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Recidivism Rates and Its Correlation to Mathematics and Reading Comprehension Among Detention Center Juveniles Who Participate in Trauma Informed Teaching

Isaac Collin

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by

Isaac Collins

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Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work here at Lindenwood University and that I have not submitted it for any other college or university course or degree here or elsewhere.

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Abstract

In this study rates of recidivism and their relationship with mathematics and reading comprehension will be analyzed. In the literature, a full comprehensive study of high school mathematics and reading was taught without the implementation of a watered-down academic curriculum. In order for detention center students to benefit from a detention center education they need instructors to expose them to state academic standards. The research questions guiding this study included 1) Is there a significant difference in the achievement scores in mathematics and reading skills and abilities based on the rates of recidivism at XYZ Detention Center, 2) Do XYZ Detention Center juveniles who have lower mathematical and reading skills and abilities experience higher rates of recidivism, than their counterparts, who have higher levels of mathematical/reading comprehension with lower rates of recidivism?, and 3) Do students with higher recidivism rates have higher accuracy and ability to determine their daily learning in mathematics and reading? The investigator analyzed self-assessment Likert surveys that the instructors gave to students to rate their level of understanding of the week's lessons. The self-assessment surveys provided students a window into their level of understanding and comprehension. The instructors distributed a Likert-Scale once a week to each student.

Several themes unfolded from the analysis of the data: a) Students achieved sizeable growth in pre-and post-inventory results, b) Trauma Informed Teaching had a significant impact on academic results. The overall results from the examination of each dataset demonstrated an increasing trend in the direction of growth in both mathematical

and verbal understanding. Practitioners may benefit from further study that examines additional detention centers inclusive of less rural areas such as suburban facilities.

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Chapter One: Introduction

Introduction

When envisioning juvenile detention centers, people often thought of an institution with barbed wires set away from populated areas; an overlooked place where juveniles go to be disciplined and removed from the public's eye. Overall crime rates remained relatively stable over the past three decades and are independent of prevailing juvenile justice policies (Jenson & Howard, 1998). Rates of recidivism are inversely proportional to the level of education attained by juvenile offenders (Winter, 1998, p. 26). About four out of every ten children in the United States have been exposed to some type of violence (Doyle, 2015)

Effective Instructional Practices in Juvenile Justice Facilities within the broad spectrum of services provided by juvenile justice systems, the education of adjudicated youths had more than likely the greatest long-term influence (Mathur & Schoenfeld, 2010). Academic performance was an extremely important predictor of delinquency and recidivism (Maquin & Loeber, 1996). An extensive study of the academic characteristics of juvenile delinquents found that these students had a low to average range of intellectual functioning and significant delays in mathematics and reading according to a national survey (Quinn, Rutherford, Leone, Osher, & Poirier, 2005).

Mathematics is crucial in our lives and is almost involved in every profession. Therefore, mathematics was a common component in aptitude testing (Maccini, Gagnon, Mulcahy, & Leon, 2006). This is why it was such a common feature in skills inventory testing. There are two distinct levels of numerical tests: numeracy tests and numerical

reasoning tests. In addition to students' math skills being measured; students' verbal reasoning skills are also essential to literacy.

The verbal comprehension test was a language-based inventory created to determine how well students can read and interpret text or apply common-sense reasoning to text-based conundrums. Verbal testing in most instances was in the form of text analysis and linguistically based questions. The inventory structure focused on students' knowledge in areas such as spelling, grammar, sentence structure and the general ability to use language proficiently.

A teaching strategy known as trauma-informed teaching was utilized because it consists of working with students in an effort to help them focus on the present. The majority of detention center students entered with varying levels of knowledge and skills. The zenith achieved irrespective of academic knowledge was through trauma informed teaching which helped to minimize external interruptions. Prior to the 2016-17 school year at the investigator's school of this study, teachers did not introduce students to trauma informed teaching, only the current school year students. The metrics was examined from students who received the trauma informed teaching component compared to the prior year students who did not receive trauma informed teaching.

Background

Prior to the 19th century courts treated children who committed crimes in the United States the same as adults who committed crimes. The judicial system was not designed to administer justice to children differently than adults. It wasn't until 1825 when the treatment of children began to change with respect to the judicial system (Lagasse, 2017). Judicial reformers opened the first New York House of Refuge

(Overview, n.d.). The idea behind the house was to create a place separate from adults where children who have committed crimes could reside in hopes of redirecting their behavior to circumvent future encounters with the judicial system. Rehabilitation was the main goal in mind for juvenile delinquents at the House of Refuge.

The institutionalization of juvenile incarceration had been around for over one hundred years. The effectiveness of juvenile incarceration was in doubt during the investigator's study. The public's concern of secure confinement to resolve issues of juvenile delinquency was an utmost concern (Abrams, Anderson-Nathe, 2012). Students acted out in classrooms throughout the country because many of them had been exposed to traumatizing events that affected their lives. Traumatized detention center students with hazardous behaviors exhibited educational and safety challenges to the judicial system (Smithgall, Cusick, & Griffin, 2013). The exercise of educational techniques and skills in the classroom was essential to contrast differences in the pre- and post-basic aptitude skills inventory. Educators interceded with trauma-informed teaching techniques that could help juvenile detention center students cope with traumatizing events better and ultimately led to fewer future run-ins with the judicial system. Child-service providers identified traumatic stress as one of the most important common themes that juveniles have in common and teachers taught skills and strategies to respond to traumatic experiences (Donisch, Bray, & Gewirtz, 2016). The investigator compared data from students who instructors taught how to cope with stress and traumatic events to date from students who did not receive training on how to cope with stress and traumatic events. The investigator strived to determine if there was a significant difference between the two types of students.

Purpose of Study

The primary concern of the research was to determine correlations associated with students' math and reading comprehension scores as they related to students' rates of recidivism. The application was associated with a specific teaching method utilized in Trauma Informed Teaching (Day, 2015). Educators suspected that the lower a student's comprehension level the greater the rate of recidivism. The illumination of more data-specific outcomes regarding possible rates of recidivism and achievement associated with varying levels of math and reading comprehension applied to the teaching method of Trauma Informed Teaching and was analyzed. The Investigator wanted to determine if XYZ Detention Center Juveniles who have lower mathematical and reading skills and abilities experienced higher rates of recidivism, than their counterparts, who have higher levels of mathematical and reading skills with lower rates of recidivism.

Rationale

Educators needed to take the necessary measures, when opportunities existed, to make a difference in students' lives. It was important to determine if the Trauma Informed Teaching method was making a difference in students' comprehension levels in reading and math. If the investigator found differences that revealed growth within the scores of the students who do participate in the Trauma Informed lessons, research suggested the rate of recidivism would decline. Additional studies would be warranted to determine whether the decrease was related to the Trauma Informed Teaching strategies. It would be possible to analyze the scores of students whose data was in both categories due to already being a student with at least 1-year prior involvement in the Juvenile detention center and then participated in the Trauma Informed Instruction. The

Investigator strived to determine if the changes related to the independent variable (participation in the Mindful Moments exit ticket evaluation).

Few studies addressed the practice of how increasing students' mathematical comprehension at the elementary school level lowered the rate of recidivism in metropolitan school districts. The Investigator's study allowed researchers to investigate the research-based outcome and the impact the study had on its' student population groups. The study allowed for future research to aid current and future educators to replicate the methods utilized in the Investigator's study to determine results in lowering rates of recidivism.

Research Questions and Hypotheses

The Investigator designed the study to investigate relationships in the increase of achievement scores of mathematics and reading skills and abilities.

Research Question 1

Is there a significant difference in the BASI achievement scores in math and reading skills and abilities based on rates of recidivism at XYZ Detention Center?

Hypothesis 1

Students who have less recidivism at XYZ Detention Center have higher BASI Math scores than students who have more recidivism at XYZ Detention Center.

Hypothesis 2

Students who have less recidivism at XYZ Detention Center have higher BASI Reading scores than students who have more recidivism at XYZ Detention Center.

Research Question 2

What is the difference between BASI math and reading scores and recidivism rates at XYZ Detention Center of students who have had daily mindfulness training?

Hypothesis 3

Students who have daily mindfulness training will have a higher increase in BASI math scores than students who have not had Mindfulness Training.

Hypothesis 4

Students who have daily mindfulness lessons will have a higher increase in BASI reading scores than students who have not had daily mindfulness lessons.

Research Question 3

What is the relationship between math and reading achievement scores of students who had daily mindfulness training and their ability to assess their learning?

Hypothesis 5

Students at XYZ Detention Center who had daily mindfulness lessons have an accurate perception of their BASI math achievement from the 2016-2017 school year.

Hypothesis 6

There is no relationship between actual BASI reading scores of students who have had daily mindfulness training and students' perception of achievement from the school year 2016-2017 at XYZ Detention Center.

Independent variable

Students who had trauma informed teaching sessions through Trauma-Informed instruction using Mindfulness activities.

Dependent variable

Students who did not have the trauma informed teaching sessions through Trauma-Informed instruction using Mindfulness activities.

Definition of Terms

Collaborative learning. Collaborative Learning is an educational approach to teaching and learning that involves groups of learners working together to solve a problem, complete a task, or create a product. (Laal & Laal, 2012)

Detention center juvenile. Students between the ages of 12 – 17 years of age that are placed in the detention center in the proposed study.

Direct individualized instruction. The explicit teaching of a skill-set using lectures or demonstrations of the material, rather than exploratory models such as inquiry-based learning (Glavin, 2014)

Least Squares Prediction Equation. One can estimate a linear model relating two variables. The process treats the two variables in a linear function as unknown parameters and yields estimates of these parameters according to statistical methods described by Agresti and Finley (1997)

Mindful Moments. The practice involves bringing your mind's attention to the present without drifting into concerns about the past or future. Many people practice it hoping to stave off stress and stress-related health problems. (Komaroff, n.d.)

Recidivism. A person's recurrence into criminal behavior, generally after the person undergoes intervention for a previous crime (NIJ, 2015).

Recidivism correlation studies. For purposes of this study the Primary Investigator will determine the relationship between mathematics and reading

comprehension and rates of recidivism according to statistical methods described by (Hendricks, Kauffman, 2014).

Student self-assessment. A process by which (1) students themselves monitor and judge the quality of their own performance and their learning habits and (2) students identify gaps in their understanding and skills and purpose ways to fill those gaps (McMillan, Hearn, 2008).

Trauma informed focus lessons. Lessons implemented in the classroom consisting of bringing one's attention to experiences occurring in the present moment, which are developed through the practice of meditation and mindfulness of the present.

Trauma informed teaching. Trauma is an exceptional experience in which powerful and dangerous events overwhelm a person's capacity to cope. In addition to the emotional impact of trauma, research now shows that trauma changes children's brains are wired (Kiebel, 2017). For purposes of this study Trauma Informed teaching includes exercises that utilized Mindful Moments exercises.

XYZ Detention Center. In order to remain in compliance with confidentiality laws and policies, the name XYZ Detention Center will be used as the research site name.

Research Perspective

The Investigator chose a quantitative research method for the study. The Investigator believed that this type of methodology was a good fit for the analysis of differences and similarities relating recidivism, juveniles, trauma, mathematics and reading. Juvenile delinquency was a growing concern in communities and the investigator determined there was is a myriad of pitfalls that school-age kids preyed victim to. The researcher believed that to lessen their vulnerability, researchers needed to

increase the focus on long-term objectives to reduces the number of juveniles who return to the juvenile justice system.

Limitations

Predictions based on a student's basic aptitude skills inventory scores determined whether were more likely to recidivate or less likely to recidivate. Recidivism occurred as a consequence of a juvenile's drug addiction, family home structure, education, and many other factors. The study's limitations had a sizeable impact on the rate of recidivism and prediction factors. Within the study, some detention center students who took the skills inventory had little or no interest in the outcome. Some students marked any answer without ever reading the question or problem. The majority of students tested with sincerity and integrity, which helped decrease, otherwise noted limitations.

Summary

Courts dealt with Detention center juveniles who participated in crimes as minors by using identified procedures that led to juvenile courts and juvenile detention centers for measures related to crimes committed under a certain age. According to Wang, Blomberg, and Li (2005) documentation existed which characterized delinquent students as students who experienced a series of disproportionate educational deficiencies. Justice-involved juveniles find themselves at risk for drug abuse and academic deficiencies. National results demonstrated that justice-involved juveniles reported high rates of trauma exposure and this trauma generally started early (Dierkhising, et al., 2013). Upon enrollment in detention center classes, the instructor exposed students to trauma informed teaching. The juvenile educators centered Trauma informed educational practices around safety in the classroom. Juvenile educators used the five tenants of

trauma informed teaching, ensuring safety, trustworthiness, choice, maximum collaboration, and prioritizing empowerment which helps to improve test scores because it improved a student's ability to focus.

Chapter Two: Review of Literature

The review of the literature consisted of a historical review of juvenile detention centers followed by an examination of publications that focused on various types of trauma that affect rates of recidivism among detention center juveniles. Following the examination of the effects of trauma on rates of recidivism, the literature review focused on mental health issues among detained adolescents relating to psychopathic traits and relative offender characteristics. The Investigator provided a detailed discussion on the effectiveness of academic programs and achievement that help to substantiate a reduction in rates of recidivism. An examination of issues which dealt with health, family, gender, drugs, and sports helped to accentuate core components of recidivism rates which have been decreasing over the past decade.

Juvenile Detention

Juvenile reform occurred before the implementation of juvenile courts. New York created the first juvenile reformatory established under the name, "New York House of Refuge." The New York House of Refuge was an initial movement that ultimately led to the juvenile justice system (Pisciotta, 1985). The quantity, diversity, and intricacy of conjectures established to explain criminality among juveniles substantiate the difficulty and enormity of the problem. There exist no one theory that satisfactorily explains youth crime (Lawrence, 2007). There is no single etiology of delinquency in juvenile behavior. The high prevalence of exposure to traumatic events among incarcerated youth, prior to detention, often has a cumulative impact and can lead youth to become triggered by many aspects of the detention experience (Dierkhising et al., 2013).

Trauma-Informed Approaches

According to the Federal Bureau of Investigation (2014), criminal wrongdoing among black youth dropped drastically. This drop included violent crimes, burglary, and drug infractions (Federal Bureau of Investigation, 2014). Despite the reduction in delinquency and incarceration, minority juveniles faced housing placement at remarkably greater rates compared to their white counterparts. According to Crosby (2016), minority youth represent an increasing percentage in the adolescent judicial system. Minority juveniles encounter housing assignment at excessively higher percentages than their corresponding equals (Crosby, 2016). A larger percentage of juveniles of color is typical in the adolescent judicial system (Lawrence, Hesse, 2010). More than 62% of juveniles arrested or put in residential placement are of African American origin. (Sickmund, Sladky, Kang, & Puzanchera, 2013). African American Youth are nearly five times likely to be detained. Latino and native American Indian juveniles are more than twice as likely to be assigned in an adolescent residential placement. Juveniles of color experience unequal justice contact and recidivism (Crosby, 2016).

Race Theory

Critical race theory is a construction for analyzing the connections between supremacy, race, bigotry, and subjugation to advance positive social change (Delgado & Stefancic, 2001). Critical race theory Delgado and Stefancic (2001) is "a collection of activists and scholars interested in studying and transforming the relationship among race, racism, and power" (p. 2). Crosby (2016) suggests that "racism is interpreted as a systematically inescapable matter, versus a random social event" (p. 7). An additionally significant element explained by Crosby included a framework that incorporates the idea

of intersectionality. For example, minority juveniles have multiple identities such as race, gender, and religion that overlap with and skirmish against one another. Thus, attempts to bring to light the role of racism and oppression must take into consideration intersectionality, as it relates to the knowledge of various pathways for which a system of subservience converges.

Police Interaction

Harsh interactions between law enforcement officials and youth in most cases is the initial interaction, and this interaction sets an undesirable tone for lack of trustworthiness and social sensitivity (Geistman & Smith, 2007). According to Lawerence and Hess (2010), adverse interactions between law enforcement officials and adolescents lead to feelings of prejudicial treatment, which help to maintain reckless behavior (Lawrence & Hesse, 2010). Law enforcement has a great deal of latitude as to how they execute their duties (Maanen, 2006). The current law used to decide when officers can employ deadly force provides police with great flexibility while making impromptu life or death decisions. The U.S. Supreme Court established that a patrolman who believes a suspect who presents a danger of significant harm to the officer or others can utilize deadly force to thwart escape (Tennessee v. Garner, 471 U.S. 1(1985). Interactions police have with young black males vary tremendously from neighborhood to neighborhood. Operations such as the Black Lives Matter organization have grown as advocates for fair policing practices, and to put an end to police harshness against males of color (Black Lives Matter, 2015, Liberman & Fontaine, 2015). "Unfair law enforcement practices lead to behavioral and emotional trauma reactions.", (Crosby, 2016, p. 9).

Court Interaction

Juvenile interactions with the judicial system can have a great impact on their future. According to Howard and Tener (2008), decisions concerning out-of-home residency, psychoanalytic therapy methods, which do not take into consideration adolescent culture and traumatic backgrounds, do not get full consideration during adjudication (Howard & Tener, 2008). According to Crosby (2016), juvenile courts with delinquency jurisdiction dealt with cases in which prosecutors charged juveniles with acts that courts considered crimes if adults had committed them (p. 9). According to Crosby (2016), the Transfer Law affected juveniles of color because the practice, most often, did not take into consideration the fundamental differences between adolescent and adult psychosocial development (Crosby, 2016). Overwhelming differences in cognitive development, reasoning, and impulse-control existed between grownups and adolescents (Lawrence & Hess, 2010). Research indicated that transfer laws had been ineffective (Redding, 2008). For example, on a national scale, the procedural shift relating to the transfer of delinquents to criminal court was centered on the idea that more harsh corrective adult sanctions would deter immature crime (Redding, 2008). Several research studies uncovered higher rates of recidivism among adolescents imprisoned for brutal offenses in criminal court as contrasted with comparable adolescents tried in juvenile court. "Transfer laws produced little or no general deterrent effect" (Redding, 2008, p. 2).

Detainment

Adolescents housed in correctional institutions created parental emotional concerns related to their child's physical safety (Lawrence & Hess, 2010). The act of

detainment functioned in opposition to the idea of treating and rehabilitating adolescent juveniles. Additionally, a few correctional facilities remained insensitive to the mental health concerns of minority juveniles (Snyder & Sickmund, 2006). Research determined that increased rates of detention may amount to more crime as the imprisonment of delinquent juveniles has not been more successful than civic corrections (Lyon, 2003). Trauma as a direct consequence of incarceration increased and amplified bad behavior as juveniles grappled with the disturbing impact of incarceration. Some youth detention facilities remained insensitive to the psychosocial needs of the minority adolescent population, and possibly intensified the condition of their emotional health (Neely-Barnes & Whitted, 2011).

Aftercare

Programs designed to assist juveniles after release from detention had demonstrated temporary effects on ensuing juvenile behavior and recidivism (James, Stams, Asscher, De Roo, & Van Der Laan, 2013). Literature has pointed out the significance of ethnic understanding (Snyder & Anderson, 2009). The presence of professionals of color while offering rehabilitative services to youth of color could have an enormous impact (Williams, 1992). According to Crosby (2016), "Many juveniles of color feel that their way of life is constantly subjected to condemnation by the Anglo-American system" (p. 11). According to Snyder & Anderson (2009), the emphasis in research demonstrated the significance of ethnic understanding and the presence of professionals of color when delivering restorative services to cultural minority inhabitants.

Turmoil associated with juvenile behavior exemplified patterns of irresponsible and antisocial activities, which included juvenile delinquency for which there was an enormous cost to the surrounding communities (Greenwald, 2014). According to Greenwald (2014), the awareness of risk factors associated with behavior disorders consisted of temperament, low intelligence, impulsivity, and affiliation with ordinary peers. Krystal (1978) defined trauma as an occurrence in which an adolescent encountered horror, terror, pain, in addition to helplessness (Krystal, 1978). Examples of such experiences included physical and/or sexual assault and observing violence (Krystal, 1978).

Effects of Trauma

Only some trauma experiences led to post-traumatic stress effects. Such effects normally varied widely in seriousness (Greenwald, 2014). Many factors, such as, an individual's disposition, personality style, the severity of an experience, the frequency of an experience, and post-trauma environmental influences determined how juveniles recovered from psychological trauma (Fletcher, 1996).

According to Greenwald (2014), trauma could be scary, horrific, upsetting, and unbearable. Greenwald (2014) explained that the destructive nature of the painful experience could lead to a malfunction to get over the memory. Components of the frightened memory could impose restrictions on the victim until the memory goes through the usual processing system (Greenwald, 2014). Those who worked with victims of trauma should interpret trauma as a violation of a victim's sense of security and belief about their environment as a protected place. Traumatic experiences could impact the victim from a content posture to a distrustful posture (Greenwald, 2014).

Although most Americans will go through at least one traumatic experience before 18 years of age, trauma excessively affected those involved in the juvenile penal system. Amassed evidence pointed to childhood trauma exposure as a possible risk factor for later involvement in the juvenile justice system (Branson, 2017). Research suggested that children under the age of 18 had vulnerabilities to future involvement with the judicial system, but those individuals with histories of exposure to trauma and Posttraumatic Stress Disorder (PTSD) had increased levels of recidivism, school dropout rates, and attempts of suicide (Kerig & Becker, 2010). Juveniles may have dealt with traumatic stress in ways that escalated the probability of arrest, including running away, using drugs, and possessing a weapon (DeHart & Moran, 2015). Possible sources of trauma in our judicial system consisted of unfair police practices such as "Stop and Frisk," cruel actions taken by correctional staff, and elevated rates of sexual abuse in juvenile justice institutions (Dierkhising, Lane & Natsuaki, 2014). A study of juveniles who recently exited a detention center experienced exposure to ill-treatment while serving time was positively connected with post-released unlawful behavior and PTSD symptoms (Dierkhising et al., 2014).

A past account of adolescent abuse was a strong predictor of future involvement in the adolescent justice system (Kerig & Becker, 2010). Juveniles recently entangled in the judicial system had recounted excessive rates of lifetime experiences of physical mistreatment (39.9%), neglect (30.1%), and sexual abuse (24.3%) (Dierkhising et al., 2013). The Survey of Youth in Residential Placement (SYRP) released in 2010, included a sample of 7,073 juveniles who researchers interviewed (Sedlock & McPherson, 2010). More than one-third indicated spending time in solitary confinement, and more than 50%

of this group exceeded 24 hours in solitaire (Sedlak & McPherson, 2010). An extended stay in isolated confinement was a disheartened practice; research suggested there was a direct correlation with suicide during confinement (Hayes, 2009).

Additional researchers examined numerous studies and countless reports involving thousands of cases of adjudicated juvenile sexual delinquents (Aylwin, Reddon, Burke, 2005; Kahn, & Lafond, 1988; Perry & Orchard, 1992). Caldwell's (2016) research examined reports between 1938 and 2014 (Caldwell, 2016). The studies conducted between 2000 and 2015 conveyed a weighted average sexual recidivism rate of 2.75%; lower than the rate of 10.30% conveyed by studies carried-out between 1980 and 1995 (Caldwell, 2016).

Abram et al., (2004) calculated that approximately 75 % of confined juveniles had encountered at least one traumatic incident (Abram, et al., 2004). Incarceration was meant to offer security and protection for our community in addition to a suitable sentence for juvenile criminals (Pickens, 2016). Hirschfield (2008) found that school disciplinary practices aid to the adolescent entry in the juvenile justice system. Hirschfield's (2016) research suggested that these outcomes represented criminal normative adolescent behavior (Hirschfield, 2008).

Researchers had named other factors associated with adolescent incarceration, including dad absenteeism, parental confinement, lack of education, and family dysfunction, which impacted adolescents and possibly had an effect on court decisions to support secure placement instead of alternative housing (Kjellstrand Eddy, 2011). The research found that a preponderance of parents with a past account of incarceration possessed a high school education or less. A few of the parents (5.4%), had

college degrees. Seventy-five percent of the families had incomes less than $30,000/year. The research found no remarkable differences among families with and without past accounts of incarceration concerning family size.

Researchers had provided empirical evidence that suggested incarcerated individuals demonstrated intense reactions to apparent fears during gatherings, which reinforced a heightened sense of vulnerability. According to Pickens (2016), youth responses to potential threats represented an effort to sustain a sense of physical and psychological safety (Pickens, 2016). Addressing juvenile responses to traumatic experiences required a solid understanding of the six distinct types of trauma that both juveniles and staff possibly experience. The vibrant nature of juvenile and staff interactions can reveal system protocols which could further traumatize juveniles. Chronic trauma in adolescents points to physical reaction anxiety driven by an overactivated nervous system associated with intensive numbing (Van der Kolk, MacFarlane, Weiseath, 1996).

Management of juvenile behavior while in detention has taken a toll on workers. Workers who believe they are ill-equipped to deal with such behavior are most affected by stress (Pickens, 2016). Pickens found that adolescent traumatic pressure and common behavioral dysregulation could significantly disrupt workforce self-care and inner-relationships with fellow coworkers and others (Pickens, 2016, pp. 222) According to researchers Metcalfe, Pickett, and Mancini (2015,) Juveniles confined to detention centers historically have are deemed as “bad kids” who only react positively to harsh directives dispensed by capable staff. A study by Wilson (2016) explained that staff sometimes excessively rely on disciplinary measures when there is no alternative

justification for juvenile behavior. When ample organizational provisions are lacking for professional self-care, the impact of vicarious trauma creates an environment abound with dissatisfied workers, poor job attendance, and increased resignations (Wilson, 2016).

Core Elements

Many resources are accessible for trauma-informed preparations utilized by juvenile justice staff. Two common methodologies included creating a universal model for trauma-informed exercises and finding a suitable training program (Elwyn, Esaki, & Smith, 2015). A well-established example of deploying a universal model for creating trauma-informed practices was Sanctuary, a change model which focused on changing organizational beliefs via seven principles of diplomacy, emotional brainpower, inquiry learning, social accountability, and change of workplace practices (Bloom, 2013). The Sanctuary Model had demonstrated success as evidenced by statements of enhanced safety and fewer incidents (Elwyn, Esaki, & Smith, 2015).

An issue that surfaced when creating a trauma-informed language was an apparent contradiction to the most important aims of juvenile justice. Juveniles casted off to detention centers for rehabilitation, and the use of punitive measures had worked in the past to deter criminal behavior. Trauma-informed practices remained less abrasive and if not applied correctly could deter the rehabilitation process (Merlo & Benekos, 2010). A popular tactic that brought together staff in a diffusion of content supported early buy-in and cushioned ethnic norms that opposed assimilation of trauma-informed procedures (Donisch, Bray, & Gewirtz, 2016). Trauma-informed training offered chances to oppose punitive approaches and better understand the elements that drive undesirable behavior.

A trauma-informed organization reinforced the notion that staff health and safety are important concerns.

Proof-based healing solutions had been developed to target the needs of juveniles and engage staff right away. Therapeutic, educational assets for staff consisted of an essential guide, Trauma Affect Regulation: Guide for Education and Therapy (TARGET), which represented a well-known intervention designed to assist staff members (Ford, Hawke, 2012). Trauma and Grief Components Therapy for Adolescents (TGCTA) signified another research-based group intervention which involved collectively sharing traumatic encounters and acquired the knowledge of adaptive functioning and its relationship to future goals. TGCTA had demonstrated a reduction in PTSD symptoms and despair (Layne et al., 2008).

The effects of trauma on detention center workers due to creating a detailed trauma-informed approach was noticeable; many staff members missed work on a regular basis and others sought medical attention with their doctor. The workforce team's exposure to brawls, extreme traumatic stress effect on juveniles, or an environment that did not promote the safety of employees which could deplete the energy resources of everyone. Family Courts that were trauma-informed can help with the identification of youth who need trauma-informed services. Courts can improve community awareness concerning trauma-related services. When family court judges make decisions, they have the latest information concerning a juvenile but, not necessarily everything about the juvenile's personal history (Howard, Tener, 2008). Some judges now know additional factors concerning juveniles' personal histories and experiences at home and outside the

home. Judicial decision-making adjusted to include the results of the UCLA PTSD Index number (Howard, Tener, 2008).

According to MacArthur (2015), the establishment of the facts relating to violence exposure can curtail a child's basic cognitive functioning which is essential for healthy development (MacArthur, 2015). Trauma, unidentified and not treated, puts juveniles at extensively greater risk than their counterparts for outcomes such as depressive disorders, drug abuse, and dangerous sexual activity. These disorders can continue well after childhood. They can have an enormous effect on adult health and productivity (Sickmund, 2016). "Traumatic violence can postpone brain development, leaving the most resilient youth vulnerable to brain damage. Sickmund explains science has revealed that the growing brain, in early childhood and throughout the teenage years, is extremely susceptible to punitive and harsh conditions. Investigations on brain development within the last twenty years has demonstrated that the areas of the brain in charge of reasoning are not entirely developed (MacArthur, 2015).

Trauma can postpone or disturb cognitive development, leaving the strongest and smartest child with a weakened capability to restrain powerful impulses to evaluate the effects of socially unacceptable conduct (Sickmund, 2016). Children exposed to violence become distrustful of others and develop a lack of empathy. Consequently, Sickmund explained that children who go through prolonged violence adjust by focusing on survival (Sickmund, 2016).

The pre- and post- stages of court judication required assessments of amenability to psychosocial healing (Melton, Petrila, Poythress, & Slobogin, 2007). Assessments in the pre-stage part of the hearing are asked for by either the judge or prosecutor in order to

decide whether a case is presented in juvenile or adult court. States which consented to courts trying juveniles in adult courts also stipulated that a backup system is in place to return a juvenile to the juvenile courts when appropriate. The backup system most courts had in place was the evaluation of a juvenile by a psychologist and the number of previous criminal offenses the juvenile had. The most important backup system was the nature of the crime committed. This process was known as decertification or reverse waiver (Melton et al., 2007). Transfer decisions had centered around factors that forecast judges' decisions to move cases to criminal court (Jordan & Myers, 2007). The gravity of the crime and existence of a criminal record appeared to be the greatest predictors of transfer to criminal court (Jordan & Myers, 2007). The research proposed that judges theorized factors observed in Kent v. United States, life-experience, and responsiveness to treatment and predictably recounted these three concepts as essential in considering decisions to move juveniles to criminal court (Salekin, Yff, Neumann, Leistico, & Zalot, 2002).

Criminals who suffered from trauma recounted more mental stress than criminals who did not suffer from trauma which suggested a need for evaluation and therapy (Cuevas, Finkelhor, Turner, & Ormrod, 2007). Buka, Stichick, Birdthistle, and Earls (2001) linked hostile aggression with heightened Post-Traumatic Stress Disorder (PTSD) symptoms comprised of sleep disturbance, more likelihood of possessing weapons, drugs, and experiencing increased trouble in school (Buka et al., 2001). Information related to the undesirable effects of Potentially Related Experiences (PTEs) indicated that recommendations concerning the need to have trauma therapy is essential. Various types

of PTEs and traumatic occurrences link to antisocial behaviors, and criminal youth who have accounts of violent mistreatment are prone to recidivate (Ryan, 2006).

Juveniles with traumatic occurrences are statistically likely to have engaged in marijuana use than juveniles with no occurrence of trauma (Romaine, Goldstein, Hunt, & DeMatteo, 2011). The data agreed with earlier research indicating that environmental factors could influence any association with delinquency and trauma (Maschi & Bradley, 2008). Research has shown that juveniles clearly exposed to hostile events possess more grim symptoms than juveniles subjected to violence vicariously (Fitzpatrick, 1993).

The courts will eventually handle the decision concerning how stressful experiences are interpreted, concerning amenability. According to Romaine et al. (2011), scientific research will help to inform judicial decision-making by assessing the effects of trauma-related interventions on reoffending juveniles (Romaine et al., 2011). If consistent observations reveal a reduction of criminal behavior as a result of treatment, assessment of trauma-related incidents could become vital to amenability appraisals (Romaine et al., 2011). The consequences of this study are consistent with earlier research indicating juveniles who have felt the effects of PTEs have distinct treatment requirements (Romaine et al., 2011). Juveniles who have suffered from PTEs are prone to have psychological issues related to crime and recidivism (Romaine et al., 2011). Juvenile delinquency rates have risen such that researchers interpret the rates as mathematically normal (Centers for Disease Control and Prevention, 2010). Up to 40% of juvenile males were most likely to be incarcerated before age 18 (Cebulla, 2016). There is an insatiable desire to understand and handle delinquency using an inclusive approach, tackling, and distinguishing factors that further influence criminal behavior and

recidivism (Cebulla, 2016). Comprehending commons factors between neurocognitive deficits, traumatic brain injury, and executive dysfunction can yield significant information regarding the type of screening methods necessary to offset future engagement with the judicial system. Many juvenile delinquents experience traumatic brain injuries, which further complicates treatment while in detention facilities. The majority of these juveniles will continue to have problems upon returning to their community. In this setting, it is noteworthy to examine whether traumatic brain injury and neurocognitive discrepancies are related to patterns of recidivism. Incarcerated youths consistently have complications upon returning to their family and community.

It is essential to explore whether traumatic brain injury and neurocognitive deficits might be a starting point for a more effective remedy for the reduction in juvenile incarceration (Cebulla, 2016). Damage to the brain as a consequence of a mechanical blow which triggers an acceleration or deceleration of the brain is considered a Traumatic Brain Injury (TBI). Most traumatic brain injuries in juveniles are consequences of closed head injury (Lezak, 2013).

Damage to the brain leads to socially developmental and neurocognitive injuries. The seriousness of the injuries hinge upon many factors, for example, age, the location of a wound, and the severity of the injury (Grant, Lange, 2011). Existing research points out that the growing brain is exceptionally predisposed to brain trauma sustained throughout juvenile (Anderson & Yeates, 2014), A more recent clinical study demonstrates neuropsychological proof of physical and metabolic disruptions as a consequence of traumatic brain injury (Bigler, 2016). Additional studies existed, which denoted that some juveniles recuperate from injury inside 12 months with no significant

impairment. An additional significant feature of traumatic brain injury in juveniles is the time difference between traumatic brain injury and skill deficit. Early damage to a developing brain impairs higher executive functions. Therefore, shortfalls in these areas of upper processes and integration impact adolescents later when these functions develop. Shortfalls in social and academic functioning can generate complications over time (Cebulla, 2016).

The gravity of traumatic brain injuries associates with the degree of neuropsychological and social damage (Lezak, 2013). A widely used classification, the Glasgow Coma Scale (GCS), categorized the severity of traumatic brain injury based on the amount of time the patient experiences unconsciousness and posttraumatic amnesia (Jennett & Bond, 1975). A mildly closed head traumatic brain injury with perception deficits can have an extensive psychological impact on attention, memory, and rate of information managing. Differences in personality may also be detected. The changes in character and disposition generate difficulties for successful therapy after mild traumatic brain injuries. Several research reviews demonstrate a uniform pattern of behaviors such as argumentativeness, an absence of concern for penalties based on behavior, and violence (Yudofsky, MacKinnon, 2010). Therefore, juveniles who experience head injuries are at higher risk of involvement with the judicial system. An escalation in irritability and violence implies a likely connection with vicious offending. The lack of self-consciousness and precaution could connect to an increased risk of violent behavior (Raine, 2013). Neuropsychological reviews of nonviolent adolescents indicate a wide-range of neurocognitive shortfalls across most studies. Some reviews have shown unique deficits in executive functions (Veneziano, Veneziano, LeGrand, & Richards, 2004), for

instance, poor impulse control, problems learning from earlier experiences, and anticipation of consequences (Miller, 1988). Furthermore, research demonstrates an intense link between rebellious behaviors and weak executive functions (Brunton, Hartley, 2013).

Adolescents entangled in the criminal justice system have greater rates of trauma exposure than in the general population (Schufelt, & Cocozza, 2006). Ninety-two percent of juveniles involved with the law recounted at least one type of trauma, and exposure to additional traumas was the standard (Abram, et al., 2004). In addition to the elevated rates of trauma exposure, numerous prominent studies have centered their attention on the enhancement of PTSD. Varying levels of PTSD are between 3 and 50% of confined juveniles (Ford, Chapman, Hawker, Albert, 2007). A report comparing 96 girls and 93 boys discovered that half of the girls met standards for PTSD compared to about one-third of the boys. Another study selected juveniles in detention and found that 11% of boys and 15% of girls met the standards for PTSD (Abram, et al., 2004). The inconsistencies among the different rates have associations with regional variations among study participants, the utilization of different assessment tools, and the time of day the testing took place during judicial processing (Wolpaw & Ford, 2004). Juveniles who suffer from trauma early in life are more likely to experience different types of trauma later on in life (Finkelhor, Ormrod, & Turner, 2007).

According to Patterson, parenting difficulties, behavior issues, and academic failure at an early age is connected with more long-term delinquency (Patterson, DeBaryshe, Ramsey, 1989). Adolescents who begin their criminal careers at a young age rather than at an older age become long-term criminal offenders (Moffitt, 1993). Seven

out of ten criminal juveniles met standards for one or more mental health illnesses. In addition, about eight of every ten met standards for two or more disorders (Schufelt & Cocozza, 2006). The most prevalent conditions were disorderly conditions, drug abuse conditions, and disposition disorders. Juveniles involved with the judicial system share similar characteristics such as substance abuse setbacks, academic issues, and coexisting child welfare participation. For Example, 80 % of 2.4 million youth arrested in 2000 were incarcerated on a drug-related issue (National Center on Addiction and Substance Abuse, 2004). An inadequate academic record links directly to increased criminal involvement (Maguin & Loeber, 1996). Most juveniles discontinue their schooling once released from a juvenile detention center (Buffington, Dierkhising & Marsh, 2010). Furthermore, about 42 % of adolescents in the criminal justice system are crossover juveniles, youth who are entangled in the child welfare and criminal justice system (Herz, Ryan, & Bilchick, 2010). These risk factors are connected with PTSD and trauma exposure. Very little is known about the connections associated with these risk factors and justice-involved juveniles (Dierkhising, et al., 2013).

Mental Health Needs in Residential Juvenile Justice Programs Barriers

Juvenile detentions have not had success with best practices tackling the demands of incarcerated juveniles (Grisso, 2007). Detention centers have maintained three important goals of increasing safety, improving justice, and avoiding recidivism. Many juveniles in detention have severe mental health issues (Teplin, Welty, Abram, Dulcan & Washburn, 2002). Another goal has surfaced: tackling issues relating to mental health (Steinberg, 2009). Although efforts to promote communication among mental health and detention center leaders, many variables have blocked the development of mental

health plans (Gallagher & Dobrin, 2007). Financial backing for mental health provisions is more developed in the juvenile justice system versus in the community (Pottick, et al., 2008). About one in three adolescents are acknowledged by juvenile probation as needing mental health services (Wasserman et al., 2008). The significance of giving treatment to juveniles in need is highlighted by findings that, after five years of being evaluated in detention, 40% of males and 30% of females continued to have a substance abuse disorder (Teplin et al., 2012).

Juvenile detention residential facilities seem to deliver more comprehensive services, but seldom have employees with professional mental health schooling or substance abuse training (Grisso, 2007). Only a minimal number of juvenile justice residential facilities gain accreditation from the National Commission on Correctional Health Care (Gallagher & Dobrin, 2007). Detention programs connected to behavioral health care providers are more prone to providing evidence-based services, but this is not a reflection of the norm (Henderson et al. 2007). Adolescents in detention and their guardians also account for attitudes and rational barriers which reduce their willingness and ability to take advantage of behavioral health services (Ford & Blaustein, 2013). Guardians of detention center juveniles described feeling a great deal of disparity that lessened their self-assurance to pursue mental health assistance for their loved one. Some parents refused to characterize their child as having a mental health illness (Watson, Kelly & Vidalon, 2009). Adolescents in detention centers refer to violence and ill-treatment as inescapable in their lives and connect it with severe mental health and substance abuse (Douglas & Plugge, 2008). Psychological and drug abuse issues can be damaging to the well-being of juveniles (Steinberg, 2009).

Post-traumatic Dysregulation

Relevance to Residential Juvenile Justice Programs

Adolescents admit that in detention center programs physical hostility and harassment are widespread and have an alliance with mental health and drug abuse (Douglas & Plugge, 2008). Teplin et al., (2002) approximated that between 6 % to 90% of imprisoned juveniles meet criteria for at least one mental health issue (Drerup, Croysdale, & Hoffman, 2008). One research example by Copeland, Keeler, Angold, and Costello, (2007a) determined the dominance of PTSD in juvenile detention is approximately 15 times higher than in the general population (Copeland, Keeler, Angold, & Costello, 2007a). Biological modifications that incur due to survival are essential for a distressed juvenile's coping skills but, when these skills persist despite being no longer functional, the brain system's function gives in to three self-regulation systems (Thayer, Hansen, Saus-Rose, & Johnson, 2009). The first is the reward/motivation system centered around the middle cortex of the brain and responsible for the release of the neurotransmitter dopamine. The second is the distress/tolerance system centered on the limbic section of the brain, responsible for the release of serotonin and adrenaline. The third is the executive system responsible for emotion centered on the medial and dorsolateral prefrontal cortices in the brain (Ford & Blaustein, 2013).

The Trauma-Impacted Juvenile Justice Facility

Self-regulation is learned socially, through demonstration and corroboration from primary people in a juvenile's surroundings. Particular educational provisions can offer juveniles direction for self-regulation (Ford et al., 2013). These provisions consist of mentoring and tutoring fundamental concepts, skills, and boosting

enthusiasm and hope. The chief source of community knowledge for juveniles in confinement is detention center staff and milieu. Detention centers provide encouragement and model mindfulness to nerve-wracking events which result in an increased capacity for employees to manage the traumatic events when they occur. Also, psychoeducation and proper supervision can help staff to utilize specific skills related to de-escalation tactics.

An agenda for the restoration of confined juveniles is consistent with two current viewpoints that developed as substitutes for punitive reprisal models (Monterosso, 2009). The criminogenic risk model emphasizes distinguishing among attitudes, personal situations, and actions which increase the risk of adolescent crime participation (Andrews, Bonta, & Wormith, 2006). Self-regulation lessens the propensity to promote criminal attitudes and participate in unlawful activities (Frick & White, 2008). The restorative justice model gives emphasizes rectifying the damage to victims and the community assumes accountability and compensation to the community and the victims (Crawford & Newburn, 2003).

Students who lack self-regulation strategies do not have the ability to (1) willfully focus concentration, (2) be mindful of your surroundings and body states; (3) reminisce to ascertain facts from the past; and, (4) preserve an emotional state which offers a candid sense of security. Organizing juvenile detention centers to elicit collaboration and adopt an impartial use of these self-regulation capabilities by detained juveniles is an up-front approach to assist juvenile recovery from complex trauma (Ford et al., 2013). Self-regulation starts with an extended period of attention. Youth who have faced constant worry most of the time have general issues with prolonged attention. Posttraumatic stress

disorder can easily be confused with attention deficit disorder symptoms (Ford, Connor, 2009). An important first step regardless if an adolescent is suffering from ADD and/or PTSD, improving attention centering skills is an essential step in tackling the difficult self-regulation shortfalls of most incarcerated juveniles (Ford et al., 2013).

Children Who Have Been Traumatized: One Court's Response

Family Courts that are trauma-informed can help with the identification of youth who need trauma-informed services. Courts can improve community awareness concerning trauma related services. When family court judges make decisions, they have the latest information concerning a juvenile but, not necessarily everything about the juvenile's personal history. Some judges now have additional factors concerning juveniles' personal histories and experiences at home and outside the home. Judicial decision-making has been adjusted to include the results of the University of California at Los Angeles Post Traumatic Stress Disorder Index (PTSD). The examination is a simple test to distinguish among children with challenging life experiences who are surviving and those whose actions and daily performance is habitually impacted by the outcome of trauma. The use of the UCLA PTSD Index gave the court the opportunity to screen children and also educate their relatives regarding the consequences of trauma and the need for proper therapy intervention.

The court system has begun to look deeper into the histories of children. Courts have been educating themselves about trauma the past several years. It is no longer acceptable to sentence a kid to detention without thoroughly questioning and probing into their history. Researchers questioned children about specific events that stand out in their lives that lead to a feeling of danger and the sense that they must protect themselves.

Many kids have trouble with concentration and attentiveness (Carrion, Weems, & Reiss, 2002).

During the process of trauma screening, researchers Carrion, Weems, and Reiss (2002) discovered that kids with bad dreams and hallucinations led to irresponsible actions. During the day trauma affects their ability to concentrate and direct their attention. Attention-Deficit/Hyperactivity Disorder (ADHD) share many of the same symptoms as most children who suffer from traumatization (Carrion, Weems, & Reiss, 2002).

The compassionate response received from the court gave children a distinct feeling of concern about the status of the trauma in their life (Howard, Tener, 2008). The courts hoped their point of view was handled accordingly, despite the fact that society enforced restrictions and consequences on negative behavior. A common factor of psychiatric illnesses among the juvenile population was estimated to be as high as 85% and less than 50% had been classified (Cunliffe, 1992). Referrals relating to mental health are contingent upon the cooperation and dependability of the juvenile (Zeola, Guina, & Nahhas, 2017). The potential use of skewed information given during initial intake can hinder a juvenile's opportunity to be adequately examined for mental health issues. Standard-specific warning signs may also ignore important psychosocial concerns affecting criminal behavior. Trauma, a result of mental illness, is common among juvenile delinquents. Incurred trauma places them at a much larger risk for recidivism (Moore, Gaskin, & Indig, 2013). The cause of criminal wrongdoing may not be so obvious, in particular, if juveniles are not forthcoming in telling the truth.

Interested researchers should not interpret all unlawful juvenile behavior as conduct disorder or that juveniles displaying conduct disorder will acquire a rebellious personality disorder. About 30% of juveniles with conduct disorder will acquire antisocial personality disorder based on average common factors. Many juveniles acquire mood disorders, and nervousness disorders indicating additional factors involved in juvenile criminal behavior (American Psychiatric Association, 2013). Juveniles who suffer from conduct disorder and oppositional defiant disorder also share disorders with nervousness and depression which indicate comorbidity (Brensilver, Negriff, Mennen, et al., 2011). Criminal adolescents are prone to have problem-solving and societal skill shortages which intensify the possibility of pursuing unsuitable solutions to issues they are incapable of managing (Cunliffe, 1992). Juvenile behavior can be interpreted as externalizing behavior associated with fundamental conflicts and psychological demands. Many mental illnesses besides conduct disorder include externalizing actions; for example, childhood hyperactivity disorder is associated with juvenile behavior (Elander, Simonoff, Pickles, et al, 2000).

There are many studies on mental health interventions for criminal adolescents. The ones that exist seem to concentrate on mental health healing separate from the judicial system and evaluate referral rates minus the process of assessing results (e.g., recidivism) (Rawal, Romansky, Jenuwine, et al., 2004).

The implementation of recordkeeping of sex offender laws is one of a few substantial developments in judicial guidelines in modern time. All fifty states have required sexually related crime registration and announcement laws. During the decade of the 1990's, many states including the federal government ratified laws that demand an

open-ended civil commitment for all sexual wrongdoers upon completion of their adjudicated judgment (National District Attorneys Association, 2012). The reasoning behind such regulations is to keep the public safe from sexual wrongdoers who present a heightened level of danger to the public. Adolescent criminal wrongdoers make up between 15 and 20% of sexual wrongdoing arrests (Federal Bureau of Investigation, 2014a). The common occurrence of sexual criminality among juveniles is lopsided in comparison to other age groups (Caldwell, 2002). While criminal adolescents are strongly represented in sexual wrongdoing arrests, their insertion in such laws was contentious (Chaffin, 2008). The concerns for applying such laws to young, immature criminals are founded on the view of adolescent sexual wrongdoers as a small group who present a fairly low risk of sexual recidivism the older they get. As such, policies relating to sexual offenses among adolescents may have little capacity for creating a huge impact on sexual violence (Batastini, Hunt, Present-Koller, & DeMatteo, 2011). Creating a dependable base rate for criminal adolescent sexual recidivism creates many issues. Public guidelines such as sex offender enrollment, residency limitations affect all adjudicated adolescents.

The creation of a trauma-informed juvenile justice system is a process that requires a shift in thinking at all levels of development. In order to be successful collaboration of common goals between judicial professionals and researchers of traumatic stress must develop goals in relation to trauma-informed practices. Both sides agree that the primary objective is to enhance adolescent well-being. Both sides can accomplish this by reducing behavior which put adolescents at risk with the law.

Reducing recidivism is another goal both sides strive to achieve. Juveniles who strengthen their resilience can reduce recidivism and posttraumatic stress.

The main objectives of detention centers are to increase public safety, lessen rates of recidivism, and make juveniles responsible for their actions. Trauma research and juvenile advocates have shown that aborting traumatizing methods in juvenile justice settings and having effective screening can enhance the work environment and lessen rates of recidivism for juveniles (Kerig, 2013).

Screening

To design trauma-informed juvenile justice organizations practitioners must carry out routine screenings of juveniles for exposure to trauma and post-traumatic stress disorder (Dierkhising, 2016). Juvenile justice organizations practitioners must implement screening to obtained leads to distinctive actions. It is important to note that jurisdictions have to decide the type of information needed as juveniles move through the system (Kerig, 2013). If incoming juveniles have not established a rapport with the intake staff, it may not be required or trauma-informed to have new admittances screened for traumatic disorders. Screening for traumatic stress reactions may be more important early on so that the issues that brought the juvenile in contact with the system initially can be addressed. Those individuals who screen positive for trauma-related injury must be recommended to a trauma-informed specialist for assessment to establish if treatment is necessary.

Assessment

Assessment of juvenile offenders is usually centered on criminogenic risk factors (recidivism) and mental-health needs. Researchers usually interpret criminogenic risk

factors as distinct from mental health needs, but growing evidence has brought to light an overlap of criminogenic risk factors and post-traumatic stress. Evans-Chase (2014) scrutinized linking trauma experience and PTSD with substance use, school problems, uncaring and dispassionate emotional traits is scrutinized. A primary goal would be to have the means to distinguish between assessment tools which could demonstrate that some juveniles have deficits in self-regulation as a consequence of posttraumatic stress rather than criminogenic risk factors. Courts would be inclined to recommend these individuals to a local trauma-informed facility. This facility would be responsible for the promotion of self-regulation skills (Justice Policy Institute, 2010).

Intervention

Services structured to foster recovery from posttraumatic stress lessen symptoms of PTSD that influence juvenile involvement in the juvenile justice system (Black, Woodworth, Tremblay, & Carpenter, 2012). Juveniles involved in criminal offenses at the highest levels are inclined to receive the majority of services. These youths displayed the largest drop in recidivism (Lipsey, 2009). Preparing front-line employees (probation officers, correction officers, and case managers) to provide interventions advances cost-effective approaches for expanding trauma-informed assistance in detention center settings (Ford & Hawke, 2012). Probation officers, correctional officers, and case managers could deal with mild to moderate cases, while juveniles with more grave or complicated trauma concerns would receive treatment intervention or onsite, committed providers in the case of detention (Dierkhising, 2016).

Workforce Development

Instilling trauma-informed procedures require all employees to be knowledgeable of childhood traumatic stress (Dierkhising, 2016). Juvenile justice staff have access to Trauma-informed intervention standards. These standards address education and the effect of traumatic stress exposure on juvenile development. Resources vary from best practice brochures to three-day training events devised to improve front-line staff familiarity and teach specific skills to assist traumatized juveniles (Ford, 2014). Building and sustaining trauma-informed juvenile justice systems required a sturdy empirical base. The construction of such systems can be accomplished via program evaluation, needs assessment and methodological evaluations.

Summary

The establishment of a house of refuge was vital in separating adult prisoners from juveniles. Prior to the establishment of the house of refuge all prisoners, regardless of age, remained confined together and judicated alike. The house of refuge in New York was the first to separate inmates according to age. Courts assigned and placed more than half of the incarcerated juveniles of African American origin within a residential placement (Sickmund et al., 2013). Harsh interactions between law enforcement and juveniles in most cases was the initial contact which promoted a sense of distrust. Many programs designed to help and assist juveniles after being released only demonstrated weak results. Mental health played such an important role in the health and safety of juveniles because it shaped their perceptions of the world around them. Traumatic experiences had been linked to substance abuse which also interfered with rational decision making. There is a wealth of information found within the literature review that

related to the education of detention center juveniles afflicted with traumatizing experiences.

Chapter Three: Research Method and Design

Decreased youth recidivism results in early intervention. Trauma-informed students tend to academically perform better than those without trauma-training. Examining academic achievement using factors such as mindful moment techniques with students appear to better benefit juvenile students in detention.

The purpose of this quantitative study was to examine secondary data of student test scores and analyze relationships about academic achievement and rates of recidivism. The investigator examined two academic achievement components, mathematics and reading skills and abilities. The investigator used the ANOVA test to answer research question 1. To answer research question 2, the investigator used the two-sample *t*-Test of means, and to answer research question 3, the investigator used both the Pearson Product Moment Coefficient and the Regression Analysis test.

Location and Population

The institution of research was a public city detention center courthouse located in an urban Midwestern city. The court housed the detention center in the north and south wing of the complex, which had three floors and housed juvenile students from 12 to 17 years of age. The research focused on middle and high school juveniles. The juveniles' ethnicity consisted of the following: Asians 2 (0.2%); White, not of Hispanic origin 12 (1.3%); Hispanic 22 (2.4%); Black/African American 892 (96.1%). Juveniles who had a classification of special education 510 (55%), and 149 (16%) had been subjected to homelessness. Table 1 depicts the demographic percentages of race in corresponding school districts scattered throughout the country.

Table 1

Percent of Ethnicity Representation in Cities included in Study Sample

Racial Demographics				
School District	White	Black	Hispanic	Asian
Atlanta	37	52	5	4
Chicago	32	31	29	6
Dallas	28	23	45	2
Kansas City	42	39	14	3
Los Angeles	26	9	52	11
Omaha	61	16	17	3
San Francisco	41	5	15	34
St. Louis	43	48	4	3
Tucson	49	4	40	34
Washington DC	36	47	11	4

Problem and Purpose Overview

Research finds higher levels of literacy associated with lower rates of juvenile delinquency, re-arrest, and recidivism (Special Education in Correctional Facilities - EDJJ, n.d.). The available literature focuses on the rich field of education. The Investigator focused on mathematics and reading comprehension achievement. The Investigator investigated reading and math comprehension relationships to rates of recidivism and claimed the more knowledge a student has in mathematics and reading, the less the rate of recidivism. The Investigator also claimed the less knowledge detention students have in reading and math, the higher the rate of recidivism.

Independent variable

The Investigator examined mathematics and reading skills and ability through an initial data-analysis for the pre-test math scores from the data collected from the 2016-17 school year. The Investigator determined that the independent variable represented students from the population who attended the school year where techniques for reducing

trauma were practiced at the beginning of each class and each school day for the 2016-17 school year. The participants were labeled, "Primary-Focus Participant Group" and N=88.

Dependent variable

The Investigator determined that the dependent variable represented the previous four school years where no trauma-reducing activities and training techniques for reducing trauma training took place, which included the school the year 2015-2016, and labeled the participants as the "Secondary-Focus Participant Group" with N=199.

Hypothesis and Testing

The Investigator organized the research around the following three questions:

1. Is there a significant difference in the BASI achievement scores in math and reading skills and abilities based on rates of recidivism at XYZ Detention Center?
2. What is the difference between BASI math and reading scores and recidivism rates at XYZ Detention Center of students who have had mindfulness training?
3. What is the relationship between math and reading achievement scores of students who have mindfulness training and their ability to assess their learning?

Research Question 1

Is there a significant difference in the BASI achievement scores in math and reading skills and abilities based on rates of recidivism at XYZ Detention Center?

Hypothesis 1

Students who have less recidivism at XYZ Detention Center have higher BASI Math scores than students who have more recidivism at XYZ Detention Center.

Null Hypothesis 1

There is no difference in achievement on the BASI Math scores based on rates of recidivism at XYZ Detention Center.

H1 Statistical Test 1 and Test 2. The Investigator used the Analysis of Variance (ANOVA) statistical test to test H1, which compared the increase of Pretest and Posttest BASI math scores from three populations of students with 3 rates of recidivism: Group R1 included students who attended XYZ Detention Center for the first time, Group R2 included students who attended XYZ Detention Center 2 times, and Group R3 included students who attended XYZ Detention Center 3 times.

H1 Population and Sample 2015-2016 and 2016-2017 Tests 1-2. The 2015-2016 population for H1 included the R1 Population of (N = 121) and a random population sample of (N = 30), R2 Population of (N = 47) and a random population sample (N = 30, and R3 Population of (N = 32), and a random population sample (n = 30). The 2016-2017 population for H1 included the R1 Population of (N = 64) and a random population sample of (N = 30), R2 Population of (N = 19) and a random population Sample (N = 19), and R3 Population of (N = 5), which was the entire population sample (N = 5).

Hypothesis 2

Students who have less recidivism at XYZ Detention Center have higher BASI Reading scores than students who have more recidivism at XYZ Detention Center.

Null Hypothesis 2

There is no difference in achievement on the BASI Reading scores based on rates of recidivism at XYZ detention center.

H2 Statistical Test 1 and Test 2. The Investigator used the Analysis of Variance (ANOVA) statistical test to test H2, which compared the increase of Pretest and Posttest BASI reading scores from three populations of students with 3 rates of recidivism from the 2015-2016 and the 2016-2017 school year separately.

H2 Population and Sample 2015-2016 and 2016-2017 Tests 1-2. The 2015-2016 population for H2 included the R1 Population of (N = 121) and a random population sample of (n = 30), R2 Population of (N = 47) and a random population sample (n = 30), and R3 Population of (N = 32), which used a population sample (n = 30). The 2016-2017 population for H2 included the R1 Population of (N = 64) and a random population sample of (n = 30), R2 Population of (N = 19) which was the entire population Sample (n = 19), and R3 Population of (N = 5), which was the entire population sample (n = 5).

Research Question 2

What is the difference between BASI math and reading scores and recidivism rates at XYZ Detention Center of students who have had daily mindfulness training?

Hypothesis 3

Students who have daily mindfulness training will have a higher increase in BASI math scores than students who have not had Mindfulness Training.

Null Hypothesis 3

Students who had daily mindfulness training during the 2016-2017 school year at XYZ Detention center do not have a higher increase in BASI math scores than students who have not had daily mindfulness training during the 2015-2016 school year.

H3 Statistical Test 1. The Investigator used a right-tailed *t*-Test to test H3, which compared the increase of Pretest and Posttest BASI math scores of students who participated in daily mindfulness activities to those students who did not participate in daily mindfulness activities

H3 Statistical Test 2, 3, and 4. The Investigator conducted a *t*-Test of two means comparing each recidivism group R1, R2, and R3, to see if the students who had mindfulness training in the 2016-2017 had a higher increase in BASI Math scores than the students who did not have mindfulness training in the 2015-2016 school year. Group R1 included students who attended XYZ Detention Center for the first time, Group R2 included students who attended XYZ Detention Center 2 times, and Group R3 included students who attended XYZ Detention Center 3 times. The Investigator determined if there was a difference between the 3 different recidivism rates for each of the two school years separately; the school year 2015-2016, which did not have trauma informed training and the 2016-2017 school year which did have trauma informed training.

H3 Population and Sample 2015-2016 and 2016-2017 Tests 1-4. The Investigator compared 2 populations of students. The first population of students included 201 students who did not participate in daily mindfulness activities from the 2015-2016 school year, and the second population included 88 students who did participate in daily mindfulness activities from the 2016-2017 school year. A random sample of 30 students from population group 1 was compared to a random sample of 30 students from population group 2.

Hypothesis 4

Students who have daily mindfulness lessons will have a higher increase in BASI reading scores than students who have not had daily mindfulness lessons.

Null Hypothesis 4

Students who had daily mindfulness training during the 2016-2017 school year at XYZ Detention center will not have a higher increase in BASI reading scores than student who have not had daily mindfulness training during the 2015-2016 school year.

H4 Statistical Test 1. The Investigator used a right-tailed *t*-Test to test H4, which compared the increase of Pretest and Posttest BASI reading scores of students who participated in daily mindfulness activities to those students who did not participate in daily mindfulness activities.

H4 Statistical Test 2, 3, and 4. The Investigator conducted a *t*-Test of two means comparing each recidivism group R1, R2, and R3, to see if the students who had mindfulness training in the 2016-2017 had a higher increase in BASI Reading scores than the students who did not have mindfulness training in the 2015-2016 school year.

Group R1 included students who attended XYZ Detention Center for the first time, Group R2 included students who attended XYZ Detention Center 2 times, and Group R3 included students who attended XYZ Detention Center 3 times. The Investigator determined if there was a difference between the 3 different recidivism rates for each of the two school years separately; the school year 2015-2016, which did not have trauma informed training and the 2016-2017 school year which did have trauma informed training.

H4 Population and Sample 2015-2016 and 2016-2017 Tests 1-4. The Investigator compared 2 populations of students. The first population of students included 201 students who did not participate in mindfulness activities from the 2015-2016 school year, and the second population included 88 students who did participate in daily mindfulness activities from the 2016-2017 school year. A random sample of 30 students from population group 1 was compared to a random sample of 30 students from population group 2.

Research Question 3

What is the relationship between BASI math and BASI reading achievement scores of students who had daily mindfulness training and their ability to assess their learning?

Hypothesis 5

Students at XYZ Detention Center who had daily mindfulness lessons have an accurate perception of their BASI math achievement from the 2016-2017 school year.

Null Hypothesis 5

There is no relationship between actual BASI math scores of students who have had daily mindfulness training and student's perception of achievement from the school year 2016-2017 at XYZ Detention Center.

H5 Statistical Tests 1, 2, 3, and 4. The investigator used the Pearson's Product Moment Coefficient (PPMCC), to analyze the strength of the relationship between student's perception of their own skills and abilities on the BASI math test score results and the Likert scale average results utilizing mindful moment techniques.

H5 Population and Sample Test 1. Test 1-Groups R1, R2, R3 were combined. The investigator sought to compare relationships of math BASI test scores with student's perceptions of their own skills and abilities using a population of size ($N = 88$) and a sample size of ($n = 30$).

H5 Population and Sample Test 2. R1 Data: The investigator sought to compare relationships of math BASI test scores with student's perceptions of their own skills and abilities using a population of size ($N = 63$) and a sample size of ($n = 30$).

H5 Population and Sample Test 3. R2 Data. The investigator sought to compare relationships of math BASI test scores with student's perceptions of their own skills and abilities in math using a population of size ($N = 19$), which was the entire sample size of ($n = 19$).

H5 Population and Sample Test 4. R3 Data: The investigator sought to compare relationships of math BASI test scores with student's perceptions of their own skills and abilities in math using a population of size ($N = 5$), which was the entire population sample size of ($n = 5$).

Hypothesis 6

Students at XYZ Detention Center who had daily mindfulness lessons have an accurate perception of their BASI Reading achievement from the 2016-2017 school year.

Null Hypothesis 6

There is no relationship between actual BASI reading scores of students who have had daily mindfulness training and students' perception of achievement from the school year 2016-2017 at XYZ Detention Center.

H6 Statistical Tests 1, 2, 3, and 4. The investigator used the Pearson's Product Moment Coefficient (PPMCC), to analyze the strength of the relationship between student's perception of their own skills and abilities on the BASI reading test score results and the Likert scale average results utilizing mindful moment techniques.

H6 Population and Sample Test 1. R1, R2, R3 - Data: The investigator sought to compare relationships of reading BASI test scores with student's perceptions of their own skills and abilities using a population of size ($N = 88$) and a sample size of ($n = 30$).

H6 Population and Sample Test 2. R1 - Data: The investigator sought to compare relationships of reading BASI test scores with student's perceptions of their own skills and abilities using a population of size ($N = 63$) and a sample size of ($n = 30$).

H6 Population and Sample Test 3. R2 - Data: The investigator sought to compare relationships of reading BASI test scores with student's perceptions of their own skills and abilities in reading comprehension using a population of size ($N = 19$), which was the population sample size of ($n = 19$).

H6 Population and Sample Test 4. R3 - Data: The investigator sought to compare relationships of reading BASI test scores with student's perceptions of their own skills and abilities in reading comprehension using a population of size ($N = 5$), which was the population size of ($n = 5$).

Validity and Reliability

The institution's screening process consisted of the personnel making sure each new juvenile student who entered the detention center was tested immediately after the intake division completed the entry process. The Basic Achievement Skills Inventory test was administered by the school's testing coordinator. Immediately after the student

completed the test, the testing coordinator hand-delivered it to the grader. The grader entered the student's answer sheet into a scanner to be graded by computerized software. The software printed the results of the student's exam on a common-separated values (CSV) spreadsheet with each student's name and profile. Then the school's secretary transferred the students' scores onto the spreadsheet pictured in Figure C1 (See Appendix C).

Threat to Validity

The Investigator then determined if the data were considered normally distributed under the Gaussian distribution curve and made the following observations; For the Post-Math assessment for the 2016-17 school year. The Post-Math assessment data yielded an average of 29.37 (SD = 11.38, SE_M = 1.19, Min = 0.00, Max = 61.00, Skewness = 0.05, Kurtosis = 0.39). The observations for Pre-Math had an average of 17.95 (SD = 8.30, SE_M = 0.87, Min = 0.00, Max = 42.00, Skewness = 0.55, Kurtosis = 0.44). The skewness of the data calculated as less than 2, and the Investigator determined the variable as asymmetrical about its mean. Since the kurtosis measured as less than 3, the Investigator considered the variable's distribution as markedly different than a normal distribution in its tendency to produce outliers (Westfall & Henning, 2013). A summary of the statistics can be found in Table 2.

Table 2

Summary Statistics Table for Interval and Ratio Variables

Variable	*M*	*SD*	*n*	SE_M	Min	Max	Skewness	Kurtosis
Post-Math	29.37	11.38	91	1.19	0.00	61.00	0.05	0.39
Pre-Math	17.95	8.30	91	0.87	0.00	42.00	0.55	0.44

Research Design

To investigate responses relating to the research queries, the Investigator used a quantitative styled analysis. The Investigator assessed the effect of detention center juvenile achievement scores in mathematics and reading skills and abilities using a pre and post aptitude inventory that the detention center instructors administered beginning with the 2012-2013 school year through the 2016-2017 school year. The 2016-2017 school year served as the intervention period. All juvenile students during the 2016-2017 school year participated in activities relating to trauma mediation in the classroom.

To understand how achievement scores in mathematics and reading comprehension are associated with rates of recidivism, the Investigator compiled a de-identified court-education secondary dataset ($N = 928$). A short narrative of the juveniles who comprised the juvenile detention secondary dataset ($N = 240$) followed. A juvenile detention center staff member generated and maintained the secondary dataset at the juvenile detention center.

The total research population utilized a convenience sample that included 928 juveniles for all five school years under investigation. The 2016-2017 school year consisted of a convenience sample of the Primary-Focus Participant Group of 124 juveniles housed at the detention facility. The average period of confinement ranged from six weeks to forty-two weeks. Therefore, the research population participated in the study at a minimum of four weeks and a maximum of forty-two weeks.

The Primary-Focus Participant Group who participated in trauma reducing activities and training represented the independent variable, which was part of the dataset ($N = 200$). The Secondary-Focus Participant Group did not participate in trauma reducing

activities and training and represented the dependent variable, which was part of the dataset (N = XXX). The instructor tested students at the end of each week on Friday. The content of each weekly test consisted of mathematics problems taught earlier in the week, which contained a Likert-scale so that students were able to express any frustration or satisfaction with topics required by the curriculum. The instructor used the students' Likert-scale results to pace students' on-going instruction during the week (**See Appendix** A). The instructor also created a thoughtfully designed rubric to evaluate students at the end of the week thoroughly (**See Appendix** B).

An important component of the drive in this chapter was measuring statistical relations between rates of recidivism and academic performance in mathematics and reading comprehension. This chapter initiated the process of quantizing students' perceptions of what they thought about their academic skills and abilities in mathematics and reading. The investigator chose to answer Research Question 1 "Is there a significant difference in the BASI achievement scores in math and reading skills and abilities based on rates of recidivism at XYZ Detention Center?" through Hypothesis 1 and 2 by using the ANOVA test and a t-sample *t*-test for means. Hypothesis 1 focused on BASI math scores, while Hypothesis 2 focused on BASI reading scores. The choice of the ANOVA test was used because the investigator's interest was to determine whether there were any statistically significant differences between the means of students' academic skills in mathematics according to their rate of recidivism R1, R2, and R3. On the BASI math and BASI reading test scores. The Investigator chose the test to compare the 2015-2016 school year that did not have mindfulness training with the 2016-2017 school year that did have mindfulness training.

The investigator used the *t*-Test to help answer research question 2 "What is the difference between BASI math and reading scores and recidivism rates at XYZ Detention Center of students who have had daily mindfulness training? The idea behind research question two was to determine if students who had mindfulness moment training had higher test scores than those students who did not have mindfulness training. The investigator analyzed the difference between students trained using mindful moment techniques and those who did not train, and the *t*-Test was used to compare the two means. A one-tailed test was used since the idea was to show that those students with mindfulness training had a higher increase in scores than those students who did not have the training. Hypothesis 3 focused on BASI math scores, while Hypothesis 4 focused on BASI reading scores.

The investigator used linear regression to help answer research question 3 "What is the relationship between math and reading achievement scores of students who had daily mindfulness training and their ability to assess their learning?". The idea behind the third research question was to examine student's perceptions of their own learning and forecast the results of students BASI test scores. Regression analysis was used to find estimates of students' BASI test scores.

Trauma-Informed Teaching – Mindfulness

The Instructor chose Mindfulness exercises because of its effectiveness in reducing social anxiety in the classroom. Students practiced mindfulness exercises regularly beginning with the first-period class which began at 8:00 in the morning, each day of the week (except Friday) began with a specific Mindfulness moment exercise. Figure 2 illustrates the specific mindfulness activity executed each morning.

Monday	Tuesday	Wednesday	Thursday
Raisin Exercise	Body Scan Exercise	Listening Exercise	Seeing Exercise

Figure 1. Weekly Activity Schedule

Every Monday of each week, the instructor guided students through an exercise called the Raisin exercise, which aimed to reduce social anxiety disorder. Each week the instructor used a different fruit. The instructor cut fruits such as apples and pears were into chunks with the skin attached for purposes of touch. Then the instructor issued students a piece of fruit in a small ziplocked bag shortly after the exercise began.

Students practiced the Raisin Exercise each Monday of the week. The instructor used the Raisin Exercise because it was a great entry-level exercise for beginners to begin practicing mindfulness (Ojallia, n.d). First, the instructor provided each student with a few raisins to hold in their hands. Then the instructor asked students to make-believe they were introduced to the raisin for the very first time. The instructor asked everyone to focus on the following information pertaining to the raisins in their hands. Figure 3 lists the five characteristics of the raisin observation.

1.	The way the raisin looks;
2.	How the texture feels;
3.	How their skin interprets its manipulation;
4.	How it smells;
5.	How it tastes.

Figure 2. Characteristics of a Raisin

Full concentration on the raisins was intended to transfer the student's mind to the present, to what is directly in front of them. The theory behind the exercise was the thought that students may be accustomed to raisins. However, the students may not be accustomed to spending time to really notice the raisins. The instructor explained to all the students that by focusing on the raisin in their hand and emphasizing its characteristics, they were less likely to expend energy, care, and time on concerning themselves with other things in their lives.

Mindfulness Body Scan

Every Tuesday, the instructor began an exercise called the Body Scan. The body scan exercise did not require any props and was manageable for all students. The instructor began the Body Scan with the students lying on their backs with their hands pointed upward and their feet somewhat spread apart. Some students sat in a chair with their feet flat on the floor. The instructor asked students to lie very still until the end of the exercise and move with mindfulness if they feed a need to readjust their position. The instructor initiated the process, and students started by bringing awareness to their breath, quietly observing the rhythm, and the process of inhaling and exhaling. The instructor explained to everyone that no one should attempt to alter their breathing pattern, but instead maintain a calm discernment about their breathing. The instructor softly and commandingly directed students' attention to their body in terms of how it feels, smoothness of clothing touching the skin, and the temperature of their body and surrounding. Finally, on Tuesday, the instructor channeled consciousness to places in the body that were painful, burning, or hypersensitive. A characteristic Body Scan tracks

through all segments of the body, paying close attention to how each part feels. The scan travels methodically through specific parts of the body, as indicated in Figure 4.

- Toes of both feet;
- The rest of the feet (top, bottom, ankle);
- Lower legs;
- Knees;
- Thighs;
- Pelvic region (buttocks, tailbone, pelvic bone);
- Abdomen;
- Chest;
- Lower back;
- Upper back (back ribs & shoulder blades);
- Hands (fingers, palms, backs, wrists);
- Arms (lower, elbows, upper);
- Neck;
- Face and head (jaw, mouth, nose, cheeks, ears, eyes, forehead, scalp, back & top of the head)

Figure 3. Body Scan

Mindfulness Listening. Students practiced mindful listening every Wednesday of each week. Students succeeded when they felt fully heard and seen, and mindful listening propositioned students to move their thought emphasis from focusing on oneself. Alternatively, mindful listening helped to create an awareness from within, which promoted a sense of inner calmness. The idea behind this exercise was for students to experience a sense of freedom from preconceptions or judgments from others and not be distracted from idle chatter while acquiring positive communication skills. Table 3 displays the steps involved in Mindful listening.

Table 3

Mindful Listening Steps

Actions
Students were invited to think of one thing they are stressed about and one thing they look forward to;
Each student shared their story with the group;
Each student was encouraged to direct their attention to how it felt to speak, how it felt to talk about something stressful as well as how it felt to share
Students were instructed to observe their own thoughts, feelings, and body sensations both when listening and talking;
Students were asked to give a final observation of their experience.

Summary

Intervening early in a juvenile's life helps lower the probability that he or she will become a repeat offender. The early intervention needed is education. A solid understanding of mathematics, reading, and science. The act of educating kids at an early age helps them engage in academics with an understanding of real interest. Since students experience trauma at early stages in life it is important to begin teaching them how to manage traumatic events in their life as early as possible. Integrating trauma control into the classroom should begin gradually. Higher levels of literacy are associated with lower rates of juvenile delinquency (Special Education in Correctional Facilities – EDJJ, n.d.). Reading comprehension and its relationship with recidivism was examined. Mathematical comprehension was examined and compared with rates of recidivism. Students' math and reading abilities were examined using the BASI test inventory. Students were taught how to manage trauma throughout the school year. Students were tested at the end of the school year using the same test. The idea was to check for academic growth. The investigator created the independent variable and the dependent variable used for statistical testing of the ideas of academic achievement

versus recidivism. Three research questions were answered based on academic achievement scores and rates of recidivism. The Gaussian distribution curve refers to the Bell-Shaped Curve in statistics. Students perception of their academic skills were measured using a Likert Scale. The investigator was able to use statistical tests (ANOVA, *t*-test, *F*-test, etc.) to arrive at results for analysis.

Chapter Four: Results

The methodology undertaken in Chapter Three managed the direction of this quantitative research investigation, which examined the close adherence to which statistical tests should be implemented and why. The Investigator relentlessly focused on analyzing each step of the process for overlapping themes. The investigator surveyed students' opinions in conjunction with their perception of what the students thought about their academic skills and abilities. The primary drive behind this study was to measure statistical relations between rates of recidivism and academic comprehension. Results from the ANOVA shed light on data from the BASI test that reflected the premise of hypothesis one and hypothesis two. The Investigator issued a weekly survey to students from the 2016-2017 schoolyear that asked how much they felt they had learned during the previous weeks. The investigator calculated the correlation coefficients for all three categories of recidivism rates one, two, and three vs. the students' weekly test scores. The Investigator provided research questions followed by the null hypotheses and a description of the statistical test used.

Normative Data-analysis

The Investigator determined if the data were considered normally distributed under the Gaussian distribution curve and made the following observations; For the Post-Math assessment for the 2016-17 school year. The Post-Math assessment data yielded an average of 29.37 (SD = 11.38, SE_M = 1.19, Min = 0.00, Max = 61.00, Skewness = 0.05, Kurtosis = 0.39). The observations for Pre-Math had an average of 17.95 (SD = 8.30, SE_M = 0.87, Min = 0.00, Max = 42.00, Skewness = 0.55, Kurtosis = 0.44).

The skewness of the data calculated as less than 2, and the Investigator determined the variable as asymmetrical about its mean. Since the kurtosis measured less than 3, the Investigator considered the variable's distribution as markedly different than a normal distribution in its tendency to produce outliers (Westfall & Henning, 2013). A summary of the statistics can be found in Table 4.

Table 4

Summary Statistics Table for Interval and Ratio Variables

Variable	*M*	*SD*	*n*	SE_M	Min	Max	Skewness	Kurtosis
Post-Math	29.37	11.38	91	1.19	0.00	61.00	0.05	0.39
Pre-Math	17.95	8.30	91	0.87	0.00	42.00	0.55	0.44

Hypotheses and Testing Results

Research Question 1

Is there a significant difference in the BASI achievement scores in math and reading skills and abilities based on rates of recidivism at XYZ Detention Center?

Null Hypothesis 1

There is no difference in achievement on the BASI Math scores based on rates of recidivism at XYZ Detention Center.

H1 Population and Sample 2015-2016 and 2016-2017 Tests 1-2. The 2015-2016 population for H1 included the R1 Population of $N = 121$ and a random population sample of $n = 30$, R2 Population of $N = 47$ and a random population sample $n = 30$, and R3 Population of $N = 32$, which was the entire population sample $n = 30$. The 2016-2017 population for H1 included the R1 Population of $N = 64$ and a random population sample of $n = 30$, R2 Population of $N = 19$ and a random population Sample $n = 19$, and R3 Population of $N = 5$, which was the entire population sample $n = 5$.

Results for Hypothesis 1 Statistical Test 1 R1R2R3 (2015-2016 & 2016-2017 BASI Math)

The Investigator used the Analysis of Variance (ANOVA) statistical test to test H1 Test 1 for the 2015-2016 and 2016-2017 school years, which compared the increase in Pretest and Posttest BASI math scores from three populations of students with 3 rates of recidivism. Group R1 included students who attended XYZ Detention Center for the first time, Group R2 included students who attended XYZ Detention Center 2 times, and Group R3 included students who attended XYZ Detention Center 3 times.

The analysis results for H1 Test 1 for mathematics from 2015-2016 and 2016-2017 school years for R1, R2, and R3 are displayed in Table 5.

Table 5

H1 ANOVA Test 1 R1R2R3 (2015-2016 & 2016-2017 BASI Math)

Source of Variation	*SS*	*df*	*MS*	*F*	*p-value*	*F crit*
Between Groups	8785.71	5	1757.14	19.98	$p < 0.001$	2.28
Within Groups	12135.18	138	87.94			
Total	20920.89	143				

The Investigators conducted an Analysis of Variance (ANOVA) to determine whether, or not, the BASI math scores from the 2015-2016 & 2016-2017 school years in the three recidivism groups were the same. The analysis revealed a significant difference between an increase in scores of the three different rates of recidivism. The primary investigator determined ($p < 0.001$) and rejected the null hypothesis and accepted the claim and concluded the final increase in scores were associated with rates of recidivism with an alpha value of 0.05.

The sum scores reflect that 1617R1 group had more students scoring higher in math on the pretest than on the posttest. The mean score for group 1516R1 shows their average math score reflects the average pretest score was higher than the average score on the posttest. The spread of the data around 1516R1, 1516R2, and 1516R3 has a greater magnitude than school year 2016-2017. The mean score of 1617R2 displays the greatest magnitude, but it shows that the pretest scores were greater than the posttest scores in math. The sum and mean scores of 1516R2 and 1516R3 clearly show that the majority of the posttest scores were higher than the pretest scores. The descriptive data are displayed in Table 6.

Table 6

Descriptives for Test 1 2015-2016 & 2016-2017 Math

Groups	*Count*	*Sum*	*Mean*	*Variance*
1516R1	30	-237.00	-7.90	131.61
1617R1	30	351.00	11.70	32.01
1516R2	30	34.00	1.13	118.60
1617R2	19	-227.00	-11.95	36.72
1516R3	30	41.00	1.37	112.10
1617R3	5	6.00	1.20	9.70

Null Hypothesis 2

There is no difference in achievement on the BASI Reading scores based on rates of recidivism at XYZ detention center.

H2 Population and Sample 2015-2016 and 2016-2017 Tests 1-2. The 2015-2016 population for H2 included the R1 Population of $N = 121$ and a random population sample of $n = 30$, R2 Population of $N = 47$ and a random population sample $n = 30$, and R3 Population of $N = 32$, which was the entire population sample $n = 32$. The 2016-2017 population for H2 included the R1 Population of $N = 64$ and a random population sample of $n = 30$, R2 Population of $N = 19$, which was the entire random population Sample $n = 19$, and R3 Population of $N = 5$, which was the entire population sample N = 5.

Results for Hypothesis 2 Statistical Test 1 R1R2R3 (2015-2016 & 2016-2017 BASI Reading)

The Investigator used the Analysis of Variance (ANOVA) statistical test to test H2 Test 1 for the 2015-2016 & 2016-2017 school years, which compared the increase of Pretest and Posttest BASI reading scores from three populations of students with 3 rates of recidivism. Group R1 included students who attended XYZ Detention Center for the

first time, Group R2 included students who attended XYZ Detention Center 2 times, and Group R3 included students who attended XYZ Detention Center 3 times.

The analysis results for H2 Test 1 for reading from 2015-2016 & 2016-2017 school years for R1, R2, and R3 are displayed in Table 7.

Table 7.

H1 ANOVA Test 1 R1R2R3 (2015-2016 & 2016-2017 BASI Reading)

Source of Variation	*SS*	*df*	*MS*	*F*	*p-value*	*F crit*
Between Groups	9355.48	5	1871.10	28	$p < 0.001$	2.28
Within Groups	9223.46	138	66.84			
Total	18578.94	143				

The Investigator conducted an Analysis of Variance (ANOVA) to determine whether, or not, the BASI reading scores from the 2015-2016 & 2016-2017school years in the three recidivism groups were associated with rates of recidivism. The analysis revealed a significant difference between an increase in scores of the three different rates of recidivism. The primary investigator rejected the null hypothesis and concluded the final increase in scores were associated with rates of recidivism that were not due to chance with an alpha value of 0.05.

School year 2015-2016 & 2016-2017 showed more variation in test score differences of groups 1617R1, and 1617R2. The sum column for1516R1 and 1516R3 represent higher pretest scores compared to posttest scores on the BASI reading test. Group 1617R1 had higher posttest scores in reading than pretest scores. The spread of data for 1617R1 is wide and scattered. The spread of data for 1617R2 is the second largest around the mean. The spread of data for 1516R3 is closest to its mean score. The

sum of 1617R1 has the greatest mean score. The descriptive data are displayed in Table 8.

Table 8

Descriptives for Test 1 2015-2016 & 2016-2017 Reading

Groups	Count	Sum	Mean	Variance
1516R1	30	-148.00	-4.93	64.34
1617R1	30	546.00	18.20	168.03
1516R2	30	26.00	0.87	6.88
1617R2	19	72.00	3.79	118.95
1516R3	30	-17.00	-0.57	3.70
1617R3	5	4.00	0.80	9.20

Research Question 2

What is the difference between BASI math and reading scores and recidivism rates at XYZ Detention Center of students who have had daily mindfulness training?

Null Hypothesis 3

Students who had daily mindfulness training during the 2016-2017 school year at XYZ Detention center do not have a higher increase in BASI math scores than students who have not had daily mindfulness training during the 2015-2016 school year.

H3 Population and Sample 2015-2016 and 2016-2017 Tests 1-4. The Investigator compared 2 populations of students. The first population of students included 201 students From R1, R2, and R3 who did not participate in daily mindfulness activities from the 2015-2016 school year, and the second population included 88 students From R1, R2, and R3 who did participate in daily mindfulness activities from the 2016-2017 school year. A random sample of 30 students from population group 1 was compared to a random sample of 30 students from population group 2.

Results for Hypothesis 3- preliminary *F*-Test and Statistical Test 1: *T*-Test (BASI Math)

The Investigator conducted a *t*-test of two means comparing a sample from R1, R2, and R3 from 2015-2016 school year with a Sample of R1, R2, and R3 from 2016-2017 school year, to see if the students who had mindfulness training in the 2016-2017 had a higher increase in BASI Math scores than the students who did not have mindfulness training in the 2015-2016 school year.

A preliminary test of variances revealed that the variances were equal ($p = 0.14$). The preliminary results of the *F*-Test Two-Sample for Variances are displayed in Table 9.

Table 9

H3 f-Test Two-Sample for Variances Test 1 R1R2R3 (BASI Math)

	S1516 MATH R1R2R3	*S1617 MATH R1R2R3*
Mean	3.47	11.07
Variance	46.53	70.13
Observations	30	30
df	29	29
F	0.66	
P(F<=f) one-tail	0.14	
F Critical one-tail	0.54	

The *t*-test analysis revealed that the BASI math scores for students in the R1, R2, and R3 group 2016-2017 school year (M =11.07, SD = 13.00) were significantly higher than those of the students in the R1 group 2015-2016 school year (M = 3.47, SD = 9.63; $t(30) = -3.85$, $p < 0.001$.

The investigator rejected the null hypothesis and concluded that students in the 2016-2017 school year who received mindfulness training did show a difference with a significant increase in BASI math scores that were not due to chance with an alpha value of 0.05. The results are displayed in Table 10.

Table 10

H3 t-test: Two-Sample Assuming Equal Variances H3 Test 1 R1R2R3 (BASI Math)

	1516 MATH R1R2R3	1617 MATH R1R2R3
Mean	3.47	11.07
Variance	46.53	70.13
Observations	30	30
Pooled Variance	58.33	
Hypothesized Mean Difference	0	
df	58	
t Stat	-3.85	
P(T<=t) one-tail	$p < 0.001$	
t Critical one-tail	1.67	
P(T<=t) two-tail	$p < 0.001$	

Results for Hypothesis 3- preliminary f-Test and Statistical Test 2 R1: *t*-Test (BASI Math)

The Investigator conducted a *t*-Test of two means comparing R1 from 2015-2016 school year with R1 from 2016-2017 school year, to see if the students who had mindfulness training in the 2016-2017 had a higher increase in BASI Math scores than the students who did not have mindfulness training in the 2015-2016 school year.

A preliminary test of variances revealed that the variances were equal ($p = 0.44$). The preliminary results of the *F*-Test Two-Sample for Variances are displayed in Table 11.

Table 11

H3 f-Test: Two-Sample for Variances Test 2 R1 (BASI Math)

	1516 MATH R1	1617 MATH R1
Mean	5.67	10.67
Variance	82.44	78.09
Observations	30	30
df	29	29
F	1.06	
P(F<=f) one-tail	0.44	
F Critical one-tail	1.86	

The *t*-test analysis revealed that the BASI math scores for students in the R1 group 2016-2017 school year (M =10.67, SD = 8.84) were significantly higher than those of the students in the R1 group 2015-2016 school year (M = 5.67, SD = 9.09; $t(30) = -2.16$, $p = 0.03$. The investigator rejected the null hypothesis and concluded that students in the 2016-2017 school year who received mindfulness training had a significant increase in BASI math scores that were not due to chance with an alpha value of .05. The results are displayed in Table 12.

Table 12

H3 t-test: Two-Sample Assuming Equal Variances Test 2 (BASI Math)

	1516 MATH R1	1617 MATH R1
Mean	5.67	10.67
Variance	82.44	78.09
Observations	30	30
Pooled Variance	80.26	
Hypothesized Mean Difference	0	
df	58	
t Stat	-2.16	
P(T<=t) one-tail	0.02	
t Critical one-tail	1.67	
P(T<=t) two-tail	0.03	
t Critical two-tail	2.00	

Results for Hypothesis 3 -preliminary f-Test and Statistical Test 3 R2: *t*-Test (BASI Math)

The Investigator conducted a *t* test of two means comparing R2 from 2015-2016 school year with R2 from 2016-2-17 school year, to see if the students who had mindfulness training in the 2016-2017 had a higher increase in BASI Math scores than the students who did not have mindfulness training in the 2015-2016 school year.

A preliminary test of variances revealed that the variances were equal ($p = 0.45$). The preliminary results of the *F*-Test Two-Sample for Variances are displayed in Table 13.

Table 13

H3 f-Test Two-Sample for Variances H3 Test R2 (BASI Math)

	1516 MATH R2	1617 MATH R2
Mean	-1.58	4.84
Variance	28.70	30.58
Observations	19	19
df	18	18
F	0.94	
P(F<=f) one-tail	0.45	
F Critical one-tail	0.45	

The *t*-Test analysis revealed that the BASI math scores for students in the R2 group for the 2016-2017 school year ($M = 4.84$, $SD = 5.53$); were significantly higher than those of the students in the R2 group 2015-2016 school year ($M = -1.58$, $SD = 5.36$) $t(19) = -3.64$, $p < 0.001$. The investigator rejected the null hypothesis and concluded that students in the 2016-2017 school year who received mindfulness training did show a significant increase in BASI math scores that were not due to chance with an alpha value of 0.05. The results are displayed in Table 14.

Table 14

H3 *t*-Test: Two-Sample Assuming Equal Variances

	1516 MATH R2	1617 MATH R2
Mean	-1.58	4.84
Variance	28.70	30.58
Observations	19	19
Pooled Variance	29.64	
Hypothesized Mean Difference	0	
df	36	
t Stat	-3.64	
P(T<=t) one-tail	0.001	
t Critical one-tail	1.69	
P(T<=t) two-tail	0.001	
t Critical two-tail	2.03	

Results for Hypothesis 3- preliminary f-Test and Statistical Test 4 R3: *t*-Test (BASI Math)

The Investigator conducted a *t* test of two means comparing R3 from 2015-2016 school year with R3 from 2016-2017 school year, to see if the students who had mindfulness training in the 2016-2017 had a higher increase in BASI Math scores than the students who did not have mindfulness training in the 2015-2016 school year.

A preliminary test of variances revealed that the variances were equal ($p = 0.31$). The preliminary results of the F-Test Two-Sample for Variances are displayed in Table 15.

Table 15

H3 f-Test Two-Sample for Variances Test 4 R3 (BASI Math)

	1516 MATH R3	1617 MATH R3
Mean	-0.20	1.20
Variance	5.70	9.70
Observations	5	5
df	4	4
F	0.59	
P(F<=f) one-tail	0.31	
F Critical one-tail	0.16	

The *t*-Test analysis revealed that the BASI math scores for students in the R3 group for the 2016-2017 school year (M =1.20, SD = 3.11) were not significantly higher than those of the students in the R3 group 2015-2016 school year (M = -0.20, SD =2.39); $t(5) = -0.79$, $p = 0.23$. The investigator failed to reject the null hypothesis and concluded that students in the 2016-2017 school year who received mindfulness training did not show a significant increase in BASI math scores that were not due to chance at an alpha value of 0.05. Results are displayed in Table 16.

Table 16

H3 t-test: Two-Sample Assuming Unequal Variances Test 4 R3 (BASI Math)

	1516 MATH R3	*1617 MATH R3*
Mean	-0.20	1.20
Variance	6.20	9.70
Observations	5	5
Hypothesized Mean Difference	0	
df	8	
t Stat	-0.79	
P(T<=t) one-tail	0.23	
t Critical one-tail	1.86	
P(T<=t) two-tail	0.46	
t Critical two-tail	2.31	

Null Hypothesis 4

Students who had daily mindfulness training during the 2016-2017 school year at XYZ Detention center will not have a higher increase in BASI reading scores than student who have not had daily mindfulness training during the 2015-2016 school year.

H4 Population and Sample 2015-2016 and 2016-2017 Tests 1-4. The Investigator compared 2 populations of students. The first population of students included 201 students from R1, R2, and R3 who did not participate in mindfulness activities from the 2015-2016 school year, and the second population included 88 students R1, R2, and R3who did participate in daily mindfulness activities from the 2016-2017 school year. A random sample of 30 students from population group 1 was compared to a random sample of 30 students from population group 2.

Results for Hypothesis 4- preliminary f-Test and Statistical Test 1 R1R2R3: *t*-Test (BASI Reading)

The Investigator conducted a *t* test of two means comparing a sample from R1, R2, and R3 from 2015-2016 school year with a Sample of R1, R2, and R3 from 2016-2017 school year, to see if the students who had mindfulness training in the 2016-2017 had a higher increase in BASI Reading scores than the students who did not have mindfulness training in the 2015-2016 school year.

A preliminary test of variances revealed that the variances were equal ($p = 0.06$). The preliminary results of the *F*-Test Two-Sample for Variances are displayed in Table 17.

Table 17

H4 f-Test Two-Sample for Variances Test 1 R1R2R3 (BASI Reading)

	1516 READ R1R2R3	*1617 READ R1R2R3*
Mean	6.73	14.27
Variance	92.82	168.89
Observations	30	30
df	29	29
F	0.55	
P(F<=f) one-tail	0.06	
F Critical one-tail	0.54	

The *t*-Test analysis revealed that the BASI reading scores for students in the 2016-2017 school year (M = 14.27, SD = 13.00) were significantly higher than those of the students in the 2015-2016 school year (M = 6.73, SD = 9.63); $t(30) = -2.55$, $p = 0.01$. The investigator rejected the null hypothesis and concluded that students in the 2016-2017 school year who received mindfulness training did show a significant increase in BASI reading scores that were not due to chance based on an alpha value of 0.05. The results are displayed in Table 18.

Table 18

H4 t-test: Two-Sample Assuming Equal Variances Test 1 R1R2R3 (BASI Reading)

	1516 READ R1R2R3	*1617 READ R1R2R3*
Mean	6.73	14.27
Variance	92.82	168.89
Observations	30	30
Pooled Variance	130.86	
Hypothesized Mean Difference	0	
df	58	
t Stat	-2.55	
P(T<=t) one-tail	0.01	
t Critical one-tail	1.67	
P(T<=t) two-tail	0.01	
t Critical two-tail	2.00	

Results for Hypothesis 4- preliminary f-Test and Statistical Test 2 R1: *t*-Test (BASI Reading)

The Investigator conducted a *t* test of two means comparing R1 from 2015-2016 school year with R1 from 2016-2017 school year, to see if the students who had mindfulness training in the 2016-2017 school year had a higher increase in BASI reading scores than the students who did not have mindfulness training in the 2015-2016 school year.

A preliminary test of variances revealed that the variances were equal ($p = 0.45$). The preliminary results of the *F*-Test Two-Sample for Variances are displayed in Table 19.

Table 19

H4 F-Test Two-Sample for Variances Test 2 R1 (BASI Reading)

	H4 S1516 R1	H4 S1617 R1
Mean	10.53	12.37
Variance	122.53	129.00
Observations	30	30
df	29	29
F	0.95	
P(F<=f) one-tail	0.45	
F Critical one-tail	0.54	

The *t*-Test analysis revealed that the BASI reading scores for students in the R1 group 2016-2017 school year ($M = 10.53$, $SD = 11.36$) were significantly higher than those of the students in the R1 group 2015-2016 school year ($M = 10.53$, $SD = 12.37$); $t(30) = -0.63$, $p = 1.67$. The investigator failed to reject the null hypothesis and concluded that students in the 2016-2017 school year who received mindfulness training

did not show a significant increase in BASI reading scores that were not due to chance with an alpha value of 0.05. The results are displayed in Table 20.

Table 20

H4 t-test: Two-Sample Assuming Equal Variances Test 2 (BASI Reading)

	1516 READ R1	S1617 READ R1
Mean	10.53	12.37
Variance	122.53	129.00
Observations	30	30
Hypothesized Mean Difference	0	
t Stat	-0.63	
P(T<=t) one-tail	0.270	
t Critical one-tail	1.67	
P(T<=t) two-tail	0.530	
t Critical two-tail	2.000	

Results for Hypothesis 4- preliminary f-Test and Statistical Test 3 R2: *t*-Test (BASI Reading)

The Investigator conducted a *t* test of two means comparing R2 from 2015-2016 school year with R2 from 2016-2017 school year, to see if the students who had mindfulness training in the 2016-2017 had a higher increase in BASI reading scores than the students who did not have mindfulness training in the 2015-2016 school year.

A preliminary test of variances revealed that the variances were not equal (p = 0.003). The preliminary results of the *F*-Test Two-Sample for Variances are displayed in Table 21.

Table 21

H4 f-Test Two-Sample for Variances Test 3 R2 (BASI Reading)

	1516 READ R2	*1617 READ R2*
Mean	2.00	3.79
Variance	31.33	118.95
Observations	19	19
df	18	18
F	0.263	
P(F<=f) one-tail	0.003	
F Critical one-tail	0.450	

The analysis revealed that the BASI reading scores for students in the R2 group for the 2016-2017 school year (M = 3.79, SD = 10.91) were not significantly higher than those of the students in the R2 group 2015-2016 school year (M = 2.00, SD = 5.60); $t(5)$ = 2.03, p = 0.266. The investigator rejected the null hypothesis and concluded that students in the 2016-2017 school year who received mindfulness training did not show a significant increase in BASI reading scores that were not due to chance with an alpha value of 0.05. The results are displayed in Table 22.

Table 22

H4 t-test: Two-Sample Assuming Unequal Variances Test 3 (BASI Reading)

	1516 READ R2	*1617 READ R2*
Mean	2.00	3.79
Variance	31.33	118.95
Observations	19	19
Hypothesized Mean Difference	0	
df	27	
t Stat	-0.64	
P(T<=t) one-tail	0.266	
t Critical one-tail	1.70	
P(T<=t) two-tail	0.530	
t Critical two-tail	2.05	

Results for Hypothesis 4- preliminary f-Test and Statistical Test 4 R3: *t*-Test (BASI Reading)

The Investigator conducted a *t* test of two means comparing R3 from 2015-2016 school year with R3 from 2016-2017 school year, to see if the students who had mindfulness training in the 2016-2017 had a higher increase in BASI reading scores than the students who did not have mindfulness training in the 2015-2016 school year.

A preliminary test of variances revealed that the variances were equal ($p = 0.410$). The preliminary results of the *F*-Test Two-Sample for Variances are displayed in Table 23.

Table 23

H4 f-Test: Two-Sample for Variances Test 3 R3 (BASI Reading)

	1516 READ R3	*1617 READ R3*
Mean	0.60	0.80
Variance	7.30	9.20
Observations	5	5
df	4	4
F	0.79	
P(F<=f) one-tail	0.410	
F Critical one-tail	0.16	

The *t*-Test analysis revealed that the BASI reading scores for students in the R3 group for the 2016-2017 school year ($M = 0.80$, $SD = 3.03$) were not significantly higher than those of the students in the R3 group 2015-2016 school year ($M = -0.80$, $SD = 3.42$); $t(5) = 2.31$, $p = 0.228$. The investigator rejected the null hypothesis and concluded that students in the 2016-2017 school year who received mindfulness training did not show a significant increase in BASI reading scores that were not due to chance with an alpha value of 0.05. The results are displayed in Table 24.

Table 24.

H4 t-test: Two-Sample Assuming Equal Variances Test 3 (BASI Reading)

	1516 READ R3	1617 READ R3
Mean	-0.80	0.80
Variance	11.70	9.20
Observations	5	5
Pooled Variance	10.45	
Hypothesized Mean Difference	0	
df	8	
t Stat	-0.78	
P(T<=t) one-tail	0.228	
t Critical one-tail	1.86	
P(T<=t) two-tail	0.460	
t Critical two-tail	2.31	

Research Question 3

What is the relationship between BASI math and BASI reading achievement scores of students who had daily mindfulness training and their ability to assess their learning?

Null Hypothesis 5

There is no relationship between actual BASI math scores of students who have had daily mindfulness training and student's perception of achievement from the school year 2016-2017 at XYZ Detention Center.

H5 Population and Sample (BASI Math) Test 1. R1, R2, R3 Data: Test 1- Groups R1, R2, R3 were combined. The investigator sought to compare relationships of math BASI test scores with student's perceptions of their own skills and abilities using a population of size (N = 87) and a sample size of (n = 30).

H5 Population and Sample (BASI Math) Test 2. R1 Data: The investigator sought to compare relationships of math BASI test scores with student's perceptions of

their own skills and abilities using a population of size (N = 63) and a sample size of (n = 30).

H5 Population and Sample (BASI Math) Test 3. R2 Data: The investigator sought to compare relationships of math BASI test scores with student's perceptions of their own skills and abilities in math using a population of size (N = 19), which was the full population sample size of (n = 19).

H5 Population and Sample (BASI Math) Test 4. R3 Data: The investigator sought to compare relationships of math BASI test scores with student's perceptions of their results.

Results for Hypothesis 5- (BASI Math) Regression Analysis Test 1a; PPMCC Test 1b

The results from the regression analysis test allowed the investigator to determine if a moderate to strong relationship existed between students' perceptions of their abilities and skills in mathematics. The correlation coefficient 0.782 demonstrates there exist a mostly strong relationship between students' perceptions of their skills and ability in math and BASI test scores. Table 25 displays the results of the regression analysis test.

Table 25.

H5 Regression Analysis (BASI Math R1R2R3) Test 1a

Regression Statistics	
Multiple R	0.78219
R Square	0.611822
Adjusted R Square	0.597958
Standard Error	7.4833
Observations	30

The investigator rejected the null hypothesis because the calculated p-value was less than the chosen alpha value of 0.05. There is a statistically significant relationship

between students' BASI test scores and perceptions of their own skills and abilities in mathematics. The results are displayed in table 26.

Table 26.

H5 *PPMCC (BASI Math- R1R2R3) Test 1b*

	Coefficients	*Standard Error*	*t Stat*	*p-value*	*Lower 95%*	*Upper 95%*
Intercept	-6.57	5.46	-1.20	0.24	-17.76	4.62
Likert	13.26	1.99	6.64	$p < 0.001$	9.17	17.35

Results for Hypothesis 5- (BASI Math) Regression Analysis Test 2a; PPMCC Test 2b

The results from the regression analysis test allowed the investigator to determine if a moderate to strong relationship exist between students' perceptions of their abilities and skills in mathematics. The correlation coefficient 0.822 demonstrates there exist a very strong relationship between students' perceptions of their skills and ability in math and BASI test scores. The results are displayed in Table 27.

Table 27

H5 Regression Analysis (BASI Math R1) Test 2a

Regression Statistics	
Multiple R	0.82
R Square	0.68
Adjusted R Square	0.66
Standard Error	6.89
Observations	30

The investigator rejected the null hypothesis because the calculated p-value was less than the chosen alpha value of 0.05. There is a statistically significant relationship between students' BASI test scores and perceptions of their own skills and abilities in mathematics. The results are displayed in Table 28.

Table 28

H5 PPMCC (BASI Math R1) Test 2b

	Coefficients	*Standard Error*	*t Stat*	*p-value*	*Lower 95%*	*Upper 95%*
Intercept	-3.98	4.55	-0.88	0.39	-13.28	5.33
Likert	12.56	1.64	7.64	$p < 0.001$	9.19	15.92

Results for Hypothesis 5- (BASI Math) Regression Analysis Test 3a; PPMCC Test 3b

The results from the regression analysis test afforded the investigator the opportunity to determine if a moderate to strong relationship exist between students' perceptions of their abilities and skills in mathematics versus their BASI test math scores. The correlation coefficient 0.739 demonstrates there exist a very strong relationship between students' perceptions of their skills and ability in math and BASI test scores. The results are displayed in Table 29.

Table 29

H5 Regression Analysis (BASI Math R2) Test 3a

Regression Statistics	
Multiple R	0.74
R Square	0.55
Adjusted R Square	0.52
Standard Error	7.19
Observations	19

The investigator rejected the null hypothesis because the calculated p-value was less than the chosen alpha value of 0.05. There is a statistically significant relationship between students' BASI test scores and perceptions of their own skills and abilities in mathematics. The results are displayed in Table 30.

Table 30.

H5 PPMCC (BASI Math R2) Test 3b

	Coefficients	*Standard Error*	*t Stat*	*p-value*	*Lower 95%*	*Upper 95%*
Intercept	-4.50	6.27	-0.72	0.48	-17.72	8.72
Likert	12.38	2.74	4.52	$p < 0.001$	6.61	18.16

Results for Hypothesis 5- Regression Analysis Test 4a; PPMCC Test 4b

The results from the regression analysis test afforded the investigator the opportunity to determine if a moderate to strong relationship exist between students' perceptions of their abilities and skills in mathematics versus their BASI test math scores. The correlation coefficient 0.811 demonstrates there exist a very strong relationship between students' perceptions of their skills and ability in math and BASI test scores. The results are displayed in Table 31.

Table 31

H5 Regression Analysis (BASI MATH R3) Test 4a

Regression Statistics	
Multiple R	0.81
R Square	0.66
Adjusted R Square	0.54
Standard Error	3.53
Observations	5

The investigator failed to reject the null hypothesis because the calculated *p*-value was not less than the chosen alpha value of 0.05. There is not a statistically significant relationship between students' BASI test scores and perceptions of their own skills and abilities in mathematics. The results are displayed in table 32.

Post-Hoc Scheffé Test Mathematics

The investigator also calculated post-hoc analyses. Groups R1, R2, and R3 in mathematics had significant relationships among and between groups R1R2, R1R3, and

R2R3. Groups R1, R2, and R3 from 2015-2016 and groups R1, R2, and R3 from 2016-2017 had 7 different relationships among and between the six groups. The math result of each relationship is summarized in **APPENDIX D.**

Table 32

H5 PPMCC (BASI Math-R3) Test 4b

	Coefficients	*Standard Error*	*t Stat*	*p-value*	*Lower 95%*	*Upper 95%*
Intercept	-0.81	5.80	-0.13	0.89	-19.27	17.65
Likert	6.40	2.66	2.40	0.095	-2.08	14.89

Null Hypothesis 6

There is no relationship between actual BASI reading scores of students who have had daily mindfulness training and students' perception of achievement from the school year 2016-2017 at XYZ Detention Center.

H6 Population and Sample (BASI Reading) Test 1. R1, R2, R3 - Data: The investigator sought to compare relationships of reading BASI test scores with student's perceptions of their own skills and abilities using a population of size ($N = 87$) and a sample size of ($n = 30$).

H6 Population and Sample (BASI Reading) Test 2. R1 - Data: The investigator sought to compare relationships of reading BASI test scores with student's perceptions of their own skills and abilities using a population of size ($N = 63$) and a sample size of ($n = 30$).

H6 Population and Sample (BASI Reading) Test 3. R2 - Data: The investigator sought to compare relationships of reading BASI test scores with student's perceptions of their own skills and abilities in reading comprehension using a population of size ($N = 19$), which was the full population sample ($n = 19$).

H6 Population and Sample (BASI Reading) Test 4. R3 – Data: The investigator sought to compare relationships of reading BASI test scores with student's perceptions of their own skills and abilities in reading comprehension using a population of size ($N = 5$), which was the full population sample size of ($n = 5$).

Results for Hypothesis 6- (BASI Reading) Regression Analysis Test 1a; PPMCC Test 1b

The results from the regression analysis test allowed the investigator to determine if a moderate to strong relationship exist between students' perceptions of their abilities and skills in reading comprehension. The correlation coefficient 0.807 demonstrates there exist a strong relationship between students' perceptions of their skills and abilities in reading and BASI test scores. The results are displayed in Table 33.

Table 33.

H6 Regression Analysis (BASI Reading R1R2R3) Test 1a

Regression Statistics	
Multiple R	0.81
R Square	0.66
Adjusted R Square	0.64
Standard Error	8.16
Observations	30

The investigator rejected the null hypothesis because the calculated *p*-value was less than the chosen alpha value of 0.05. There is a statistically significant relationship between students' BASI test scores and perceptions of their own skills and abilities in reading comprehension. The results are displayed in Table 34.

Table 34

H6 PPMCC (BASI Reading R1R2R3) Test 1b

	Coefficients	*Standard Error*	*t Stat*	*p-value*	*Lower 95%*	*Upper 95%*
Intercept	-11.40	5.95	-1.92	0.07	-23.59	0.78
Likert	14.45	1.99	7.23	$p < 0.001$	10.35	18.54

Results for Hypothesis 6- (BASI Reading) Regression Analysis Test 2a; PPMCC Test 2b

The results from the regression analysis test allowed the investigator to determine if a moderate to strong relationship exist between students' perceptions of their abilities and skills in reading comprehension. The correlation coefficient 0.833 demonstrates there exist a very strong relationship between students' perceptions of their skills and ability in math and BASI test scores. The results are in Table 35.

Table 35

H6 Regression Analysis (BASI Reading R1) Test 2a

Regression Statistics	
Multiple R	0.83
R Square	0.69
Adjusted R Square	0.68
Standard Error	7.14
Observations	30

The investigator rejected the null hypothesis because the calculated p-value was less than the chosen alpha value of 0.05. There is a statistically significant relationship between students' BASI test scores and perceptions of their own skills and abilities in reading comprehension. The results are displayed in Table 36.

Table 36

H6 PPMCC (BASI Reading R1) Test 2b

	Coefficients	*Standard Error*	*t Stat*	*p-value*	*Lower 95%*	*Upper 95%*
Intercept	-8.18	4.75	-1.72	0.10	-17.91	1.55
S READ LIKERT	13.19	1.65	7.98	$p < 0.001$	9.80	16.57

Results for Hypothesis 6- (BASI Math) Regression Analysis Test 3a; PPMCC Test 3b

The results from the regression analysis test afforded the investigator the opportunity to determine if a moderate to strong relationship exist between students' perceptions of their abilities and skills in reading comprehension versus their BASI test reading scores. The correlation coefficient 0.678 demonstrates there exist a moderate to strong relationship between students' perceptions of their skills and ability in reading comprehension and BASI test scores. The results are displayed in Table 37.

Table 37

H6 Regression Analysis (BASI Reading R2) Test 3a

Regression Statistics	
Multiple R	0.68
R Square	0.46
Adjusted R Square	0.43
Standard Error	9.94
Observations	19

The investigator rejected the null hypothesis because the calculated p-value was less than the chosen alpha value of 0.05. There is a statistically significant relationship between students' BASI test scores and perceptions of their own skills and abilities in reading comprehension. The results are displayed in Table 39.

Table 38

H6 PPMCC (BASI Reading R2) Test 3b

	Coefficients	*Standard Error*	*t Stat*	*p-value*	*Lower 95%*	*Upper 95%*
Intercept	-5.89	9.19	-0.64	0.53	-25.27	13.50
LIKERT	14.66	3.85	3.81	$p = 0.001$	6.54	22.79

Results for Hypothesis 6- Regression Analysis Test 4a; PPMCC Test 4b

The results from the regression analysis test afforded the investigator the opportunity to determine if a moderate to strong relationship exist between students' perceptions of their abilities and skills in reading comprehension versus their BASI test reading comprehension scores. The correlation coefficient 0.902 demonstrates there exist a very strong relationship between students' perceptions of their skills and ability in reading comprehension and BASI test scores. The results are displayed in Table 39.

Table 39

H6 Regression Analysis (BASI Reading R3) Test 4a

Regression Statistics	
Multiple R	0.90
R Square	0.81
Adjusted R Square	0.75
Standard Error	1.76
Observations	5

The investigator rejected the null hypothesis because the calculated p-value was less than the chosen alpha value of 0.05. There is a statistically significant relationship between students' BASI test scores and perceptions of their own skills and abilities in reading comprehension. The results are displayed in Table 40.

Table 40

H6 PPMCC (BASI Reading R3) Test 4b

	Coefficients	*Standard Error*	*t Stat*	*p-value*	*Lower 95%*	*Upper 95%*
Intercept	1.91	2.89	0.66	0.56	-7.30	11.11
LIKERT	5.08	1.40	3.63	0.04	0.62	9.54

Post-Hoc Scheffé Test Reading

The investigator also calculated post-hoc analyses. Groups R1, R2, and R3 in reading had significant relationships among and between groups R1R2, R1R3, and R2R3. Groups R1, R2, and R3 from 2015-2016 and groups R1, R2, and R3 from 2016-2017 had 7 different relationships among and between the six groups. The math result of each relationship is summarized in **APPENDIX D.**

Summary

An important component of the Investigator's drive in this chapter measured statistical relations between rates of recidivism and academic performance in mathematics and reading comprehension. This chapter initiated the process of quantizing students' perceptions of what they thought about their academic skills and abilities in mathematics and reading. The investigator chose to answer Research Question 1 "Is there a significant difference in the BASI achievement scores in math and reading skills and abilities based on rates of recidivism at XYZ Detention Center?" through Hypothesis 1 and 2 by using the ANOVA test and a *t*-sample *t*-test for means. Hypothesis 1 focused on BASI math scores, while Hypothesis 2 focused on BASI reading scores. The choice of the ANOVA test was used because the investigator's interest was to determine whether there were any statistically significant differences between the means of students' academic skills in mathematics according to their rate of recidivism R1, R2, and

R3. On the BASI math and BASI reading test scores. The Investigator chose the test to compare the 2015-2016 school year that did not have mindfulness training with the 2016-2017 school year that did have mindfulness training.

The investigator used the *t*-test to help answer research question 2 "What is the difference between BASI math and reading scores and recidivism rates at XYZ Detention Center of students who have had daily mindfulness training? The idea behind research question two was to determine if students who had mindfulness moment training had higher test scores than those students who did not have mindfulness training. The investigator analyzed the difference between students trained using mindful moment techniques and those who did not train, and the *t* test was used to compare the two means. A one-tailed test was used since the idea was to show that those students with mindfulness training had a higher increase in scores than those students who did not have the training. Hypothesis 3 focused on BASI math scores, while Hypothesis 4 focused on BASI reading scores.

The investigator used linear regression to help answer research question 3 "What is the relationship between math and reading achievement scores of students who had daily mindfulness training and their ability to assess their learning?". The idea behind the third research question was to examine student's perceptions of their own learning and forecast the results of students BASI test scores. Regression analysis was used to find estimates of students' BASI test scores. The regression analysis successfully predicted BASI math test score outcomes when paired with the students' assessment of their own learning. The investigator associated the graph connected to the prediction equation in figure 2. The linear prediction equation $y = 12.01x - 3.288$ and the range of the error is

given by $14 \leq y \leq 45.0$. The domain of the prediction equation is given by $1.0 \leq x \leq 4.0$. The slope of the prediction equation is positive.

An example of this is given in Figure 5.

If a student feels that his or her math skills and abilities are ranked at 2 points on the Likert Scale then according to the prediction equation, his or her BASI test score can be estimated at 20.7 or 21 when rounded to the nearest whole number. If we take into consideration the error factor with a range of $14 \leq y \leq 45$, then a student's score can range from $14 - 5 \leq y \leq 45 + 5$ or $8 \leq y \leq 50$. The student is predicted to score on the BASI test at a minimum of 8 points up to and including a maximum of 50 points.

Figure 4. Slope Equation

The graph in Figure 6 accurately predicted the student's BASI math test score when given the student's appropriate Likert scale input value.

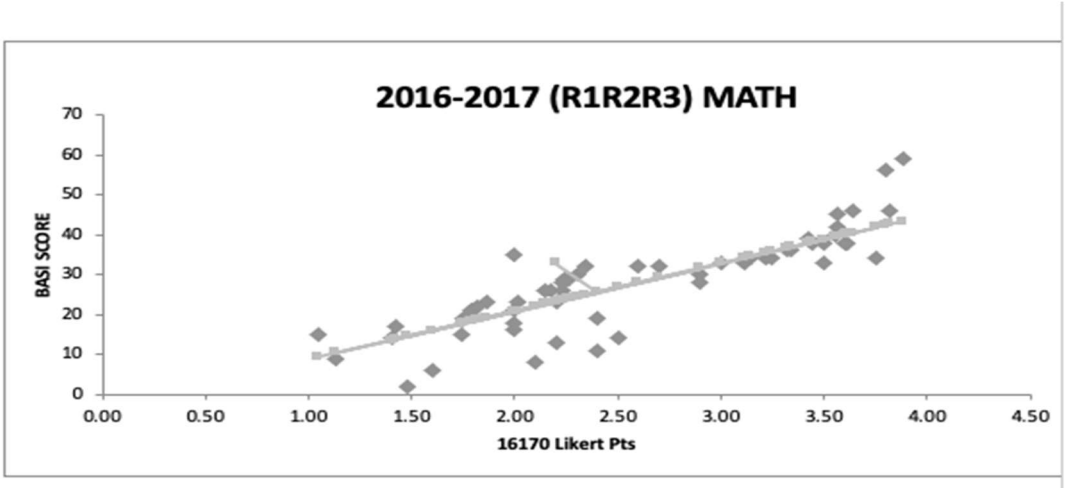

Figure 5. Likert Scores

Table 41 summarizes the research outcome for each hypothesis. Five out of six Hypotheses rejected the Null Hypothesis.

Table 41

Summary Table of Hypothesis

Hypothesis	*Result*
H1: Students who have less recidivism at XYZ Detention Center have higher BASI Math scores than students who have more recidivism at XYZ detention Center.	Reject Null
H2: Students who have less recidivism at XYZ Detention Center have higher BASI Reading scores than students who have more recidivism at XYZ detention Center.	Reject Null
H3: Students who have daily mindfulness training will have a higher increase in BASI math scores than students who have not had Mindfulness Training.	Reject Null
H4: Students who have daily mindfulness lessons will have a higher increase in BASI reading scores than students who have not had daily mindfulness	Fail to Reject Null
H5: Students at XYZ Detention Center who had daily mindfulness lessons have an accurate perception of their BASI math achievement from the 2016-2017	Reject Null Strong Relationship
H6: Students at XYZ Detention Center who had daily mindfulness lessons have an accurate perception of their BASI reading achievement from the 2016-2017 school year.	Reject Null Strong Relationship

Chapter Five

Research about juvenile delinquents was examined in the literature dating back to the late 1800s. This research study was designed to shed light on juvenile recidivism at an urban detention center, and the role of education and trauma in reading skills, abilities, and mathematics. Researchers have linked academic achievement with recidivism (Katsiyannis, Ryan, Zhang, & Spann, 2008). The following research inquiries and hypotheses served as the guiding pillars of this investigation:

Research Question 1: Is there a significant difference in the BASI achievement scores in math and reading skills and abilities based on rates of recidivism at XYZ Detention Center?

Research Question 2: What is the difference between BASI math and reading scores and recidivism rates at XYZ Detention Center of students who have had daily mindfulness training?

Research Question 3: What is the relationship between BASI math and BASI reading achievement scores of students who had daily mindfulness training and their ability to assess their learning?

Hypothesis #1. Students who have less recidivism at XYZ Detention Center have higher BASI math scores than students who have more recidivism at XYZ Detention Center.

Hypothesis #2. Students who have less recidivism at XYZ Detention Center have higher BASI reading scores than students who have more recidivism at XYZ Detention Center.

Hypothesis #3. Students who have daily mindfulness training will have a higher increase in BASI math scores than students who have not had Mindfulness Training.

Hypothesis #4. Students who have daily mindfulness lessons will have a higher increase in BASI reading scores than students who have not had daily mindfulness lessons.

Hypothesis #5. Students at XYZ Detention Center who had daily mindfulness lessons have an accurate perception of their BASI math achievement from the 2016-2017 school year.

Hypothesis #6. Students at XYZ Detention Center who had daily mindfulness lessons have an accurate perception of their BASI reading achievement from the 2016-2017 school year.

Review of Methodology

To respond to all research questions and hypotheses appropriately, the process selected was a quantitative analysis research implemented in three phases. Because the investigator collaborated directly with other professionals in the field, the investigator sought the assistance of others who had excellent ideas in the implementation of this investigation.

Phase 1

The first phase dealt with determining if there was a significant difference in achievement scores in mathematics and reading skills and abilities based on rates of recidivism. Intuitively the investigator assumed there had to be a noticeable difference in the two.

Students who have fewer recidivism rates have higher mathematical achievement scores than those who have higher rates of recidivism. The test was chosen to best determine if there exists any significant difference between achievement and recidivism was the analysis of variance test referred to as ANOVA. To analyze any significant difference between rates of recidivism and academic achievement in mathematics, the investigator examined school years 2015-2016 and 2016-2017 using three categories of recidivism R1, R2, and R3. The examination of differences in pre-test and post-test scores in mathematics of students who are confined to detention was analyzed for results comparing mean scores. The null hypothesis indicated there is no difference in math achievement scores based on rates of recidivism was rejected because the calculated *p*-value was less than 0.001. Therefore, the notion that students who have less recidivism at XYZ Detention Center have higher BASI math scores than students who have more recidivism was accepted.

Students who have fewer recidivism rates have higher scores in reading skills and abilities than those who have higher rates of recidivism. The test used to best determine if there was any significant difference between achievement and recidivism was the ANOVA test. To analyze any significant difference between rates of recidivism and academic achievement in reading skills and abilities, the investigator examined school years 2015-2016 and 2016-2017 using three categories of recidivism R1, R2, and R3. The examination of differences in pre-test and post-test scores in reading from students who are confined to detention was analyzed for results comparing mean scores. The null hypothesis indicated there is no difference in reading skills and abilities achievement scores based on rates of recidivism was rejected because the calculated *p*-value was less

than 0.001. Therefore, the notion that students who have less recidivism at XYZ Detention Center have higher BASI reading scores than students who have more recidivism was accepted.

Phase 2

The second phase focused on determining the difference between BASI math and reading scores and recidivism rates at XYZ Detention Center of students who have had daily mindfulness training.

2015-2016 (R1 R2 R3) vs. 2016-2017 (R1 R2 R3) H3

I examined a random sample of 30 mathematics test scores from all three categories of recidivism. Two tests were used to determine whether, or not, the null hypothesis should be rejected or whether to fail to reject it. The investigator used the *F*-Test initially to determine if equal or unequal variance should be used when choosing which *t*-Test to use. Once the decision to use the equal or unequal variance *t*-Test was made the investigator determined whether to reject or accept the idea that students who had daily mindfulness training during the 2016-2017 school year at XYZ Detention Center did not have a higher increase in BASI math scores than those students who did not have daily mindfulness training during the 2015-2016 school year. The probability result of the *t*-Test which compared the math test scores and rates of recidivism for the school year 2015-2016 with test scores and rates of recidivism for the school year 2016-2017 which had mindfulness training indicated a rejection of the null hypothesis which had a p-value of 0.008 based a 95% confidence interval. Analyzing the results of BASI test scores in mathematics from the 2015-2016 school year when Mindfulness training did not take place compared to the school year 2016-2017 when Mindfulness training did

take place makes it intuitively clear that with trauma training student academic performance reflected an increase in math scores.

2015-2016 (R1) vs. 2016-2017 (R1) H3

The investigator used two tests to determine whether, or not, the null hypothesis should be rejected or accepted. The investigator used the *F*-Test initially to determine whether, or not, equal or unequal variance should be used when choosing which *t*-Test to use. Once the decision to use the equal or unequal variance *t*-Test was made the investigator determined whether to reject or accept the idea that students who had daily mindfulness training during the 2016-2017 school year at XYZ Detention Center did not have a higher increase in BASI math scores than those students who did not have daily mindfulness training during the 2015-2016 school year. The probability result of the *t*-Test which compared the math test scores and rates of recidivism for the school year 2015-2016 with test scores and rates of recidivism for the school year 2016-2017 which had mindfulness training indicated a rejection of the null hypothesis which had a *p*-value of 0.017 based a 95% confidence interval. Analyzing the results of BASI test scores in mathematics from the 2015-2016 school year when Mindfulness training did not take place compared to the school year 2016-2017 when Mindfulness training did take place makes it intuitively clear that with trauma training student academic performance reflected an increase in math scores.

2015-2016 (R2) vs. 2016-2017 (R2) H3

I used two tests to determine whether, or not, the null hypothesis should be rejected or accepted. The investigator used the *F* Test initially to determine whether, or not, equal or unequal variance should be used when choosing which *t* test to use. Once

the decision to use the equal or unequal variance *t* test was made the investigator determined whether to reject or accept the idea that students who had daily mindfulness training during the 2016-2017 school year at XYZ Detention Center did not have a higher increase in BASI math scores than those students who did not have daily mindfulness training during the 2015-2016 school year. The probability result of the *t* test, which compared the math test scores and rates of recidivism for the school year 2015-2016 with test scores and rates of recidivism for the school year 2016-2017, which had mindfulness training rejected the null hypothesis which had a *p*-value of 0.008 based a 95% confidence interval. Analyzing the results of BASI test scores in mathematics from the 2015-2016 school year when Mindfulness training did not take place compared to the school year 2016-2017 when Mindfulness training did take place makes it intuitively clear that with trauma training, student academic performance reflected an increase in math scores.

2015-2016 (R3) vs. 2016-2017 (R3) H3

I used two tests to determine whether, or not, the null hypothesis should be rejected or accepted. the investigator used the *F* Test initially to determine whether, or not, equal or unequal variance should be used when choosing which *t* test to use. Once the decision to use the equal or unequal variance *t* test was made the investigator determined whether to reject or accept the idea that students who had daily mindfulness training during the 2016-2017 school year at XYZ Detention Center did not have a higher increase in BASI math scores than those students who did not have daily mindfulness training during the 2015-2016 school year. The probability result of the *t* test which compared the math test scores and rates of recidivism for the school year 2015-2016 with

test scores and rates of recidivism for the school year 2016-2017 which had mindfulness training did not reject the null hypothesis which had a *p*-value of 0.226 based on a 95% confidence interval. Analyzing the results of BASI test scores in mathematics from the 2015-2016 school year when Mindfulness training did not take place compared to the school year 2016-2017 when Mindfulness training did take place makes it not so intuitively clear that with trauma training student academic performance reflected an increase in math scores.

I suspects that the number of data values was insufficient. There wasn't enough data to show definitively whether, or not, Mindfulness training was an effective intervention.

2015-2016 (R1 R2 R3) vs. 2016-2017 (R1 R2 R3) H4

I examined a random sample of 30 reading comprehension test scores from all three categories of recidivism. Two tests were used to determine whether, or not, the null hypothesis should be rejected or whether to fail to reject it. The investigator used the *p*-value initially to determine if equal or unequal variance should be used when choosing which t-test to use. the investigator determined whether to reject or accept the idea that students who had daily mindfulness training during the 2016-2017 school year at XYZ Detention Center did not have a higher increase in BASI reading comprehension scores than those students who did not have daily mindfulness training during the 2015-2016 school year. The probability result of the *t*- test which compared the reading comprehension test scores and rates of recidivism for the school year 2015-2016 with test scores and rates of recidivism for the school year 2016-2017 which had mindfulness

training rejected the null hypothesis which had a *p*-value of 0.007 based on a 95% confidence interval.

The analyzed results of BASI test scores in reading comprehension from the 2015-2016 school year when Mindfulness training did not take place compared to the school year 2016-2017 when Mindfulness training did take place makes it intuitively clear that with trauma training student academic performance reflected an increase in reading comprehension scores.

2015-2016 (R1) vs. 2016-2017 (R1) H4

I used two tests to determine whether, or not, the null hypothesis should be rejected or not. The investigator used the *p*-value from the *F* Test initially to determine, whether or not, equal or unequal variance should be used when choosing which t-test to use. Once the decision to use the equal or unequal variance *t* test was made the investigator determined whether to reject or accept the idea that students who had daily mindfulness training during the 2016-2017 school year at XYZ Detention Center did not have a higher increase in BASI reading comprehension scores than those students who did not have daily mindfulness training during the 2015-2016 school year. The probability result of the t-test which compared the reading comprehension test scores and rates of recidivism for the school year 2015-2016 with test scores and rates of recidivism for the school year 2016-2017 (which had mindfulness training) did not indicate a rejection of the null hypothesis which had a *p*-value of 0.265 based on a 95% confidence interval. Analyzing the results of BASI test scores in reading comprehension from the 2015-2016 school year when Mindfulness training did not take place compared to the school year 2016-2017 when Mindfulness training did take place did not make it

intuitively clear that with trauma training student academic performance reflected an increase in reading comprehension scores. The investigator failed to reject the null hypothesis with an understanding that their communications art teacher was not teaching students from the 2016-2017 school year, but instead by their mathematics teacher using Mindfulness moment techniques.

2015-2016 (R2) vs. 2016-2017 (R2) H4

I used the *p*-value from the *F* Test initially to determine whether, or not, equal or unequal variance should be used when choosing which t-test to use. The decision to use the equal or unequal variance t-test was made by the investigator to determine whether to reject or accept the idea that students who had daily mindfulness training during the 2016-2017 school year at XYZ Detention Center did not have a higher increase in BASI reading comprehension scores than those students who did not have daily mindfulness training during the 2015-2016 school year. The probability result of the *t* test which compared the reading comprehension test scores and rates of recidivism for the school year 2015-2016 with test scores and rates of recidivism for the school year 2016-2017 (which had mindfulness training) did not indicate a rejection of the null hypothesis which had a *p*-value of 0.266 based on a 95% confidence interval. Analyzing the results of BASI test scores in reading comprehension from the 2015-2016 school year when Mindfulness training did not take place compared to the school year 2016-2017 when Mindfulness training did take place did not make it intuitively clear that with trauma training student academic performance reflected an increase in reading comprehension scores. The investigator failed to reject the null hypothesis with an understanding that

their communications art teacher was not teaching students from the 2016-2017 school year, but instead by their mathematics teacher using Mindfulness moment techniques.

2015-2016 (R3) vs. 2016-2017 (R3) H4

I used two tests to determine whether, or not, the null hypothesis should be rejected, or not. The investigator used the *p*-value from the *F* Test initially to determine whether, or not, equal or unequal variance should be used when choosing which t-test to use. Once the decision to use the equal or unequal variance *t*-test was made the investigator determined whether to reject or accept the idea that students who had daily mindfulness training during the 2016-2017 school year at XYZ Detention Center did not have a higher increase in BASI reading comprehension scores versus those students who did not have daily mindfulness training during the 2015-2016 school year. The probability result of the *t* test which compared the reading comprehension test scores and rates of recidivism for the school year 2015-2016 with test scores and rates of recidivism for the school year 2016-2017 (which had mindfulness training) did not indicate a rejection of the null hypothesis which had a p-value of 0.228 based on a 95% confidence interval. Analyzing the results of BASI test scores in reading comprehension from the 2015-2016 school year when Mindfulness training did not take place compared to the school year 2016-2017 when Mindfulness training did take place did not make it intuitively clear that with trauma training student academic performance reflected an increase in reading comprehension scores. The investigator failed to reject the null hypothesis with an understanding that their communications art teacher was not teaching students from the 2016-2017 school year, but instead by their mathematics teacher using Mindfulness Moment techniques.

Phase 3

The third phase is concerned with the relationship between BASI math and reading achievement scores of students who had daily mindfulness training and their ability to assess their learning. The investigator applied the most common measure of correlation in statistics, the Pearson Product Moment Correlation (PPMC). The investigator also used regression analysis to examine any relationships between students' BASI academic achievement and their assessment of how they performed using the Likert scale described in chapter 3. The comparison of both the BASI achievement scores in mathematics and reading skills and abilities were examined along with the result of each student's Likert scale score.

2016-2017 R1 R2 R3 H5

I calculated the correlation coefficient for the 2016-2017 dataset using BASI math achievement scores from all three rates of recidivism R1, R2, and R3. Each student's BASI math score was paired with their Likert scale score. The correlation coefficient was calculated for the entire group R1R2R3. The correlations coefficient (cc) in mathematics for the group was 0.782. The correlation coefficient of 0.782 represents a strong relationship between math scores and students' perceptions of how they viewed their own academic beliefs and strengths in mathematics. The graph describes the relationship between BASI math scores during the 2016-2017 school year and student Likert Scale choices.

2016-2017 R1 H5

I calculated the correlation coefficient for the 2016-2017 dataset using BASI math achievement scores from the R1 recidivism rate. Each student's BASI math score was

paired with their Likert scale score. The correlation coefficient was calculated for the entire group R1. The correlations coefficient (*cc*) in mathematics for the group was 0.822. The correlation coefficient 0.822 represents a strong relationship between math scores and student's perceptions about how they viewed their own academic beliefs and strengths in mathematics.

The calculated *p*-value was less than 0.001, which allowed the investigator to reject the thought that there is no relationship between actual BASI Math scores of students who have had daily mindfulness training and students' perceptions of achievement from the school year 2016-2017 at XYZ Detention Center.

2016-2017 R2 H5

The calculations for the correlation coefficient in the 2016-2017 data-set using BASI math achievement scores from R2 recidivism were made from the Excel Spreadsheet Calculator. Each student's BASI math score was paired with their Likert scale score. The correlation coefficient was calculated for the entire R2 group. The *cc* in mathematics for the R2 group was 0.739. The correlation coefficient 0.739 represents a strong relationship between math scores and student's perceptions about how they viewed their own academic beliefs and strengths in mathematics. The calculated *p*-value was less than 0.001, which allowed the investigator to reject the thought that there is no relationship between actual BASI math scores of students who have had daily mindfulness training and students' perceptions of achievement from the school year 2016-2017 at XYZ Detention Center.

2016-2017 R3 H5

The correlation coefficient in the 2016-2017 dataset using BASI math achievement scores from R3 recidivism was calculated from the Excel Spreadsheet Calculator. Each student's BASI math score was paired with their Likert scale score. The *cc* in mathematics for the R3 group was 0.811. The correlation coefficient 0.811 represents a strong relationship between math scores and student's perceptions about how they viewed their own academic beliefs and strengths in mathematics. Because the calculated *p*-value 0.095 was greater than our alpha value of 0.05 forced the investigator to fail to reject the notion that there is no relationship between actual BASI math scores of students who have had daily mindfulness training and students' perceptions of achievement from the school year 2016-2017 at XYZ Detention Center. The investigator had only five data points for which to use in the calculation.

2016-2017 R1 R2 R3 H6

I calculated the correlation coefficient for the 2016-2017 dataset using BASI reading achievement scores from all three rates of recidivism R1, R2, and R3. Each student's BASI reading score was paired with their Likert scale score. The correlation coefficient was calculated for the entire group R1R2R3. The correlation coefficient (*cc*) in reading skills and abilities for the group was 0.807. The correlation coefficient 0.807 represents a strong relationship between reading achievement scores and student's perceptions about how they viewed their own academic beliefs and strengths in reading skills and abilities. The graph represents the relationship between BASI reading achievement scores during the 2016-2017 school year and the student Likert Scale number.

2016-2017 R1 H6

I calculated the correlation coefficient for the 2016-2017 dataset using BASI reading achievement scores from the R1 recidivism group. Each student's BASI reading score was paired with their Likert scale score. The correlation coefficient was calculated for the entire group R1. The correlations coefficient (*cc*) in reading skills and abilities for the group was 0.833. The correlation coefficient 0.833 represents a strong relationship between reading scores and student's perceptions about how they viewed their own academic beliefs and strengths in reading.

The calculated *p*-value was less than 0.001, which allowed me to reject the philosophy that there is no relationship between actual BASI reading scores of students who have had daily mindfulness training and students' perceptions of achievement from the school year 2016-2017 at XYZ Detention Center.

2016-2017 R2 H6

The calculations for the correlation coefficient in the 2016-2017 dataset using BASI reading achievement scores from R2 recidivism were implemented on the Excel Spreadsheet Calculator. Each student's BASI reading achievement score was paired with their Likert scale score. The correlation coefficient was calculated for the entire R2 group. The correlation coefficient for the R2 group was 0.678. The correlation coefficient 0.678 represents a moderately strong relationship between reading achievement scores and student's perceptions about how they viewed their own academic beliefs and strengths in reading. The calculated p-value was less than 0.001, which allowed me to reject the philosophy that there is no relationship between actual BASI

reading scores of students who have had daily mindfulness training and students' perceptions of achievement from the school year 2016-2017 at XYZ Detention Center.

2016-2017 R3 H6

The correlation coefficient in the 2016-2017 dataset using BASI reading achievement scores from the R3 recidivism group was calculated from the Excel Spreadsheet Calculator. Each student's BASI reading score was paired with their Likert scale score. The correlation coefficient in reading for the R3 group was 0.902. The correlation coefficient 0.902 represents a strong relationship between reading achievement scores and student's perceptions about how they viewed their own academic beliefs and strengths in reading. Because the calculated *p*-value 0.036 was less than our alpha value of 0.05, The investigator rejected the notion that there is no relationship between actual BASI reading achievement scores of students who have had daily mindfulness training and students' perceptions of achievement from the school year 2016-2017 at XYZ Detention Center. There were only five students in the R3 group from the school year 2016-2017. This may have played an essential role in the correlation coefficient being so high at 0.902.

Recommendations

An important component of the study was to avoid students from returning to the detention for two or more times. First-time recidivism is key. These are the students for whom it is important to share experiences in order to avoid them from becoming multiple recidivists. It is important to make sure the educational staff members are trained on Mindful moment strategies, so students benefit from outcomes of higher scores and awareness of scores. It is going to be important to share data outcomes with staff and

students to promote education regarding mindfulness training. Informing the principle relating to such training is essential in order to expand the education system and ultimately expanding the practice. Providing youth with restorative practices such as focusing on the present and solitude of thought when they are young, prior to engaging in delinquent behavior helps heal the trauma that comes from substance abuse, anger, anxiety, avoidance, isolation, law breaking, and helplessness. This can be done by providing restorative treatment prior to being incarcerated a second or third. So essential! Students should also be provided supplemental help to avoid falling too far behind upon entering the court system, not when they are incarcerated. In addition, court systems could make tutoring a requirement to lessen the educational gaps that the literature states aids in students becoming delinquent and ending up dropping out of school or incarcerated.

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Appendix A

Name: _____ Date October 11, 2016

SURVEY

1. What did you learn from this week or last weeks' lessons? **(give examples).**

2. Check one box below. How satisfied are you with what you learned in class this past week?

Not Satisfied = 1	Slightly Satisfied = 2	Moderately Satisfied = 3	Very Satisfied = 4	Extremely Satisfied = 5

Evaluate each expression.

3a $\frac{7}{6} + \frac{5}{6} =$ _____

3b) $\frac{4(5^2 - 4*3)}{4(4*5+2)} =$ _____

3c) $\frac{1}{5} + \frac{1}{5} =$ _____

Appendix B

0 PTS	1 PT	2 PTS	3 PTS	4 PTS
Mathematical knowledge: Shows no understanding of the problem's mathematical concepts and principles. Strategic knowledge: May attempt to use irrelevant outside information; fails to indicate which elements of the problem are appropriate; copies part of the problem, but without attempting a solution.	Mathematical knowledge: Shows very limited understanding of the problem's mathematical concepts, and principles; may misuse or fail to use mathematical terms; and may make major computational errors. Strategic Knowledge: May attempt to use irrelevant outside information; fails to identify important elements or places too much emphasis on unimportant elements.	Mathematical knowledge: Shows understanding of some of the problem's mathematical concepts, and principles; and may contain serious computational errors. Strategic knowledge: Identifies some important elements of the problems but shows only limited understanding of the relationships between them; and gives some evidence of a solution process, but solution process may be incomplete or somewhat unsystematic.	Mathematical knowledge: Shows nearly complete understanding of the problem's mathematical concepts and principles; uses nearly correct mathematical terminology and notations; executes algorithms completely; and computations are generally correct but may contain minor errors. Strategic knowledge: May use relevant outside information of a formal or informal nature; identifies the most important elements of the problems and shows general understanding of the relationships between them.	Mathematical knowledge: Shows understanding of the problem's mathematical concepts and principles; uses appropriate mathematical terminology and notations; and executes algorithms completely and correctly. Strategic knowledge: May use relevant outside information of a formal or informal nature; identifies all the important elements of the problem and shows understanding of the relationships between them; reflects an appropriate and systemic strategy for solving the problem; and gives clear evidence of a solution process.

Appendix C

2016 - 2017 School Year - Independent Variable - MINDFUL MOMENTS INSTRUCTION EXIT TICKET

1 time recidivism

Actual Student	Student #	PRE- TESTS		Student #	POST-TESTS		Exit Ticket
		math BASI	reading BASI		math BASI	reading BASI	participation #
	W.1			W.1			
	W.2			W.2			
	W.3			W.3			
	W.4			W.4			
	W.5			W.5			
	W.6			W.6			
	W.7			W.7			
	W.8			W.8			
	W.9			W.9			
	W.10			W.10			
	W.11			W.11			
	W.12			W.12			
	W.13			W.13			
	W.14			W.14			
	W.15			W.15			
	W.16			W.16			
	W.17			W.17			
	W.18			W.18			
	W.19			W.19			
	W.20			W.20			
	W.21			W.21			
	W.22			W.22			
	W.23			W.23			
	W.24			W.24			
	W.25			W.25			
	W.26			W.26			
	W.27			W.27			
	W.28			W.28			
	W.29			W.29			

2 time recidivism

Actual Student	Student #	PRE- TESTS		Student #	POST-TESTS		Exit Ticket
		math BASI	reading BASI		math BASI	reading BASI	participation #
	X.1			X.1			
	X.2			X.2			
	X.3			X.3			
	X.4			X.4			
	X.5			X.5			
	X.6			X.6			
	X.7			X.7			
	X.8			X.8			
	X.9			X.9			
	X.10			X.10			
	X.11			X.11			
	X.12			X.12			
	X.13			X.13			
	X.14			X.14			
	X.15			X.15			
	X.16			X.16			
	X.17			X.17			
	X.18			X.18			
	X.19			X.19			
	X.20			X.20			
	X.21			X.21			
	X.22			X.22			
	X.23			X.23			
	X.24			X.24			
	X.25			X.25			
	X.26			X.26			
	X.27			X.27			
	X.28			X.28			
	X.29			X.29			

3 or more time recidivsim

Actual Student	Student #	PRE- TESTS		Student #	POST-TESTS		Exit Ticket
		math BASI	reading BASI		math BASI	reading BASI	participation #
	Y.1			Y.1			
	Y.2			Y.2			
	Y.3			Y.3			
	Y.4			Y.4			
	Y.5			Y.5			
	Y.6			Y.6			
	Y.7			Y.7			
	Y.8			Y.8			
	Y.9			Y.9			
	Y.10			Y.10			
	Y.11			Y.11			
	Y.12			Y.12			
	Y.13			Y.13			
	Y.14			Y.14			
	Y.15			Y.15			
	Y.16			Y.16			
	Y.17			Y.17			
	Y.18			Y.18			
	Y.19			Y.19			
	Y.20			Y.20			
	Y.21			Y.21			
	Y.22			Y.22			
	Y.23			Y.23			
	Y.24			Y.24			
	Y.25			Y.25			
	Y.26			Y.26			
	Y.27			Y.27			
	Y.28			Y.28			
	Y.29			Y.29			

Appendix D

MATH	Scheffe Sig?	+/-
1516R1vs1617R1	Yes	+
1516R1vs1516R2	Yes	-
1516R1vs1516R3	Yes	-
1617R1vs1516R2	Yes	-
1617R1vs1617R2	Yes	-
1617R1vs1516R3	Yes	-
1516R2vs1617R2	Yes	+
1617R2vs1516R3	Yes	-

Appendix E

READ	Scheffe Sig?	+/-
1516R1vs1617R1	Yes	+
1516R1vs1516R2	Yes	+
1617R1vs1516R2	Yes	-
1617R1vs1617R2	Yes	+
1617R1vs1516R3	Yes	-
1617R1vs1617R3	Yes	-

Vitae

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Education

2006-2007 **Master of Science in Computer Education**
Fontbonne University, Saint Louis, Missouri
GPA: 3.850 cumulative.
Thesis Title: Ethics in Computer Technology in Secondary Schools
Relevant Coursework: Multimedia Exploration and Production, Technology and Learning, Web Page Design, Review/Selection Computer Hardware, Curriculum Technology Integration, Ethics of Technology Use in Education, Special Topic in Education: Teaching Online

1997-2002 **Bachelor of Arts in Classical Applied Mathematics**
GPA: 3.1248 cumulative.

Relevant Coursework: Calculus with Analytic Geometry, Real Analysis, Complex Variables, Numerical Analysis, Linear Analysis, Topology, Abstract Algebra, Foundations of Real Analysis, Non-Euclidean Geometry,

Teaching and Research Experience

2002-2004 **Mathematics Tutor**
Tutored undergrads needing remediation in college algebra
Tutored Calculus II Taylor's Polynomial Approximations to incoming School of Optometry students at UMSL under the direction of Dr. Long.

2004-2020 **High School Mathematics Teacher**
Taught Algebra, Geometry, Advance Algebra, Trigonometry, Elementary Functions, AP Calculus, College Algebra

2008-2020 **Saint Louis Community College**
Adjunct Mathematics Instructor
Courses: Math Remediation, Pre-Algebra, Elementary Algebra, College Algebra, Elementary Applied Mathematics, Calculus