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Darren Wilson
Lindenwood University

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Memory Patterns in a Dementia Patient

Darren Wilson⁶

Alzheimer's disease is characterized by the gradual loss of memory and personality traits. Cognitive function deteriorates over time and affects a person's quality of life, as well as his or her ability to remember. More specifically, Alzheimer's disease affects one's ability to recall specific types of memory, including those of an implicit nature. Implicit memories are those that are subconsciously stored and later retrieved throughout the lifespan with relative ease. Examples include, but are not limited to: learning to ride a bike, or tying one's shoes. These are abilities that may or may not require a great deal of learning, and they are also more difficult to explain to others with regards to the actual process that goes in to carrying out the behavior, as opposed to declarative memories which are memories of facts, events, or occurrences. Alzheimer's has been shown to adversely affect one's memory storage in very complex ways. Some may experience anterograde amnesia in which the person has difficulty creating new memories, while others may experience retrograde amnesia in which they have trouble recalling events or situations that have already happened. The purpose of this study was to observe a patient with Alzheimer's disease and determine how well he or she was able to retrieve implicit memories through completion of everyday tasks. It was discovered that tasks that required greater physical effort were less likely to be completed than those that were quicker to carry out.

Under the umbrella of dementia, Alzheimer's disease is defined by the American Psychological Association as a condition characterized by gradual loss of memory, and a decline in one's social and/or mental faculties (2002, p. 1) The subject involved in this research was diagnosed with Alzheimer's disease in December of 2009 at the age of 62. His memory patterns have changed significantly over the years since his diagnosis. At times he is able to carry out everyday behaviors (e.g. changing his clothes or rolling his own wheelchair) with relative ease, while at other times he is much slower to react or not able to carry out the behavior at all. This poses many questions as to what affects his competence from day to day, whether his ability to remember is damaged, and/or is there a motivation component that drives him to behave in particular ways. The purpose, however, was to uncover any significant findings with regards to

⁶ Darren Wilson, Department of Psychology, Lindenwood University.

Correspondence regarding this paper should be addressed to Darren Wilson, Department of Psychology, Lindenwood University, 209 S. Kingshighway • St. Charles, MO 63301.

his ability to recover implicit memories. It is believed that some aspects of implicit memory are unaffected initially in the onset of Alzheimer's (Storandt, 2008). These types of memories are subconsciously stored and typically recalled without great effort. These abilities are also said to involve automatic activation of existing memories (Storandt, 2008). This was particularly relevant because the subject has shown patterns of some memory loss over time, but to varying degrees. His memory changes over time, and it is of great interest to examine if there may be a potential motivation component underlying his ability to retrieve memories.

For an Alzheimer's patient with retrograde amnesia (forgetting prior histories), it may be severe to the point that it goes well beyond the inability to recall recent events, and may encompass their entire life. Of course the severity is important to examine because it may suggest that there is atrophy in the MTL (medial temporal lobe) or neocortex, where it is believed that long-term memories are stored (Smith, 2014). But, when looking at the MTL or hippocampus, it is known that when these structures are damaged, memory loss is likely to occur (Moskovitch, 2008). The subject suffered from multiple diagnosed strokes in 2009, leading to initial damage. With that said, observing his behavior in ways that required very little effort on his part would aim to provide insight into not just how Alzheimer's disease affects implicit memories, but also whether a motivation component was present as well. This also tied into how well he selectively paid attention, which is why observation of his implicit memories was of utmost importance. Observation allowed for the principal investigator to thoroughly examine the subject without placing unnecessary stress on the individual. This also allowed the principal investigator to determine what extrinsic as well as intrinsic factors were motivating the subject to carry out a particular behavior. For example, an extrinsic factor may have been his desire of

wanting to close the window blinds because there was too much sunlight in his room. An intrinsic factor on the other hand may have been his desire to quench his thirst by getting a soda.

Another study examined the relationship between implicit memories (with explicit memories) and Alzheimer's disease with regards to priming. Specifically, priming occurs when an individual is exposed to a stimulus that may provoke a response to the same stimulus after repeated exposure (Psychology Dictionary, n.d.). What they discovered was that memory ability in Alzheimer's may be damaged or intact due to the processes underlying the particular types of memory that are controlled by the parts of the brain that are affected by the presence of Alzheimer's (Fleischman, et. al, 2005). Essentially, Alzheimer's was shown to definitively have an impact on implicit memory ability. They conducted two different tests (category-exemplar and word-identification tests) and saw that higher levels of neuropathology with regards to Alzheimer's were related to lower levels of implicit memory in the first test, though these levels of neuropathology were not related to implicit memory levels in the word-identification test (Fleischman, et. al, 2005). All of this is relevant because by presenting the same stimuli to the subject over time, priming could occur (i.e. the subject would be more likely to remember events from the previous visits). So, if behaviors occurred or were encouraged to occur during the first visit, they would hopefully trigger memories of these events in the future when visiting him. Comparatively speaking, the behavior of the subject between visits may indicate that there was a substantial effect with regards to priming and implicit memory. Another relevant study indicated that there was a relationship between priming and implicit memories. David B. Mitchell cited relevant research when he determined through long-term picture priming that individuals exhibited higher recognition rates than those in a control group who had never seen the image before (Drumme & Newcombe, 1995). They were shown an image for 1 to 3 seconds, and

again showed these images 17 years later by mail. Their recognition rates were higher than for those who had never been shown the images. When considering individuals with Alzheimer's it was determined by Mitchell and Schmitt that with regards to long-term picture priming, these individuals showed some impairment when they were assisted in remembering but their long-term picture priming was more intact when presented with a brand new image (i.e. they recognized them better) (2006, p. 928).

All of these studies serve the purpose of recognizing that implicit memories are durable over time and that even though the subject has Alzheimer's, he or she is still more than capable of recalling events from the past, regardless of how briefly they were exposed to an event. If the subject is not able to complete a task, it may be due to some other factor, and likely not because of his or her inability to remember.

Method

Participant

The subject studied was a resident at Dutchtown Care and Rehabilitation Center. The subject, who is 67 years old, was visited two times per week for approximately three weeks. Data was collected in the form of descriptive statistics to display the frequency of implicit behaviors that occurred. It was performed by the principal investigator, whom is also related to the subject. The subject also has Alzheimer's disease.

Materials

For the research, mere observations were used to gather data on the subject. A list of implicit memories was used to determine which behaviors did or did not occur (see Appendix A). The facility in which the subject resides was also used to gain access to the participant on a consistent basis.

Procedure

A set of nine implicit memories was observed by the investigator during each visit. These behaviors would often occur by the subject, although there were times in which he would ask for assistance to complete some of the behaviors. After each visit, the frequency of each implicit memory was recorded in a table that accurately displays how often the implicit behaviors occurred. This started in early April, and concluded later in the month.

Results

Data were collected on five different days, starting April 12, 2015, and occurred approximately once to twice a week for three consecutive weeks. The following implicit behaviors or basic tasks were observed of the participant: pushing an elevator button for transportation, spending money at a vending machine to retrieve a soda, opening a can of soda, washing his face by first turning on the sink, clipping his own fingernails, changing the channel using the remote, rolling his own wheelchair, opening or closing of the closet door to look for a shirt, and opening/closing of his window blinds in his room. The frequency was recorded from each of these behaviors from visit to visit.

For the behavior of pushing the elevator button, out of five consecutive visits, the behavior occurred at least once during each visit. The behavior of spending money at the vending machine occurred at some point during all five visits. For the behavior of opening a can of soda, out of five consecutive visits, the behavior occurred during all five visits after money was spent at the vending machine. After shaving his face, the behavior of washing his face by turning on the sink did not occur at all, as well as the behavior of clipping his own fingernails, which did not occur at all. These behaviors were instead completed by the principal investigator upon request; other behaviors that did not occur included opening and closing of the closet door to

retrieve a shirt to change in after the shaving. Assistance was provided in this particular situation. Rolling his wheelchair occurred during visits 1, 4, and 5. The behavior of changing the channel using the remote occurred during every single visit. Lastly, the behavior of opening or closing his window blinds did not occur either (see Table 1).

Discussion

A noticeable trend occurred over time pointing to the subject's personal level of motivation. Behaviors that occurred more frequently typically led to personal satisfaction for the subject, as determined by overall affect and pleasant mood. The participant was also more talkative when satisfied and appeared to have little to no stress. This included going to the elevator so that he could facilitate going to the vending machine much faster. This would lead to the behavior of spending money at the machine, as well as actually drinking the soda, all behaviors that occurred with great frequency. Once back in his room, the behavior of changing the channels on his television with his remote occurred with great frequency as well. Collectively, these were all behaviors that the participant wanted to accomplish because they led to personal satisfaction or fulfilled natural processes (i.e., quenching his thirst, or watching his favorite television show). The other behaviors that did not occur with great frequency were not of particular interest to the subject, and were very telling with regard to the subject and his current mental state. The behaviors of looking after himself were of very little interest, if at all, because they did not occur frequently. Another interesting aspect of this development was that these behaviors required greater effort physically from the participant. Clipping his own fingernails, washing his face after turning on the sink, as well as opening and closing of the closet door to change clothes, as well as opening or closing of the window blinds were tasks that required him to put in greater effort, for an outcome that he did not value as greatly as the frequently occurring

behaviors. This was all very telling with regard to how motivation can play an important role in a person with Alzheimer's disease, and if it truly has an effect on his or her implicit memories.

As for future implications, it would be imperative to conduct research on many more individuals with Alzheimer's because as the elderly population climbs, the occurrences of Alzheimer's may increase as well. Being able to confront this condition in this manner will likely help families understand why their loved ones behave in the manner in which they do while also allowing caregivers to be able to effectively meet the demands of those with Alzheimer's and ensure that they have a comfortable future while living with the condition. While there is no cure for Alzheimer's, if there is a possibility to delay any damaging mental effects through motivating or encouraging them to keep active through physical activity, it will hopefully allow for them to retain some mental sharpness as they progress with the disease.

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Appendix A

Implicit Memory Behaviors

- 1) Pushing elevator button for transportation
- 2) Opening can of soda
- 3) Spending money at vending machine
- 4) Washing face by first turning on sink
- 5) Clipping fingernails
- 6) Change channel using remote
- 7) Rolling his own wheelchair
- 8) Opening/closing closet door to look for shirt (aftershave)
- 9) Opening/closing the window blinds

Table 1. The frequency of implicit behaviors throughout each of the five visits.

Behaviors	Visits				
	1	2	3	4	5
Pushing elevator button	1	1	2	1	2
Spending Money at Machine/Opening can of soda	1	1	3	2	2
Washing face after turning on sink	0	0	0	0	0
Clipping fingernails	0	0	0	0	0
Change channel using remote	2	5	7	2	4
Rolling his own wheelchair	2	0	0	2	2
Opening/Closing closet door	0	0	0	0	0
Opening/Closing Window Blinds	0	0	0	0	0