particular cues exert effective stimulus control over skilled performance. Strategies to improve confidence, concentration, and peak performance include teaching athletes to orient to proper cues (Nideffer & Sagal, 2006), influencing athletes to perform well in simulations of competitive cues (Weinberg & Gould, 2007), using imagery to relive best performances (Orlick & Partington, 1988), encouraging athletes to focus on realistic goals for execution rather than worrying about outcome (Ward & Carnes, 2002), using facts and

reasons to build a case against negative thinking (called countering; Bell, 1983), and encouraging athletes to prepare and follow specific competition plans (Rushall, 1979, 1992).

MINDFULNESS AND ACCEPTANCE APPROACHES

Where cognitive-behavioral interventions attempt to deliberately change the content of thoughts and feelings, mindfulness and acceptance approaches help athletes sustain task-focused attention, in this case by training open, non-reactive, present moment awareness (Birrer et al., 2012). Mindfulness and acceptance interventions aim to promote a modified relationship with internal experiences (i.e. cognitions, emotions, and physiological sensations), rather than seeking to change their form or frequency (Gardner & Moore, 2012). They often emphasise the acceptance of internal processes as a typical part of the athletic experience, and focus on the present moment regardless of those internal processes (Baltzell et al., 2014; Birrer et al., 2012; Gardner & Moore, 2012). These interventions have largely drawn from psychotherapeutic approaches like mindfulness meditation (Kabat-Zinn et al., 1992), acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999), and self-compassion interventions (Gilbert, 2009). Meta-analyses in the clinical domain have found these approaches to have a positive effect for various psychological conditions (e.g. depression, chronic pain, tinnitus; Brown, Glendenning, Hoon, & John, 2016; Khoury et al., 2013; Ost, 2014). More generally, meditative approaches have been shown to reduce

anxiety, stress, and neurobiological markers such as cortisol, epinephrine, and norepinephrine (Chen et al., 2012; Chiesa & Serretti, 2010).

Authors have argued that application of mindfulness and commitment based approaches to sports performance, including focusing on the present moment with acceptance, facilitates the automatic execution of performance (Gardner & Moore, 2006, 2007, 2012). Birrer et al. (2012) suggested that athletes perform at their peak when executing skills with automaticity, and with open awareness to the context so they can make goal-directed adjustments. Some studies have found large effect sizes for mindfulness and acceptance interventions for promoting present-moment awareness and improving performance. While there are a number of studies showing positive effects for mindfulness and acceptance-based interventions for athletes, this systematic review indicates that the evidence is, at present, of low quality. A recent meta-analysis indicated that improvements in study design are critical to adequate evaluation of mindfulness and acceptance approaches on sports performance (Noetel et al., 2017).

SINGLE SUBJECT DESIGN

Reliance on single-subject research design (SSD) provides a focus on individual athletic performance across several practices and/or competitions; acceptability by athletes and coaches because no control group is needed, few participants are needed, and sooner or later all participants receive the intervention, easy adaptability to assess a variety of interventions in practices and/or competitions; and effectiveness assessed

through direct measures of sport-specific behaviors (e.g., jumps landed by figure skaters) or outcomes of behaviors. Single-case evaluation of behavioral coaching interventions are desirable because they (a) concentrate on the individual athlete, (b) include direct measurement of performance, (c) are intended to isolate the most effective procedures, and (d) can be implemented in a relatively brief period of time (Luiselli, 2011). Thus, the designs are compatible with best practices in applied sport psychology intervention and consultation (Martin, 2011). The following sections provide examples of the implementation of variations of SSD in BSP.

MULTIPLE BASELINE DESIGN

The multiple baseline design (MBD) is defined as an experimental design that begins with the concurrent measurement of two or more behaviors in a baseline condition, followed by the application of the treatment variable to one of the behaviors while baseline conditions remain in effect for the other behavior(s). After maximum change has been noted in the first behavior, the treatment variable is applied in sequential fashion to each of the other behaviors in the design (Cooper et al., 2009). The MBD is the most commonly implemented SSD in BSP with a total of 53 articles published using the experimental framework (Schenk & Miltenberger, 2019). For example, Harding and colleagues (2004) conducted a MBD across behaviors with two adults (ages 33 and 40 years) participating in martial arts training. The intervention target was to improve their punching and kicking techniques during drill and sparring sessions. Differential reinforcement of technique execution was

implemented first for punching, followed by kicking, and was effective with both adults. Stokes and colleagues (2010) designed a study that evaluated three behavioral coaching interventions within a MBD across individuals. The participants were five offensive linemen (ages 15–17 years) on a varsity high school football team. The offensive line coach recorded the percentage of steps the players executed correctly according to a 10-step, task analyzed blocking sequence. a) descriptive (nonverbal) feedback, (b) descriptive and verbal feedback, and (c) teaching with acoustical guidance. The results revealed that the players responded similarly to the intervention procedures, that in-game performance improved following intervention, and that the intervention procedures had to be reinstated to support performance during a second season.

REVERSAL DESIGN

The reversal design is characterized by at least three distinct phases: 1) baseline 2) treatment 3) baseline with preference for a fourth, return to treatment phase. The reversal design has been utilized to demonstrate the effects of multiple intervention components in sports performance. According to the review published by Schenk and Miltenberger (2019), a total of eight studies implemented reversal designs in BSP. For example, Smith and Ward (2006) evaluated several coaching procedures using an A-B-A-C-A-B+C design. The performance measures were the percentage of blocks, pass routes, and releases from the line of scrimmage, each wide receiver executed correctly during practices and games. In baseline (A), the coach reviewed expectations with the

players, gave them verbal feedback, and corrected errors. The three intervention phases were public posting of performance (B), goal setting (C), and public posting of performance with goal setting (B+C). The three coaching interventions were equally effective with the players and better than baseline. Reversal designs are not appropriate when the behavioral target is the learning of a new skill, due to irreversibility effects. Since over 70% of BSP studies targeted the improvement of sport-specific skills, the applicability of reversal designs in BSP studies is limited.

MULTIELEMENT DESIGN

The multielement design or alternating treatment design is defined by the concurrent measurement of two or more behaviors in a baseline condition, followed by the application of the treatment variable to one of the behaviors while baseline conditions remain in effect for the other behavior(s). After maximum change has been noted in the first behavior, the treatment variable is applied in sequential fashion to each of the other behaviors in the design (Cooper et al., 2009). Osborne and colleagues (1990) studied curveball hitting proficiency of five college baseball players (ages not specified) under baseline and two intervention conditions in an ATD. Before intervention, the players practiced hitting against a pitching machine that was adjusted to simulate a curveball thrown at a standard speed. The interventions consisted of marking the seams of baseballs with either 1/4 inch or 1/8 inch orange stripes. Each of these marked-ball conditions was compared to the unmarked-baseball condition during two batting practice sessions each day.

The ATD showed that curveball hitting proficiency improved with the marked-ball interventions.

SOCIAL VALIDITY

Baer, Wolf, and Risley (1968; 91-92) defined the application of behavior analysis as “a self-examining, self-evaluating, discovery-oriented research procedure for studying behavior... constrained to examining those which are socially important.” But how do behavior analysts define social importance? Social importance must be defined by the context/community in which it occurs. Financial impact represents one way in which level of social importance may be objectively evaluated and quantified. According to the National Collegiate Athletic Association (NCAA; 2019), the total revenue generated by college athletic programs in 2018 was \$10.8 billion. In an effort to gain or maintain competitive advantages in a landscape in which athletes cannot be financially compensated for participation, universities invest in lavish athletics facilities. The Washington Post (2015) reported that the 48 universities in the five largest athletic conferences spent a total of \$772 million on athletic facilities in 2014. In 2018, Northwestern University opened a \$270 million athletic complex. In addition to state-of-the-art football fields, basketball courts, and weight rooms, these facilities include saunas, movie theaters, barber shops, bowling alleys, and miniature golf courses. In addition to building modern palaces for athletes, universities spend top dollar on coaches for revenue generating sports. ESPN (2019) reported that the highest paid public employee was an NCAA football coach in 29 of 50 states and that no NCAA

Division I basketball coach earned a salary of less than \$1 million. The financial impact of collegiate athletics demonstrates its high social significance in the United States.

Social validity is defined as increasing participant access to reinforcers across three criteria; the 1) selection of goals that participants deem important, 2) procedures used to achieve these goals are acceptable to participants, and 3) results are satisfactory (Wolf, 1978). This definition was intended for behavior analysis as a broader discipline, but it is also explicitly stated as a primary characteristic of BSP. In a 30 year review of BSP, Martin and colleagues (2004) reported that 26 of 40 total studies utilized a social validity questionnaire as part of their study. Participants in these 26 studies provided overwhelmingly positive responses to the three criteria outlined above. A more recent review (Page & Thelwell, 2013) offered suggestions for BSP practitioners to improve collection of social significance data. Recommendations included the comparison of different types of questions within the BSP social validity process, methods used to assess social validity (e.g. interviews, surveys), and how to analyze the social validity data that is collected in BSP research.

APPLICATIONS OF BEHAVIORAL SPORTS PSYCHOLOGY

Applications of BSP include the development of user-friendly behavioral assessments targeting sports performance, teaching of sports-specific skills, decreasing persistent errors, and reducing problem behaviors in sports contexts (Martin, 2004). By applying

the principles of behavior analysis to the areas outlined above, behavioral sports psychologists improve sports performance to a meaningful degree. Although physical fitness is defined by behavioral repertoires (e.g. exercise and nutrition) that impact sports performance, the purpose of this chapter is to review response classes that more directly fit the criteria of BSP. For a review of behavioral applications targeting exercise see Hayes and Van Camp (2012).

ASSESSMENT

The development of user-friendly behavioral assessment tools for athletes is essential for understanding appropriate performance targets. Behavioral assessment has been defined as the collection and analysis of information and data in order to identify and describe target behaviors, identify possible causes of the behavior, guide the selection of appropriate behavioral treatment, and evaluate treatment outcome (Martin & Pear, 2011). Behavioral assessment in BSP typically begins with a behavioral interview to help the athlete identify major problem areas, select one or two such areas for initial treatment, identify specific behavioral deficits or excesses within the targeted problem areas, attempt to identify controlling variables of the problem behavior, and identify some specific target behaviors for initial treatment (Tkachuk, Leslie-Toogood, & Martin, 2003). One method that has demonstrated clinical efficacy is the across-sport behavioral checklist. Examples include the Post-Competition Evaluation Form (Orlick, 1986), the Psychological Skills Inventory for Sport (Mahoney, Gabriel, & Perkins, 1987), and the

Athletic Coping Skills Inventory-28 (Smith, Schutz, Smoll, & Ptacek, 1995). Another method of evaluation is the within-sport behavioral checklist. Such checklists contain behavioral descriptors and situational examples with terminology specific to a given sport. Martin, Toogood, and Tkachuk (1997) described within-sport behavioral checklists for 21 different sports. The within-sport checklists were positively reviewed and research on the checklists for basketball, swimming, running, volleyball, and figure skating has found them to demonstrate both external validity and test-retest reliability (Tkachuk et al., 2003; Lines, Schwartzman, Tkachuk, Leslie-Toogood, & Martin, 1999; Martin & Toogood, 1997). However, there was little agreement between volleyball coaches and the athletes that they coached, and between track coaches and the athletes that they coached, concerning the mental-skills strengths and weaknesses of those athletes.

TEACHING SPORTS SPECIFIC SKILLS

In a review of 30 years of research using single-subject designs in sport psychology, 72% of the studies focused on improving sport-specific skills of athletes in a variety of sports (Martin et al., 2004). Behavioral sports psychology interventions have been implemented to improve skills across 21 different sports including basketball (e.g. Kladopoulos & McComas, 2001), football (e.g. Allison & Ayllon, 1980), baseball (e.g. Osborne et al., 1990), soccer (Brobst & Ward, 2002), golf (e.g. Simek & O'Brien, 1981), swimming (e.g. Hazen, Johnstone, Martin, & Skrikameswaran, 1990), tennis (e.g. Buzas & Ayllon, 1981), figure skating (e.g. Ming & Martin, 1996), pole

vaulting (e.g. Scott et al. 1997), speed skating (e.g. Anderson & Kirkpatrick, 2002), and more. Examples of sports that have received the most attention in BSP literature will be highlighted below.

BASKETBALL

According to Schenk and Miltenberger (2019), a total of 11 interventions to improve football performance have been implemented in BSP. For example, a total of five interventions targeted free throw shooting performance using interventions such as relaxation training, self-imagery, video modeling (Hall & Erffmeyer, 1983), relaxation techniques and self-talk (Hamilton & Fremouw, 1985), relaxation techniques and self-imagery (Kearns & Crossman, 1992), goal setting and self-imagery (Lerner, Ostrow, Yura, & Etzel, 1996), and verbal feedback, instruction, and social positive reinforcement (Kladopoulos & McComas, 2001). Additional targets included improvements to shot form (Aiken, Fairbrother, and Post, 2012), field goal percentage (Templin & Vernacchia, 1995), and defensive performance (Kendall, Hrycaiko, Martin, & Kendall, 1990).

FOOTBALL

According to Schenk and Miltenberger (2019), a total of 11 interventions to improve football performance have been implemented in BSP. For example, Smith and Ward (2006) evaluated the effects of several coaching procedures to increase the percentage of correct blocks and percentage of correct routes run by wide receivers on a collegiate football team. Offensive blocking was also

improved in athletes participating in youth football (Allison & Ayllon, 1980). Improving positioning and tackling of linebackers in college football was a focus of a behaviorally-based intervention (Ward & Carnes, 2002). Additionally, Stokes, and colleagues (2010) designed a study that evaluated three behavioral coaching interventions within a MBD across individuals. The participants were five offensive linemen (ages 15–17 years) on a varsity high school football team. Using a 10-step, task analyzed blocking sequence plus an intervention composed of a) descriptive (nonverbal) feedback (DF), (b) descriptive and verbal feedback (DF+VF), and (c) teaching with acoustical guidance (TAG), players improved in-game performance. The team reinstated this teaching approach during the next season.

GOLF

A total of 8 interventions have been implemented to target golf performance according to Schenck and Miltenberger (2019). Interventions have targeted essential characteristics of swing form using video and expert modeling as well as various forms and feedback (Bertram, Marteniuk, & Guadagnoli, 2007; Guadagnoli, Holcomb, & Davis, 2002). Interventions have also included chaining procedures to improve shot quality (Simek, O'Brien, & Figlerski, 1994) and to decrease the number of shots required to finish a round (O'Brien & Simek, 1981).

SWIMMING

A total of 11 articles have been published using BSP interventions to improve swimming performance

(Schenck & Miltenberger, 2019). Interventions have targeted stroke technique using instruction plus physical prompting (Rogers, Hemmeter, & Wolery, 2010), video feedback (Dowrick & Dove, 1980), and expert modeling, physical prompting, punishment, verbal feedback, and social positive reinforcement (Koop & Martin, 1983). Additional targets have included increasing number of laps swam (Schonwetter, Miltenberger, & Oliver, 2014; Critchfield & Vargas, 1991; Rushall & Pettinger, 1969), increasing practice attendance (McKenzie & Rushall, 1974), and coaching strategies (Rushall & Smith, 1979).

TENNIS AND TABLE TENNIS

A total of 15 articles have been published in the BSP structure which improve tennis and table tennis skills (Schenck & Miltenberger, 2019). Intervention targets have included improving serve execution using instruction and video modeling (Bouchard & Singer, 1998), instruction, expert modeling, video modeling, and video feedback (Emmen, Wesseling, Bootsma, Whiting, & Van Wieringen, 1985), and instruction and video feedback (Rikli & Smith, 1980; Van Wieringen, Emmen, Bootsma, Hoogesteger, & Whiting, 1989). Additional targets have included improving service returns and/or volleys (Hebert & Landin, 1994; Todorov, Shadmehr, & Bizzi, 1997; Allison & Ayllon, 1980; Buzas & Ayllon, 1981; Scott et al., 1998; Haskins, 1965; Ziegler, 1987) and the strategic placement of forehands and backhands (Landin & Hebert, 1999).

DECREASING PERSISTENT ERRORS IN SPORTS SKILLS

Persistent errors in sport-specific skills negatively impact sports performance. For example, errors in shooting form likely cause shot accuracy to decrease in basketball skills. Improvement in form has demonstrated efficacy in improving accuracy (Aiken, Fairbrother, & Post, 2012). Martin (2004) proposed potential sources for errors in sport-specific skills. Errors made by beginning athletes might be due to imitation of other young athletes who are making the same errors, due to misidentification of appropriate antecedent cues, as a strategy to obtain attention from the coach, lack of reinforcement for correct performance, or adventitious reinforcement of an error in skill demonstration. Regarding the last point, when a skill results in early success for a young athlete, all of the components of that skill are strengthened, even if one of the components is flawed. For example, an instance of swinging a baseball bat and contacting the baseball may reinforce all components of this swing even if many of them are incorrect. Examples include reducing errors in swimming strokes (Koop & Martin, 1983), Play execution of the offensive backfield of a youth football team to reduce incorrect activity (Komaki & Barnett, 1977) reducing errors of gymnastic skills with young gymnasts (Allison & Ayllon, 1980), reducing errors in the execution of throw-ins and goal kicks in youth soccer (Rush & Ayllon, 1984), performance of volleyball skills by college players (Landin & Hebert, 1999).

DECREASING PROBLEM BEHAVIORS OF ATHLETES IN SPORTS ENVIRONMENTS

Behavior analysts often work to reduce interfering behavior in individuals with whom they work. A variety of disruptive behaviors that occur within the sports setting are likely to interfere with athletic performance including excessive socializing during athletic drills, temper tantrums, and disruptive behaviors that occur while the coach is talking to the team. Behavioral sports psychologists may work with individuals to reduce behaviors that interfere with athletic performance and to promote more effective replacement skills. For example, Galvan and Ward (1998) used public posting to effectively reduce unsportsmanlike behavior during tennis matches by male and female collegiate tennis players. In their study they reported that coaches were concerned with inappropriate behaviors such as disrespectful physical gestures, swearing publicly, and throwing and striking objects during tennis matches (e.g., tennis balls and racquets). The intervention consisted of presenting the data to the tennis players individually on the frequency of inappropriate behaviors collected during baseline and establishing an expectation in the form of a goal that these behaviors would be reduced from game to game. The data from games were publicly posted in training sessions for all players to see. While the behaviors were not eliminated for any of the players, the overall reductions were from means of 14 per game in baseline to 2–4 occurrences per game during the intervention. Interventions that have focused on teaching appropriate alternatives have also demonstrated positive outcomes. For example, self-monitoring and charting was shown

to increase desirable alternative practice behaviors and decrease interfering behaviors in freestyle figure skating participants (Hume et al., 1985). Using group music in a differential reinforcement for desirable alternative behaviors has also been effective in reducing interfering behaviors and increasing more productive behavior in swimming participants (Hume & Crossman, 1992).

CONCLUSION

Behavioral sport psychology (BSP) is defined by the use of behavior analytic principles and techniques to enhance the performance of athletes, coaches, and others associated with sports (Martin & Tkachuk, 2000). The purpose of this chapter was to provide a brief history of the subspecialty known as BSP, to identify the main components of BSP, and to provide an overview of applications of BSP across a variety of domains. Starting with the seminal works published in BSP in the early 1970's (Rushall & Siedentop, 1972; McKenzie & Rushall, 1974) through 2018, a total of 101 articles have been published in BSP across 21 sports which utilize 23 different intervention strategies. BSP research has been implemented to develop user-friendly behavioral assessments targeting sports performance, teaching of sports-specific skills, decreasing persistent errors, and reducing problem behaviors in sports contexts (Martin, 2004). BSP research has been published in behavior analytic journals as well as mainstream sports science journal, with strategies gaining acceptance from applied scientists across fields. Although this research base provides impressive precision and scope, opportunities

exist to incorporate behavior analytic techniques more thoroughly in sports sciences.

One example cited by researchers is the importance of incorporating social validity measures more consistently in BSP research as well as developing more sophisticated approaches to assessing it. Another area ripe for behavior analysis is within sports analytics. With continued technological advances, measurement of athlete behavior has become increasingly precise. Behavior analysts could embed themselves within sports analytics programs in order to help design effective measurement procedures, help to intervene when necessary, and to track progress over time. A third area of research that deserves more future attention is the use of contextual behavior science to improve sports performance. Strategies such as stimulus equivalence have demonstrated efficacy as efficient teaching approaches but have not been applied to sports behaviors. Mindfulness and acceptance based approaches have demonstrated promise as sports performance interventions but have not been adequately assessed. Future research should continue to analyze these approaches under tightly controlled experiments. Continued incorporation of behavior analytic principles to sports settings offers a bright future for the synthesis of BSP.

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CHAPTER 13.

AN OVERVIEW OF THE PICTURE EXCHANGE SYSTEM: ITS USE AMONG CHILDREN WITH AUTISM



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Picture Exchange Communication System (PECS) is a system that is used as a functional communication tool, for children with Autism and limited communication abilities. This communication system is often in place of verbal behavior and can, in some cases, help increase verbal behavior. "PECS has been proved to facilitate functional communication, improve severe impairments of functional speech, decrease the behaviors

problem;” however, only a few studies have shown positive effects in the social aspect (Lerna et al., 2012).

PECS is a commonly used Alternative and Augmentative Communication system (AAC) among children with Autism, or children with limited speech ability (Chua & Poon, 2018). It was first developed in 1985 by Lori Frost, a Speech Language Pathologist, and Dr. Andrew Bondy, from Delaware Autistic Program, in order to teach functional communication people with developmental delay, and language impairments (Chua & Poon, 2018). According to Chua and Poon (2018), these clients, regardless of communicative level, don't engage in spontaneous communication as often as typically developing children. People with Autism are more likely to need verbal, or physical, prompting and modeling (Chua & Poon, 2018).

PECS is taught in six phases and eliminates verbal prompts during early teaching phases(Chua & Poon, 2018). A prompt partner is added, to help guide the child through the steps, transitioning from full, physical, hand-over-hand prompting, to a gestural prompt. This process is to prevent the client from being dependent on prompting. The learner will learn to initiate communication because the communication partner will withhold attention, and praise, until the learner exchanges the icon (Chua & Poon, 2018).

According to Chua and Poon (2018), the learner is taught to exchange the icon first, to increase spontaneous communication. After this is mastered, the learner is taught to discriminate between non-preferred items and highly-preferred items, and then, multiple high-preferred items. This method of alternative communication doesn't

require fine motor skills to communicate, like sign language does (Chua & Poon, 2018).

It has been proven that age, severity of Autism symptomology, and the level of mastery doesn't predict spontaneous PECS use. This protocol is beneficial for all learners with Autism (Chua & Poon, 2018). Chua and Poon (2018), conducted a study, to determine the child characteristics that predict spontaneous PECS use, the teaching factors that predict spontaneous PECS use, and context in which PECS is taught being a predictor for spontaneous PECS use. This study determined the way PECS is taught has a correlation with more spontaneous communication (Chua & Poon, 2018).

HISTORICAL OVERVIEW

Picture Exchange Communication System (PECS) is a trademarked program of Pyramid Educational Products, which was founded by Andy Bondy, PhD, and Lori Frost, MS, CCC-SLP. Frost and Bondy developed this program in 1985, to help children with Autism communicate their desires. (Pyramid Education Consultants, 2020).

PECS was first implemented with preschool students with Autism at the Delaware Autism Program, by Dr. Bondy and Frost (Pyramid Educational Consultants, 2020). According to Pyramid Educational Consultants, the founding organization of PECS, PECS is implemented worldwide, and with thousands of people with various ages and cognitive, physical, and communication challenges (Pyramid Educational Consultants, 2020).

The PECS program is based on the book, Verbal

Behavior (1957), by B.F. Skinner. This book focuses on broad spectrum applied behavior analysis. Each of the 6 phases of PECS is a visually presented method to teach children to communicate, with ideas broken down into small teachable and systematic steps. Some of the clients using PECS can develop speech, while others may transition to devices that generate speech for them (Skinner, B.F., 1957).

The history and development of PECS is similar to how it is used today. There has been more research done recently, to prove that the implementation of PECS can help learners that need a method of functional communication (Travis & Geiger, 2010).

THEORETICAL UNDERPINNINGS

The topic is conceptually systematic with behavior analysis because it encompasses the seven dimensions of behavior analysis. The Picture Exchange Communication System (PECS) has been proven to generalize, across settings and people (Greenburg et al., 2012). Four children with Autism were studied, for the effects of generalization of PECS. The children generalized PECS communication to the home setting, with parents; the community, with a stranger; and a new playroom, with a therapist. This indicates that, once a learner is taught through the PECS protocol, it can be generalized, to different settings and communication partners (Greenberg et al., 2012).

The effectiveness of PECS has been studied in the results of requesting. PECS is proven to be effective for children in requesting items, and this suggests that it is highly effective for learners who have Autism (Travis &

Geiger, 2010). Two children with limited language use, and some spoken language, were taught to use PECS, to communicate. During this study, length of utterance, and frequency of requests, were evaluated, in structured and unstructured settings, in four phases: pretraining, training, post-training and follow-up. PECS was proven to be an effective functional communication tool, within this experiment (Travis & Geiger, 2010).

The technological aspect of PECs is the use of a handbook, for the summary of the process. This handbook includes each phase of PECs and how to implement PECS protocol, along with helpful hints to complete the phases, and tailor it to each specific client (Pyramid Educational Consultants, 2020). These tactics are to uphold that fidelity of PECS, and keep implementation consistent across clients and implementors (Pyramid Educational Consultants, 2020).

The goal of PECs is to provide those with little-to-no communication with a functional way to communicate their wants and needs. PECS is applied in the field and serves the purpose of functional communication for many clients (Pyramid Educational Consultants, 2020).

As previously stated, PECS is based on the book, *Verbal Behavior* (1957), by B.F. Skinner, which is why it includes behavior analytic steps, and reinforcement into the program, for the use of early learners (Pyramid Educational Consultants, 2020). This is conceptually systematic, as behavior principles are used—specifically, the use of prompts—in order to gain independence of requesting. Verbal prompts are never included, in order to reduce the possibility of generating prompt dependence. Gestures and physical prompts are used, to increase independent initiation, and reduce error

throughout the teaching process (Pyramid Educational Consultants, 2020). The protocol of PECS includes an error correction sequence that is specific to PECS to promote learning, even if errors occur (Pyramid Educational Consultants, 2020).

The functional relationship between the behavior and environment, to give access to what the client wants, determines that it is analytic in nature. The implementation being analytic is the 6th dimension to behavior analysis. Picture Exchange Communication System(PECS) involves a behavior being completed to request for the item needed, which concludes that it is behavioral in nature (Pyramid Educational Consultants, 2020).

IMPLEMENTING PECS

According to Dr. Andy Bondy, it is essential to understand what functional communication is, when looking at Picture Exchange Communication System. Functional communication from a behavioral perspective, as discussed previously, comes from B.F. Skinner, and his book, Verbal Behavior (1957). Skinner discusses the use of a speaker and listener in communication, and their role within the exchange. A listener is required to mediate reinforcement for the speaker, which, therefore, is a social aspect (Skinner, 1957). Teaching a learner how to label and mand for items independently is crucial; that learner needs the stimulus control, not to be under a question or a prompt (Skinner, 1957). Communication should be natural and occur within natural contingencies. According to Dr. Bondy, responding to questions is a completely different

control, versus initiating communication, labeling items or asking for items. The key idea for this control theory is that some kids can become prompt dependent, and need the question, and imitation, to respond. If tactics of verbal prompts, or physical prompts, must be used, Dr. Bondy explains the importance of fading them quickly, to limit prompt dependency. In the case of overcoming prompt dependence, incidental teaching was developed, to increase independent communication (Bondy, 2001).

Lori Frost and Dr. Bondy observed clients having difficulty learning, and using, language with current methods, such as sign language, and speech. PECS became an idea after teaching kids the use of picture-based systems. Pointing to the items on a communication board was successful with many children, and adults, with delays, including speech production, according to Dr. Bondy (2001). Although this method of communication was effective for some, people with Autism seemed to struggle selecting an item off the board (Bondy, 2001). Dr. Bondy believed that this method of communication was teaching children to affix themselves to the board, instead of the person they were communicating with. The board method suggests the communication was not under stimulus control of the communication partner, and prompt dependency was likely to follow (Bondy, 2001). Dr. Bondy stated that his goal, when writing the first step of PECS, was to develop a rapidly-used response, that would be a form of functional communication (Bondy, 2001).

The first step in using PECS as functional communication is doing a preference assessment (Bondy, 2001). You need to know what the child wants before you show it or help them ask for it. During this process,

it's the educator's job to make sure the child has multiple different items, and does not limit themselves to a few. If the therapist limits the child to food or drinks, then the child will only know how to ask for food or drinks, which will limit the benefits of this functional communication tool (Bondy, 2001). Dr. Bondy emphasizes that teachers should use establishing operations to teach various reinforcers. The items that are taught within the functional responses should be items the client will typically ask for (Bondy 2001).

Teaching the client is an important component of using this functional communication tool. The effectiveness of PECS depends on the implementation (Bondy, 2001). The child, in the beginning, will need assistance, to learn how to respond when they want an item. As previously mentioned, Dr. Bondy uses a "prompt partner," during the first couple stages of PECS. This person stays as invisible as possible and prompts the child from behind. No words are used during this prompt sequence, all the while the communication partner is silently enticing the child with the item (i.e. showing them the item, playing with it). The prompt includes hand-over-hand, prompting the client to complete the exchange sequence, in order to receive access to the item.

The first phase of PECS includes the child reaching for an icon, and exchanging it with their communication partner (Bondy, 2001). Dr. Bondy compares this phase to the first use of language by children who are verbal. Before learning what words mean, children use words, or sounds, consistently. This is the same idea PECS follows; the child must exchange the icon for that item, regardless if they don't know what the picture is of. Initiating

conversation is taught before discrimination (Bondy, 2001).

After the initial exchange phase is mastered, the child moves into distance, and persistence, of PECS: increasing distance; resistance to extinction; increasing the variety of reinforcers used; and conditions of the exchange (i.e. room, teachers) (Bondy, 2001). Generalization is taught, throughout the phases of PECS and the protocol. While the client continues to work on generalization, more techniques and steps are added, to increase the difficulty, and capability of the client to communicate (Bondy, 2001).

Following distance and persistence phase, the child will start discrimination training (Bondy, 2001). The difference in this phase, from the previous, is the child is not only exchanging a picture; they also must exchange the picture that corresponds to the item they are wanting. In this case, you must do a reinforcer assessment, and assess if the items considered low preferred, are truly low-preferred, for the client. Reinforcement still occurs immediately after the exchange; the teacher gives the client what they asked for (Bondy, 2001). If the low-preferred item was chosen, the teacher hands it to the client, but the client should provide some kind of negative reaction. This is when you start the error correction sequence, and the client learns what the icons mean. The error correction sequence includes pointing to the correct icon; holding the icon next to the item; showing the client; replacing both icons on the book; and then, performing a distractor (i.e. mastered task, or flipping the book over). The client is then allowed to request the item again. If they error again, error correction is used, up to two more times (Bondy, 2001). Following the third error,

the client is then given the communication book, with only the preferred item on the front, so they can only ask correctly. If the client exchanges the right icon at any point independently, they are given the item, and lots of verbal praise (Bondy, 2001).

Once discrimination of icons between high and low preferred is mastered, the client will learn to discriminate between highly preferred items (Bondy, 2001). This incorporates the use of a correspondence check. The client must exchange the icon, like previous phases, but also must remove the item, in an array of objects. This tactic is to ensure the client knows what they are asking for and can discriminate between the physical objects. A correspondence check involves the communication partner holding up the items and saying, “take it,” prompting the client to take one of the items. If the client takes the correct item, reinforcement is immediately given. If the client takes the other object, an error correction sequence, similar to the previous, is conducted. (Bondy, 2001).

The sentence strip phase teaches clients to use sentences when requesting items. The use of sentence starters such as: “I want;” “I see;” “I hear;” serve a function in communication (Bondy, 2001). When first teaching this phase, backward chaining is implemented. A sentence strip is affixed to the bottom of the book, with an icon saying, “I want,” on the left side. The client must flip through their book and find the item they want, affix it to the sentence strip, and exchange the strip with the partner. When the communication partner reads the strip, the client should touch both icons, as if they were reading the strip themselves. After this step is mastered, the “I want” icon is then moved to the front of the

communication book, and the same rules apply to this phase (Bondy, 2001).

After the sentence strip construction is mastered, it is recommended to introduce a fixed time delay, when reading back both the “I want,” and the item (Bondy, 2001). This would imply the client hands the strip to the partner, and points to the “I want” icon; the communication partner reads the first icon, but when the client points to the reinforcer, the partner waits three-to-five seconds, before saying the item. This is an attempt to increase vocalizations for the client; however, the vocalizations aren’t a requirement, for the client to contact reinforcement (Bondy, 2001). When this phase is mastered, a time delay is added to both icons on the sentence strip. Differential reinforcement is essential in this part of PECS (Bondy, 2001). When the client vocalizes either step of the sentence strip, they are given more of the item they asked for, along with social praise that exceeds other responses. If the client competes the strip exchange, but doesn’t vocalize, they are given the item in small pieces, and with some praise. The idea of differential reinforcement is to increase the likelihood the client will repeat the verbal requests, without punishing them for not vocalizing (Bondy, 2001).

Following the fourth phase of PECS, there are two routes implementers can go. The first route includes commenting, and the second includes descriptive vocabulary (Bondy, 2001). Commenting starts by the implementer using the phrase, “What do you want?”. This phrase is taught in a prompt phase, where the implementer points to the “I want” icon on the front of the book, while simultaneously saying the phrase, “What do you want?”. This prompt shows the child what the

question is asking, by telling them how to respond to the question (Bondy, 2001). Over time, the implementer increases the prompt delay, and eventually, the goal is for the child to answer the question independently, and beat the prompt from the implementer (Bondy, 2001). Next, within the commenting phase, the child is commenting on items in the environment. To teach this phase correctly, you must start with commenting on items that are not reinforcing for the client; this is the opposite of the first phase of PECS (Bondy, 2001). Typically commenting on items that are not reinforcing means objects that draw their attention (i.e. an item disappearing from environment). This phase usually begins with the implementer asking, “What do you see?” while prompting to a new icon on the book. The same delay prompt is used for teaching this as teaching the child to answer with, “I want.” After “see” is taught, the client will then learn hearing, smelling, tasting and touching. The question is also gradually faded within these prompts, so the client will see, and comment on, objects in the environment, independently (Bondy, 2001).

Expanding vocabulary is the other possible route within the 5th phase. This incorporates colors and attributes of objects (i.e. red candy, big cookie, fast car). It is often important to kids to get the big cookie, or a certain color of candy. According to Bondy (2001), it is critical to teach both sides of the attribute. A child might want the big cookie, but they want a small portion of vegetables.

The system of PECS is simple and can be applied in settings that don't include an implementer, which is a huge benefit (Bondy, 2001). If the child takes the book with them to a grocery store, and hands the sentence

strip to an employee, they can read the strip, and help the person with what they need. The outside community doesn't need training on this, which gives it strong generalization; however, extensive training is needed to train the learner on using the system (Bondy, 2001).

Another benefit of PECS, according to Dr. Bondy (2001), is that it appears to have a great impact on the development of speech. Dr. Bondy states that, when a learner starts using PECS before age six, or has been using it for longer than a year, and is using 80-120 icons within the PECS system, learners typically come to use speech as their primary method of communication (Bondy, 2001). For clients that don't develop speech, more icons can be added. After this, Dr. Bondy (2001) makes the recommendation that the learner transitions to an Augmentative and Alternative Communication Device (AAC) (i.e. a type of electronic device that the learner can use to communicate). The social aspect is essential to uphold in this transition to a device, according to Dr. Bondy. The social piece of using a device includes the learner getting the communication partner's attention, and then using the device to request (Bondy, 2001).

The final benefit that Dr. Bondy discusses is the critical skills taught by implementing PECS. During this protocol, kids learn to ask for help, and for a break (Bondy, 2001). They are also taught a waiting skill that gradually increases, from five seconds, to two minutes. This should be implemented naturally, when the communication partner must go get an item that was asked for, or cook the meal that was requested (Bondy, 2001).

While there are many benefits to PECS, there also can be some challenges. The cards used are typically small,

and easy to lose (Bondy, 2001). To combat this, making multiples of the same icons can be helpful to the learner, so they always have opportunity to ask for what they want. The icons are also limited, in the moment, to the item the client likes. If the client gets new toys, or decides they like something new, new cards must be made, and this can be time-consuming, if the right tools aren't used (Bondy, 2001).

APPLICATION

PECS INCREASES VOCALIZATIONS

A general consistence of multiple articles is the increasing effect Picture Exchange Communication System (PECS) has on requesting. Travis and Geiger (2010) included a requesting component in their mixed design, single subject-multiple baseline, across three behaviors, along with commenting, length of utterances, speech complexity, pragmatics, and communication. Two children with autism spectrum disorder, both 9 years old, presented with some spoken language, but limited in the aspect of communication exchange, and had no formal PECS training. The qualitative component within the study included the speech complexity, pragmatics, communication, and parent and educator points-of-view (Travis & Geiger, 2010). The results of this study concluded that the two participants benefitted from PECS: increases in requesting were found, along with mixed results for length of utterances, and commenting. Specifically, significant increases in deliberate communication and requesting were found, for both participants. Both participants exhibited a solid understanding of the PECS protocol, and used clear,

thorough, verbal requests by the end of the training. Utterances increased for both participants following PECS phase four; participant one's utterances increased rapidly, and participant two's utterance increased, at a gradual rate (Travis & Geiger, 2010). Along with utterances, the study examined clause level, phrases and word endings. The quality of utterances(clauses) increased, from one to two words, to three- or four-word, utterances, following PECS phase 4, for both participants. According to experimenters, the participants showed more determiners, pronouns and adjectives in their speech, following PECS. The changes in word endings included the use of plurals for one participant, and a decrease of double negatives by the other participant. This study suggests that students using PECS protocol can increase verbal communication and requests (Travis & Geiger, 2010).

The increase of utterances and speech complexity with the implementation of PECS is also found in another study, within the same parameters (Ganz & Simpson, 2004). The participants in this study were three young children with autism, or developmental delay, who were taught PECS phases one through four. The results concluded an increase in word utterances, complexity of grammar, and words used. This is the same method of study used by Travis and Geiger (2010), using PECs through phase four, and scoring the same aspects. When comparing the two studies, the main difference between the studies was the number of participants, and the ages. Travis and Geiger (2010) used children three years older than Ganz and Simpson (2004), in which maturity could have been an impact on utterances and communication.

Travis & Geiger (2010), implemented PECs phases

through four, which is the phase that includes a time delay to help promote vocalizations, and determine the real value PECS has on communication (Bondy, 2001). Conklin & Mayer (2011) discuss the need to implement PECS, through all phases, during their experiment. This specific study sought to use PECs through the whole protocol; however, they determined the rate of acquisition of PECS is different per participant. One participant completed the full PECS protocol, while the other two completed through phase 3. Although, it wasn't completed fully, Conklin and Mayer (2011) determined that PECS has an increasing effect on communication and initiation, for participants using PECS.

Similarly, a study done by Schwartz et al. (1998) showed increases in some children's verbal communication, within their experiment. This article includes two studies—one examining rapid learning of PECS, and the other looking at communicative acts. In the first study, 31 preschool students, ages three to six, were studied. 16 were diagnosed with autism spectrum disorder, and the other 15 participants had been diagnosed with down syndrome, or other developmental disabilities. This experiment concluded that for most children, on average, it will take 14 months to complete the full PECS protocol. This directly correlates with the results and method of Conklin & Mayer (2011), who discuss the varying length of time it takes children to complete the protocol. The second study with Schwartz et al. (1998) examines 18 preschoolers who have developmental disabilities and had previously completed the first experiment on PECS learning. All data for this experiment was collected in two specific settings, using observation of the activity. Observations were for the

length of the activity, or until the child completed fifty communicative acts (Schwartz et al., 1998).

Each child was observed 3 times, across a two-school year time span (Schwartz et al., 1998). The observer put the behaviors into codes: gestures, vocalizations, manual signs, PECS, and verbal. Spontaneous speech was examined throughout these observations. The participants were split into two groups: “talkers,” who demonstrated five or more words in the first observations, and “nontalkers,” who demonstrated less than five words (Schwartz et al., 1998). Eight participants were considered talkers, while ten were considered nontalkers.

Results of this study within the natural play setting indicate that “talkers” average novel and unprompted words went from twelve in the first observation, to twenty-four in the second, and to forty in the third observation. While these numbers are averages, it shows a significant increase in words for these time periods. “Nontalkers,” in a play period, had an average of one novel and unprompted word during the first observation, two in the second observation, and four during the final observation (Schwartz et al., 1998) During snack, the talkers increased, from eight novel and unprompted words; to eighteen in the second observation; then, to thirty-four, in the third observation. “Nontalkers” showed two novel and unprompted words during the first observation, three during the second observation, and three during the final observation. The observations of the group “nontalkers” didn’t increase at a rapid rate, and for this reason, the author suggests that more research be done on the direct correlation PECS has on

verbal communication, in individuals that fall within the “nontalker” category (Schwartz et al., 1998).

Across both settings, the children considered to be “talkers” increased, in novel and unprompted words per observation, which suggests a correlation between PECS and verbal communication for those individuals. However, the “nontalkers” didn’t make significant progress when studying novel words. When putting these studies together, 44% of the participants increased in spoken language, following the PECS protocol (Schwartz et al., 1998).

Both studies discussed previously showed an increase in verbal communication. Although Schwartz et al. (1998) examined specific groups of participants, that were at different levels of communication starting the PECS training, there was a very slight increase in the verbal communication for the “nontalkers” in this study (Schwartz et al., 1998). When assessing this study, the increasing trend line is subtle, but does exist, for this “nontalker” group (Schwartz et al., 1998).

A single case research study by Khuansuwan and Kummuang (2014) includes six participants, ages six-to-nineteen, with PECS phases one through three. This case study determined that PECS has an effect on communication: scores rose, from an average of 3.83 utterances per session, to 6.83 utterances per session, after the program of PECS was implemented. These results show a slight increasing trend in utterances, similar to the “nontalker” group of participants in the previous study. While the increase is subtle, it shows an increase in vocalizations and utterances, after implementing PECS (Khuansuwan & Kummuang 2014).

A meta-analysis conducted by Hart and Banda (2010) included 13 single subject studies to determine the effectiveness of PECS, the effect it has on speech and behavior, generalization beyond training, and social validity of the intervention. This study, along with previous studies, has shown a correlation between PECS protocol use, and an increase in verbal ability (Hart & Banda, 2010).

Similar to the study done by Schwartz et al. (1998), the participants were put into categories, based on their verbal ability: no speech; limited vocalizations, or imitated words; having a small repertoire of spontaneous words, to use functionally; or communication effectively, with an alternative method (Hart & Banda, 2010). For all studies, thirty-six participants were included: seventeen were portrayed as having no speech; eleven were depicted as being able to produce vocalizations that weren't words; four participants were categorized as small repertoire of words, to communicate; and four others were categorized as demonstrating functional communication, using alternative methods(i.e. Augmentative or Alternative Communication device). When studying effectiveness, PECS was a highly effective intervention, for nineteen of the thirty-five participants; moderately effective, for ten of thirty-five; minimally effective, for six of thirty-five; and showed no effect for one participant. In terms of increasing speech, five studies were targeted, as speech interventions. Therefore, ten participants were included: two proved that PECS was highly effective in increasing speech, two were moderately effective, two were minimally effective, and one student showed no effect. The effectiveness was measured by looking at word vocalizations, at home and school (Hart & Banda, 2010).

This study determined that an increase in vocalizations existed for six participants, although some increased at different rates, similar to the results found with Schwartz et al. (1998), and the “nontalker” group (Hart & Banda, 2010).

A meta-analysis by Tincani and Devis (2011) examined what effect PECS had on mands and vocalizations. One study within this analysis compared PECS, Responsive Education, and Prelinguistic Milieu Teaching for thirty-six preschool students with autism. This study concluded that both tactics increased spoken communication, but PECS provided a higher frequency of spoken communication (Yoder & Stone, 2006).

Comparatively, Hu and Lee (2019) studied vocal mands and aggressive behavior, along with PECS implementation. This study used the same measurement and analysis method of mands and vocalizations as Tincani and Devis (2011). Results are also similar in the two studies and determine that the PECS protocol increases vocal mands. The differences in the studies include the ages of the participants, and the number of participants in the study. Tincani and Devis (2011) examined 36 preschool students, while Hu and Lee (2019) studied the effects PECS had on one preschool student. The vast difference in number of the children in the studies still yielded the same outcome (Hu & Lee, 2019).

Car and Felce (2007) reported an upsurge in child to adult initiation for twenty-four participants who had PECS training through phase three, when placing them against kids that did not receive the PECS training.

After reviewing multiple single subject design cases, the authors found that PECS is an effective intervention to promote functional communication in individuals with

autism and other disabilities, regardless of age, gender, diagnosis or setting (Car and Felce, 2007). According to this study, PECs training produced varying speech levels, with the limited number of participants. Ten participants out of sixteen improved in terms of speech, after using PECS (Car and Felce, 2007).

This meta-analysis, along with the previous by Tincani and Devis (2011), determined the increasing effect PECS has on communication—specifically, verbal communication. The two articles share common viewpoints of the dramatic increase PECS can have on communication. Hart and Banda (2010) determined nine out of ten participants showed an increase in speech, while Tincani and Devis (2011) determined ten participants, out of sixteen, showed an increase in speech. Both studies characterized speech in the same manner, mands and vocalizations, which makes the two comparable (Hart and Banda, 2011).

Similarly, Gordon et al. (2011) examined the effect PECS has on children who are nonverbal and diagnosed with autism. This study sought to determine the effect PECS had on speech, spontaneous communication, and social communication. In conclusion of this study, it was determined that PECS had an increasing effect on speech and communication, although the participants showed no increase for social purposes (Gordon et al., 2011).

The increase of utterance of words by children with autism was examined in a four-week study. The study included two components not typically found in the PECS protocol: only using ten icons, and repeating the word multiple times, trying to get the client to complete the vocal mand (Juhoh & Majid, 2017). During typical

PECS, vocalizations are, “encouraged but not required” (Bondy, 2001).

The first phase of the experiment, the experimenters used known cartoons, for the client to request items (Juhoh & Majid, 2017). It was then transitioned to typical pictures.

Referenced as student A, the participant completed one utterance, within the first week of treatment, and concluded with five utterances, following week four. Student B completed two utterances within the first week of intervention, and increased to six, after four weeks of PECS training (Juhoh & Majid 2017).

The results found in Juhoh and Majid (2017) indicated an increase in word and speech after just two phases of PECS implementation, which directly coincides with research cited within Juhoh & Majid (2017): Sulzer-Azaroff et al. (2009) confirms PECS to be a very effective learning technique in communication skills, and that it is also beneficial for individuals who have a speech delay (Juhoh & Majid, 2017).

The emergence of speech in children has been proven to exist when using PECS in play, and academic, settings (Charlop-Christy et al., 2013). This experiment sought to determine if speech, social-communicative and problem behaviors would increase, or decrease, with PECS intervention. Results determined that all three children completed the PECs protocol and increased in speech production and social-communicative behavior following the study, while problem behavior decreased (Charlop-Christy et al., 2013).

While PECS has proven to be effective for some clients in increasing mands, it has also been proven to increase untrained tacts, and intraverbals, for some participants

(Ziomek & Rehfeldt, 2008). Ziomek and Rehfeldt (2008) examined mands similar to the previous articles, but also used untrained tacts and intraverbals, and along with how PECS affects those communication modalities, and when they would emerge. Results of this case suggest that PECS increased tacts, mands and intraverbals for participants with developmental disabilities, who previously had little to no limited communication skills (Ziomek & Rehfeldt, 2008).

ADAPTING PECS TO ELICIT VOCALIZATIONS

Greenburg, Tomanio & Charlop (2013) sought to determine two research topics: how PECS effected vocalizations in children with autism; and if children with limited verbal abilities can be taught to complete spontaneous vocalizations, along with the PECS protocol.

Topic one was introduced first, and data was taken on vocalizations. Before this study, all four participants were not able to request items, either with words or phrases (Greenburg et al., 2013). Three of the children used nonverbal communication (i.e. gestures, pointing or leading people by hand). One participant used vocal approximations, to convey requests. During the experiment, vocalizations were recorded, at free play times, while using PECS. Any vocalization attempt that wasn't stereotypy, imitative or laughing was counted. The vocalizations did not have to be directly related to the item to be studied; the attempt of a vocalization is what was being considered (Greenburg et al., 2013). However, the vocalizations must be in attempt to ask for an item,

which was determined by the experimenter holding up the item. Data was also taken on the vocalizations attached to the PECS exchange. In this case, the participant asks for an item with PECS, and simultaneously, or within three seconds, makes vocalizations (Greenburg et al., 2013)

Within the first study, participant one had low levels of spontaneous vocalizations at baseline, but following the eighteen-month appointment, his spontaneous vocalizations increased to high levels—an average of fourteen vocalizations per session (Greenburg et al., 2013). Participant two completed an average of six vocalizations during baseline. This number decreased slightly, but quickly returned to an average of fifteen vocalizations per session. The third participant didn't display any vocalizations during the free play baseline sessions. During his follow up, he increased vocalizations, to two per session. The fourth participant didn't show any vocalizations throughout the whole study. In conclusion, this multiple baseline design experiment determined that three of the four participants vocalized at higher rates than during baseline (Greenburg et al., 2013). From the results of this study, the experimenters made a conclusion—during PECS acquisition, a decrease of vocalizations may be observed, but it typically will follow the “u-pattern,” and increase directly after. This is because the clients are not relying on vocalizations, or approximations of words, and have a formal method of communication (Greenburg et al., 2013).

Study two within this article examined two children from the previous study, to determine if using PECS, by implementing time delay and verbal prompts, can increase spontaneous vocalizations (Greenburg et al.,

2013). A multiple baseline designs across participants was used in this case. The delay phase was targeted first with both clients. During this phase, the therapist paused for 3 seconds after receiving the sentence strip from the participant. If the participant made any vocalization during this exchange, or within 3 seconds, the therapist read the sentence, “I want (item name),” and gave the client access. If the client did not make a vocalization during that time, the therapist still read the “I want (item name)” phrase, and gave the client access. This phase continued until the client paired vocalizations with PECS with 80% accuracy, across two consecutive sessions (Greenburg et al., 2013). However, it was discontinued if the client made less than 10% PECS requests, with spontaneous vocalizations, for three consecutive sessions (Greenburg et al., 2013).

The second teaching component was introduced—time delay, plus prompt—if the client did not make progress, using just the time delay procedure (Greenburg et al., 2013). The therapist paused for three seconds after the client exchanged the sentence strip, but then gave the client a full vocal prompt. If the client made a vocalization, they were given access to the item, for an average of thirty seconds. If the client did not make the vocalization, after the full prompt, the prompt was repeated, up to three times, to try for the vocalization. Following the third attempt, the sentence strip was put back on the book, and the item was put away; no access was granted (Greenburg et al., 2013).

After the participant paired the vocalization with the sentence strip, the verbal prompt was faded. Criterion for this phase was considered met if the participant completed a spontaneous vocalization independently,

with 80% accuracy, for two consecutive trials (Greenburg et al., 2013) After this criterion was met, the participant returned to the phase used in study one (Greenburg et al., 2013).

Results of study two concluded that you can teach participants to pair vocalizations with PECS (Greenburg et al., 2013). Both participants did not pair vocalizations in the baseline phase, although one participant immediately paired it during the time delay phase, with 90%, or more, of the opportunities provided. Participant two began pairing vocalizations and PECS during the fifth delay, plus prompt, phase session. He reached mastery criterion for this phase on day nine. Following mastery, the participant was put into the time delay phase, without prompt; he proved generalization of this task by pairing the vocalizations with PECs, throughout this phase (Greenburg et al., 2013).

Time delay was another variable to the next study, by Cagilani et al. (2017). This experiment examines a similar aspect of adapting PECS, to increase vocalizations, and analyzes the effect time delay reinforcement and increasing response effort has, on the development of intelligible word vocalizations (Cagilani et al., 2017). The participants of this study were four elementary-aged students, between the ages of five and seven, who were all diagnosed with significant developmental delay, or autism spectrum disorder. All participants had previously mastered PECS, through phase three-B. At baseline, participants were inconsistently echoing vocalizations and making unintelligible sounds, but not completing vocalizations, to communicate (Cagilani et al., 2017).

During this concurrent multiple probe design, across participants, vocalizations were either considered correct

or incorrect, and had to be consistent with the item that was being asked (Cagilani et al., 2017). Experimenters used a vocalization screening tool to determine if the clients were able to use vocalizations for items, and decide what would be considered correct, and incorrect, per participant. Two of the participants used approximations, and two used whole word mands (Cagilani et al., 2017).

The reinforcer delay condition within the experiment accessed immediate reinforcement for completing the verbal mand, and a slight delay for the PECS mand. This use of differential reinforcement was used in the previous study by Greenburg et al. (2013). The same delay method was used, although Cagilani et al. (2017) didn't add a verbal prompt following teaching the delay.

When the participant completes the exchange, the communication partner waits to provide reinforcement, and if the client vocalizes during that time, they are given immediate access to the item they asked for (Cagilani et al., 2017). The delay started at one second and increased by one second for each day of treatment, until the client reached 80% accuracy for two sessions. The increase in time delay is a difference from the previous study. The time delay in the study by Greenburg et al. (2013) only included three to five seconds, without an increase. One participant was excluded from the increasing delay because he did not increase vocalizations over time (Cagilani et al., 2017).

The response effort experiment in this study involved moving the book .91 meters from the participant (Cagilani et al., 2017). In the PECS protocol, this is called distance and persistence; the participants have mastered this within PECS phase 2 (Bondy, 2001). Once the

participant has vocalized for 80 percent of trials without using picture exchange, the book is moved .76 meters away from the client (Cagilani et al., 2017). After hitting the minimum of 80 percent vocalizations, the book is then returned to in front of the client, on the table. Moving the book back to the client was to determine if the client would continue to vocalize, or would revert to exchanging pictures (Cagilani et al., 2017).

The results of this experiment proved delay to reinforcement, with PECS, resulted in an increase in intelligible word vocalizations, with three participants. This experiment also proved that moving the PECS book away from the client decreased PECS exchanges, but the vocal requests remained consistent, with the delay part of the intervention (Cagilani et al., 2017).

The inclusion of time delay had an increasing impact on vocalizations in individuals with autism or developmental disabilities, for both previous studies (Greenburg et al., 2013) (Cagilani et al., 2017). The concept of requiring vocalizations throughout the PECS protocol may have been effective in this instance, but according to Bondy (2001), vocalizations should be, “encouraged but not required” (Bondy, 2001). This study conflicts with the author’s ideal implementation of PECS. According to Bondy (2001), differential reinforcement should be used, in this instance, to entice the participant to complete the vocalization. This implies that, if they complete the vocalization, they are given a bigger piece of the snack, or longer time with the toy asked for. The time delay is used, as previously discussed, when the client completes the exchange, and waits for the item. The communication partner should hold up the sentence strip, and wait three to five seconds before reading the

strip. As you can tell by the procedure, a forced vocalization never occurs (Bondy, 2001).

Naturally, the time delay, built within the PEC protocol in the fourth phase, has shown an increase in requesting, and speech development (Tincani et al., 2006). Two participants were taught PECS, with a delay, multiple baseline, line design. They both increased levels of requesting, after implementing PECS. However, one participant demonstrated a significant increase in speech development, primarily during the fourth phase of PECS. To examine this effect deeper, Tincani et al. (2006) used a reversal design, to study reinforcement and delay on vocalizations. Results included an increase in speech when reinforcement was provided, and a decrease when reinforcement was not provided, following vocalizations (Tincani et al., 2006).

COMPARING PECS TO OTHER AUGMENTATIVE AND ALTERNATIVE COMMUNICATION METHODS

Comparing PECs to other augmentative communication methods was done in multiple cases to determine which method will increase speech and communication more rapidly and effectively. Adkins & Axelrod (2002) compared Picture Exchange Communication System (PECS) and American Sign Language (ASL). Four different types of sessions were implemented: training for PECS, training session for sign language, test for generalization of PECS and test for generalization for sign language. The number of trials to criterion was recorded along with the communication derived between both modalities. Results showed that

PECS was more effective in all aspects for the subject with a developmental disability in this study (Adkins & Axelrod, 2002).

Similar to Adkins & Axelrod (2002), Chambers and Rehfeldt (2003) examined the use of PECS, and sign language. The end goal was to determine which method would increase mand skills to individuals with developmental disabilities in the severe range (Chambers & Rehfeldt, 2003). Four participants within this study were taught to mand for reinforcing items, using both communication methods (PECS and ASL). Three of four participants acquired, and generalized, PECS usage, to ask for those items, while two of those three demonstrated mands for those items, using manual sign (Chambers & Rehfeldt, 2003). While the fourth participant was removed from the study because of an illness, they did increase in PECS usage and generalization, before being removed. The use of PECS was determined to be a more effective modality of requesting, when compared to ASL (Chambers & Rehfeldt, 2003).

Comparing sign language and Picture Exchange Communication System (PECS) confirmed that PECS increased vocal behavior, in Adkins and Axelrod (2002). Yoder and Stone (2006) compared PECS and Responsive Education and Prelinguistic Milieu Teaching, and the effect the two communication interventions have on spoken communication. Thirty-six preschoolers with autism were studied, and each treatment was trained to the participants, over a six-month time period. Three tests were done: pretreatment, post treatment, and a six-month follow up (Yoder & Stone, 2006). Results indicated that PECS was more successful at increasing the frequency of spoken communication and number of

words used, during the post- treatment measurement (Yoder & Stone, 2006).

When comparing different modalities of function communication, it is determined by this research that PECS is the most effective in increasing mand, words, spoken communication and vocalizations. This was also referenced within Cooper et al (2007), to examine the differences in sign language and PECS. However, within the article referenced, Tinani (2004) examined the effect on mands, using the two modalities. This study determined that PECS increased mands at a greater frequency initially than sign language did, when specifically examining mands, not vocal mands (Tinani, 2004). However, after prompts for one client, sign language increased mands to greater frequency than PECS. Although this study doesn't show direct effect on vocal mands, it shows the need for studying the differences in each participant, individually (Cooper et al., 2007).

As referenced previously, sign language requires more accurate fine motor skills that may not be acquired, which can lead individuals to use PECS. (Chua & Poon, 2018). This is the motivation in studying the differences of effect on vocalizations and mands that sign language, and PECS, have.

NO SIGNIFICANT INCREASE ON COMMUNICATION

The characteristics of participants that make them good candidates for PECS is an important aspect of using the protocol. A meta-analysis of eleven studies by Simpson (2011) contains children, under the age of

eighteen, with autism, or developmental disorders. These participants completed a PECS study that sought to determine what aspects of a child would make them a good candidate for this intervention, along with the effect PECS has on communication.

The effect on speech within this study concluded that PECS did not have a massive increase to show a direct correlation for all participants. The researchers used the study to determine the characteristics necessary in children to gain the most from PECS: poor joint attention, strong object exploration, and limited motor imitation (Simpson, 2011).

The characteristics to gain the most from PECS determined within Simpson (2011) strikes a common limitation, discussed in studies by Hart & Banda (2010), Greenburg et al. (2013) and Cagilani et al. (2017). These studies relate to the common theory by Bondy (2001), that each person with autism is different, and the impact of PECS on them is determined by their characteristics. Characteristics that can help determine the success of a client, before implementing a program, can be a great help for potential PECS users (Simpson, 2011).

A meta-analysis by Flippin et al. (2010) found the effect of PECS on speech to not be increasing. This study includes eight single-subject case studies, along with three group studies, that examine the use of PECS and the effects it has on communicative behaviors, and speech or vocalizations. The outcomes specified in the literature reviewed includes exchanges, requests and initiations (Flippin et al., 2010).

Increases in communication were specifically observed within both single-subject and group designs, although generalization and maintenance were lacking in all

single-subject designs, but one. The speech outcomes for the five studies, that included speech components, conclude that PECS does not increase speech for early learners with autism (Flippin et al., 2010). Five of the seventeen participants showed a slight increase in speech throughout the studies used, although, during one specific study, the speech was not maintained across a year time span. This study concludes that the increase of speech does not show a correlation with greater speech ability, after implementing the PECS protocol, and that it is a case-by-case analysis because all children are different (Flippin et al., 2010).

When looking at the measurement procedures of studies, many use frequency or rate, when measuring the usage of PECS, along with speech and communication. Howlin et al. (2007) used the assessment, Autism Diagnostic Observation Schedule-Generic (ADOS-G), among other methods, to measure communication and speech. According to Lord et al. (2000), this method of evaluation is a semi-structured standardized assessment that assesses communication, play and imaginative use of materials, for children with autism. It consists of four 30-minute modules, administered according to the participant's expressive language (Lord et al., 2000).

The study by Howlin et al. (2007), found no correlation between the use of PECS and speech or communication. PECS protocol was implemented, with fidelity, and taught extensively to the teachers and parents, using training and observation. The 84 participants, with an average age of 6.8 years, were broken into three groups: immediate treatment (following baseline); delayed treatment (two terms following baseline); and no treatment. Frequency of vocalizations and

communication were recorded during this experiment, along with the administration of ADOS-G, that concluded no increase in speech or communication, following PECS training (Howlin et al., 2007)

The results discussed in Howlin et al. (2007) were replicated, while measuring frequency, within a multiple baseline, alternating treatment study, by Boesch et al. (2013). Boesch et al., (2013) compared the use of Picture Exchange Communication System (PECS) and a speech generating device (SGD), and the effects they have on social-communicative behavior, and natural speech production.

Three participants, with autism and limited functional communication, were within this study. Results indicated little difference between PECS and SGD, and the effect they have on natural speech and social communicative behavior. Social communicative behavior seemed to have been encouraged in PECS phase 2 for the participants, and natural speech had no increase, with either method of communication (Boesch et al., 2013).

GENERALIZATION OF PECS

As discussed, PECS has often been proven to generalize, across settings and communication partners (Greenburg et al., 2012). Four children with autism were studied, specifically, for generalization, in the home setting, with parents; the community, with a stranger; and a new playroom, with a therapist; and prove that PECS could be generalized throughout those environments. Generalization can include simply asking for an item, using a PECS exchange, or in situations, such as Greenburg et al (2013), participants can be proven to

generalize vocalizations, with the PECS exchange (Greenburg et al., 2013).

A multiple baseline design, across settings and participants, is adequate, to determine generalization. A study across environments determines if the behavior is used in each setting. Three students were used in a study, to determine if PECS generalizes to their home setting, and at school (Carre et al., 2009). This study showed generalization of PECS to the home and school setting, but it was highlighted that a functionally significant degree of generalization was not observed (Carre et al., 2009).

Generalization of vocalizations, play and social-communicative behaviors can also directly correlate with PECS use (Jurgens et al., 2009). Results of this study showed rapid acquisition for PECS phases one through three. Generalization of PECS exchanges were not observed in the generalization phase; however, the participant was able to generalize vocalizations- verbal mands, and initiation of communication (Jurgens et al., 2009). While generalization was not shown through this experiment, in terms of PECS exchange, it was shown in terms of other possible effects of PECS in the study (Jurgens et al., 2009). Increases in spoken vocabulary, including length of intelligible spoken utterances, along with developmentally appropriate play, was observed (Jurgens et al., 2009).

A follow up of generalization is typically included in studies, to determine if the skills taught will generalize outside the study. Jurgens et al. (2019) followed up with their subject—three years, and seven months, after PECS training—to determine if the skill was generalized. During the follow-up, it was noted that PECS use decreased,

while vocal mands increased. Conclusions were drawn that opportunities still need to be provided, in order to prove generalization of the task. However, with the child acquiring speech, the PECS book started to become less valuable to the participants (Jurgens et al., 2019).

LIMITATIONS OF CURRENT RESEARCH

Although conclusions are drawn, from many articles, about the effectiveness of Picture Exchange Communication System (PECS), there are still some gaps in literature, to prove a direct correlation. A common limitation discussed in studies by Bondy (2001), Travis & Geiger (2010), Schwartz et al. (1998) and Hart and Banda (2010), includes the effect natural maturation has on communication in children with developmental disabilities, including autism.

A child might have naturally started to communicate, and it might not be directly because of the implementation of PECS. Hart and Banda (2010) discuss the need for characteristics of participants to be studied. In order to determine the direct effects PECS has on communication, this study suggests that there is more need to understand each participant (i.e. cognitive level, age and disability that might affect gains in speech) (Hart & Banda, 2010).

Tincani (2004) discussed the need for knowledge of motor skills for each client, which can predict the outcome of PECS. This suggest that participants with better motor imitation skills can acquire other modalities, such as sign language, more quickly, which could be more effective in mands and communication (Tincani, 2004).

The use of fine motor, within sign language, is previously highlighted in the study by Chua and Poon (2018), and how it may be easier to acquire, with greater fine motor skills.

Many studies, such as Cagilani et al. (2017), used PECS phases one through three, while only a few included phase four. When looking into the procedure aligned by Bondy (2001), phase four includes a suggestion for implementing the time delay, to try and encourage vocalizations. Travis and Geiger (2010) used PECS through phase four in their experiment, and proved an increase in utterances for participants. This is a limitation of some studies, and should be considered when looking at evidence and research (Travis & Geiger, 2010). Bondy (2012) explains a limitation of most studies is not following the full protocol of PECS, and using all phases. He discusses that most studies with PECS stop during discrimination, phase 3, which is before encouragement, and reinforcement for vocalizations, start (Bondy, 2012).

The measuring tools used in each study do not align, to compare all studies, and the impact found on communication and speech by PECS. Hart and Banda (2010), along with Tincani and Devis (2011), discuss that, in some studies, approximations are used as vocalizations, but other studies don't qualify approximations as vocalizations, and only accept whole words. Travis and Geiger (2010) used utterances to determine the effect PECS has on communication. They revealed an increase in those utterances, after following PECS procedures (Travis & Geiger, 2010).

Greenburg et al. (2013) assessed the effect of distance and persistence, and an increase in the response effort on increasing vocalizations, in participants with autism,

or other developmental delays. They discussed that a limitation of their study that, if they made the PECS book not available in more of the study, the vocalizations could have increased more (Greenburg et al., 2013).

The procedures of PECS must be implemented, according to Bondy (2001); however, the meta-analysis, by Tincani and Devis (2011), outlined a variety of teaching and exposure to the PECS protocol, within each study used. This is a limitation of studies because the procedure must be implemented the same, across all experiments, in order to directly compare. Limited participants within the studies in this meta-analysis was also identified as a limitation, to prove a direct correlation, and the results of the studies (Tincani & Devis, 2011).

The outside environment for every study is something that should be accounted for. Limitations regarding this are discussed by Cagilani et al. (2017). Within this study, the researchers believe that communication and speech could have been affected differently, if the participants were allowed access to their books at home, and outside of the study. Cagilani et al. (2017) believe that the absence of the PECS communication book, outside the study environment, may have increased the value of reinforcement of PECS within the study. This would, in time, affect the use of communication (Cagilani et al., 2017).

Most studies examined PECS communication within a mealtime setting. For some clients, mealtime is aversive. Using mealtime can be easier for researchers because of the potential amount of requests; however, it doesn't expand, and include all components of the clients' repertoire (Cagilani et al., 2017).

FUTURE RECOMMENDATIONS

Future directions for this topic should be drawn from the limitations, and lack of study, in areas concerning PECS and communication. Tincani and Devis (2011) discuss the need for future studies to examine all conditions and characteristics of participants. This includes other environments, items requested, and characteristics of the participants. Tincani and Devis (2011) also explained the need for more research on characteristics that will predict the acquisition of speech in people with autism, and if the emergence of approximations could lead to full words.

More research should be conducted following the full PECS protocol, to determine the effect it has on communication. Tincani and Devis (2011) suggest that going farther into the PECS protocol could increase the impact it has, on communication and speech.

Cagilani et al (2017) used response effort and shaping to elicit vocalizations in participants, but did not discuss the changes in word production and approximations, throughout the study. The study had criteria for approximations, and when they were considered, but never took data on the changes and progress that was made, within those approximations and words. The idea of changes in vocalizations should be an area of further study, to determine if individuals can make progress in the approximations, or sounds, of words, as well as completing full words and utterances.

The length of some studies that were conducted was very limited. Khuansuwan and Kummuang (2014) only studied speech and communication over a year time span. A suggestion made by the authors, to grasp the full

picture and effect of PECS, was to lengthen the study. Conklin and Mayer (2011) intended to complete the full protocol with their participants, but only got one client through phase 4. They highlight the differences in acquisition rate of participants with their study and included it as a limitation (Conklin & Mayer, 2011).

ETHICAL CONSIDERATIONS

While designing interventions for individuals with autism, or other developmental disabilities, within applied behavior analysis, the Professional and Ethics Compliance Code for Behavior analysts (PECC) must be referenced (Behavior Analyst Certification Board, 2014).

One common limitation of studies was the characteristics of clients and doing more research on what characteristics would help to be successful with PECS. Characteristics of the individuals is a key component to treating individuals with limited functional communication abilities. This aligns with the PECC code 1.01, that explains the need to evaluate the background information, and be aware before implementing a plan. This also means information about the client that could help with the intervention (Behavior Analyst Certification Board, 2014).

When comparing Picture Exchange Communication System to vocal behavior, it is essential to exhibit scientific knowledge within the field. Section 1.01 of the PECC explains the use of relying on information that is based on science, and behavior analysis, when making decisions in human assistance, or changing behavior (Behavior Analyst Certification Board, 2014). Using

evidence-based strategies is vital when changing behavior, especially vocal behavior because that is a method of communication for many people (Behavior Analyst Certification Board, 2014). This is why so much research has to be done on topics, to determine it is effective, before using it on a client.

Boundaries of competence is the next code that essential in changing verbal behavior and implementing Picture Exchange Communication System (PECS). The boundaries of behavior analysts should include providing services, and teaching, within the limits of their skill and education. This was upheld within the studies highlighted. The researchers used a team of people, when implementing a plan, that included a speech pathologist and teachers, or implementers, that were properly trained on how to implement the functional communication skill of PECS (Behavior Analyst Certification Board, 2014).

Ethics code 2.03 discusses the use of appropriate consent. The client, and their caregiver, should always be aware of every aspect of the experiment and interventions that are put in place. The rights and privileges of the clients are crucial and correlate with consent, which is highlighted in section 2.05 of the PECC (Behavior Analyst Certification Board, 2014). Behavior analytic assessment consent is outlined in section 3.03, and explained as consent to every procedure, and the need for written approval (Behavior Analyst Certification Board, 2014). The need for consent is discussed throughout articles but is often overlooked in practice. Before using any piece of a behavior plan, it should have the written approval of all parties involved. (Behavior Analyst Certification Board, 2014).

To avoid false or deceptive statements, both sides

(PECS increasing communication, and PECS having no effect on communication) were researched, and included, in this review. In compliance with the PECC sections 8.01, behavior analysts do not make untrue or deceptive statements. This code identifies that behavior analysts do not implement tactics and programs that are non-behavior analytic in nature (Behavior Analyst Certification Board, 2014). It would be unethical to only include some research about the effect PECS has on communication, and not include the other analyses.

When referring to other articles or someone else's work, behavior analysts must give credit to that researcher or behavior analyst (Behavior Analyst Certification Board, 2014). This is outlined in section 8.02, and states that behavior analysts must obtain permission to use materials, and must provide citations that are the property or findings of someone else (Behavior Analyst Certification Board, 2014). Many articles, that have been reviewed for this research, included other research, to support their hypothesis before providing the results from the study. Throughout this analysis, proper citations and references were used to give credit to researchers who completed the studies, which is in compliance with the PECC.

Last, behavior analysts should adhere to the guidelines for research, outlined by the PECC. Behavior analysts should not make up false research, or fabricate research. They should not omit findings that might alter versions of the research (Behavior Analyst Certification Board, 2014). Behavior analysts should not publish data, when it has been previously published, without proper recognition. After research is complete and published, they do not withhold data for other professionals to use,

to further research (Behavior Analyst Certification Board, 2014). As mentioned above, others' research is commonly used to support hypothesis, and determine the most ethical treatment or intervention.

CONCLUSION

Conclusions drawn from research determine that speech and communication could possibly be impacted, and increased, by implementing Picture Exchange Communication System (PECS). There is evidence to suggest both sides of the argument: PECS does increase vocalizations, and PECS does not increase vocalizations. The studies highlighted used different measurements of vocalizations, from mands, tacts, words, utterances, and intraverbals, along with different participants, ranging from preschool-age, to adults. In order to determine a direct correlation, between PECS and vocalizations, more research is needed—specifically, on the participants and the full protocol of PECS. Preliminary conclusions can be drawn that completing the full PECS protocol can greatly impact the chances that vocalizations will increase, according to research done, and articles highlighted in this analysis.

This is where you can add appendices or other back matter.