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## Biological Approach: The Main Factor Influencing Elderly Eyewitness Testimony

Memory is processed information stored in our brain that can be accessed through the abstract of relevant meaning from the events and experiences that we have witnessed, rather than exposing the human mind to every bit of factual detail. Through this process, a schema can be formed, enabling us to process new found knowledge more effectively. The topic itself can be explored through two approaches; cognitive and biological. Throughout the years, many researchers have undergone various studies and experiments to seek after a better understanding of the relation between age and memory, and whether age is the primary cause/influence in this regard. In order to seek this understanding, the following research questions will be explored, "To what extent does age have an effect on elderly eyewitness testimony?"

It is necessary to take on both sides of the debate of this particular topic, as not only would it deviate from a bias standpoint, but also allow for a whole range of perspectives regarding whether elderly's memory are generally 'worse' than others. Upon the start of the exploration of this question, many subsidiary factors or questions may arise, such as asking if age affects memory, is it the main or only cause? Does loss of memory have a direct correlation with the decay of a human's physical condition or with time itself? These are just a few of many things that can be considered through this investigation, despite how broad they may be. The university of Rochester medical center had deduced through various findings that a person's brain would stop developing during their early adulthood (around the age of 25).

In relation to this topic, the following questions can be brought up, 'What happens to our brain after it stops growing?', 'Does our brain or mental abilities start to decay after a period of time?', so forth. All these questions can be maintained and answered through personal experience or investigation, allowing us to reach a further concept of the topic itself. By exploring this topic in depth, I will be able to ascertain my beliefs of on how age does have a direct influence on people's memory and ability to remember. Cognitive Approach One of the key concepts in understanding memory is recognition and identification. It converges with the theory of episodic memory, elaborating on the process of practice to build coherent foundations that stabilize certain 'fragments of memory'. Episodic memory (is understood as the ability to remember specific events or things) is the first thing that starts to deteriorate as age grows older. In relation to this theory, several studies have been conducted in a widespread manner.

Research/laboratory studies have findings showing that older eye witness testimonies may 'false alarm' to unfamiliar or new faces. This may be due to the underlying reason that their analyzing skills have deteriorated as their memory deteriorates due to age. This led to an increase in the rate of false identifications by senior people (such as elderly) who were at the scene of crime/investigation.

A researcher by the name of Tim Valentine conducted a field study, (field studies are regarded to be more reliable and efficient compared to other research methods such as laboratory experiments). In the study, Tim collected 640 witnesses who were asked to identify suspects in a 314 lineup in London. From the study, Tim was able to find that from broadly classified age

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groups, around 48% of those who were 20 years old or younger were able to identify suspects, while those above that age boundary provided less identifications. He rounded a possible underlying idea that it could be possible that older men have more difficulty recognizing younger faces compared to younger people. This brought us to believe that older men have a more difficult time trying to learn something new and process it as long term memory.

However, to further support the notion that age deteriorates memory, Liz Brimacombe based in Canada conducted simulated jury studies where stereotypes of elderly testimonies were examined. The main focus of the study was to investigate how reliable elderly eye witness testimonies were compared to younger eye witness testimonies. Participants were asked to act as jurors for this investigation, and were shown videotapes of young and older testimonies. During one particular study, the older seniors were shown to provide less accurate responses to direct questions, though they did not conclude that their responses were less credible compared to the responses of younger people. But about a year later, the jurors were able to find out that elderly people (around 70 years of age) did provide testimonies that were not accurate, allowing them to come to the conclusion that their testimonies were less credible. The study itself can be generalized towards the majority of the population, as it did not cause stereotypical bias with the jurors due to being within a large range of age.

“When perception becomes less sensitive with age, sensory organs take in incomplete information from the outside world. At the same time, they also compete for scarce cognitive resources within the brain. As more working memory is being used to try to decipher vision and sounds, less working memory is available to attach meaning to sensory information and store it in memory. The ‘Speed of Processing Model’ suggests that with increasing age, it takes longer to decipher poor-quality information from the sensory organs. This delay causes a good deal of sensory information to be lost before it can be stored in memory.” A related theory posits that this decline in processing speed in older adults is caused by an inability to inhibit irrelevant information. Termed the ‘inhibitory deficit hypothesis’, this theory suggests that age-related declines in processing speed are due to scarce cognitive resources being overloaded by irrelevant environmental details, personal memories or concerns, and goal-irrelevant interpretations of events.

These cognitive changes are tied to a decline in episodic memory, the memory of events from one’s own past. Episodic memories, as opposed to semantic memories (memories for facts and language), are contextual in nature and require linking a number of individual pieces of information together like time, context, environment, personal feelings, etc. Witness testimonies involve recounting an event about one’s own past and are therefore episodic in nature. There are two prominent theories why older adults experience declines in episodic memory, as opposed to semantic memory. The first is that the slower processing speed prevents the binding of individual facts that make up an event. As a result, information is not stored cohesively, and what is remembered tends not to be the unified representation of the event but rather individual pieces of information are remembered in isolation.

Unfortunately, being able to remember these individual elements but not how they are connected to each other produces increased susceptibility to memory errors. Another way a slower processing speed is said to affect the ability to remember episodic events is by limiting the amount of resources available to recall an event. As a result, all that gets stored is a vague general idea of the event (known as ‘gist memory’) but not details about an event.

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Overall, these cognitive changes can make it harder for elders to put together the contextual details required to remember a personal event in episodic memory. Since witness accounts involve re-telling episodic memories, it follows that elders are likely to perform less accurately as witnesses. The section that follows describes the psychological research in this area, outlining the ways that elders perform differently as witnesses.

## External Factors

Regardless of the age of the eye witness testimony of an elder, the accuracy or precision of their memory can be affected by a variety of factors having to do with the witness, the suspect, or the event itself. For example, memory is impaired when the witness has relatively little opportunity to observe the perpetrator, when the witness's race is different from the suspect's, or when the witness is given misleading information after the event has occurred.

It can be understood to a certain point that a witness's ability to identify the suspect will be affected by his or her length of exposure to the suspect, particularly to the suspect's face; and indeed, time spent looking at the perpetrator correlates positively with witness accuracy. This particular understanding is supported by the statement from Stine, Wingfield, & Poon, 1989, where processing of visual and auditory information are abilities that deteriorate with age. Thus, older adults are likely to be at a particular disadvantage in witnessing crimes, which are often chaotic and contain a large number of competing visual and auditory stimuli. Any aspect of the event that interferes with the witness's ability to observe the perpetrator will have a negative effect on the witness's subsequent memory. For example, the salient presence of a weapon tends to draw the witness's attention to the weapon, consequently impairing recognition of the criminal's face. The "weapon focus" phenomenon impairs identification accuracy regardless of the witness's age. Importantly, however, its deleterious effect does not become greater as the witness's age increases. As discussed above, older adults perform worse than college-age subjects when a high demand is placed on attention to detail, while they are less disadvantaged at overall face recognition. One explanation for people's greater ability to recognize members of their own race than other races is that they attend less to detailed features in processing other-race faces. Thus, one might expect older subjects to show a stronger own-race bias than younger subjects. In correlation to this, two researchers Brigham and Williamson (1979) found that, like college-age subjects, elderly subjects were better at recognizing own-race than other-race faces; however, they did not include age as a variable in their experiment, so it is unknown whether this tendency is more pronounced in elderly witnesses. Loftus and her colleagues have demonstrated that subjects' reported memory for an event is influenced by information concerning the event that is suggested to them after the event has taken place. Lindsay (1990) has reconceptualized the misinformation effect in terms of 'source monitoring.' Source monitoring refers to judgments about the origin, or source, of information, as opposed to remembering the information itself. For example, one might recall that O. J. Simpson was charged with his ex-wife's murder without being able to remember where one originally acquired that information; was it heard on the radio, watched on television, read in the newspaper, or communicated by a friend? According to Lindsay, the misinformation effect reflects a failure of source monitoring.

Specifically, an eyewitness acquires information about an event from two sources: by observing the event itself, and from subsequent suggestion. When the witness then falsely remembers a piece of information as part of the event, rather than as a suggestion, he or she has committed a source monitoring error, which impairs the ability to remember the original event details

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correctly. The source monitoring approach is particularly relevant to studying memory in elderly eyewitnesses because of the effect of aging on this specific type of memory task. In comparison to young adults, elderly subjects have difficulty remembering the source of information however, their memory for the information itself is unimpaired. Cohen and Faulkner (1989) applied these findings to an eyewitness situation, by showing subjects a film of a kidnapping, and then presenting them with a narrative containing misleading details. When tested on their memory of the film, elderly subjects (mean age = 70) were significantly more likely than younger subjects (mean age = 35) to have been misled by suggestive information that was in the narrative. Loftus et al. (1992) also found a tendency for elderly subjects (over age 65) to be more suggestible than younger adults when remembering details of a videotaped crime. Thus, older adults are more susceptible than young adults to misleading suggestions, and this disparity appears to be due, at least in part, to an impaired ability to discriminate between different sources of information. There is not a great deal of evidence regarding the interaction between age and factors that influence eyewitness memory, but what evidence there is suggests that age may exacerbate the negative influence of some variables. Consistent with research showing that aging is associated with source monitoring deficits, the effect of misleading suggestions becomes greater in elderly subjects. Although this is true when the misinformation concerns details of the witnessed event, it is not clear whether it would hold for misinformation concerning face recognition, where elderly subjects show little, if any, impairment.

Other factors, such as the witness's opportunity to observe the crime, weapon focus, and cross-racial identification, affect the elderly in the same manner as younger subjects. A greater effect of these variables in elderly witnesses has not been demonstrated; however, in as much as the average elderly eyewitness could be expected to make poorer observations, owing simply to inferior sensory capabilities, these factors might also become more problematic as a witness's age increases.

### Biological Approach

The scientific community came to a uniform understanding that eyewitness testimony were generally not a completely exact replication/recording of an event or thing, as demonstrated from past eye witness testimonies from various age. Though not certain, it was suggested that forgetfulness is mainly caused by the lack of rehearsal of the memory of a specific event/thing, and over the course of time, the neural engrams in the brain (neuropsychology theory) being to decay/deteriorate. So in simpler words, the memory trace of a specific event or thing undergoes the process of being forgotten as time goes by. It was also suggested that the loss of a memory does not entirely lie on the passage of time, and could attribute to certain cognitive processes within the brain. Common stereotypes of old people not being able to remember a lot of things can be considered true, though only certain memory would be forgotten over time. The perception of an event is not dependent solely on the sensory organs. Older people may fail to remember an event because of changes to the brain that accompany aging. With age, deterioration happens in the frontal lobe of the brain – the region responsible for processing information from the senses, memory and judgment. The frontal lobes, and particularly the prefrontal cortex, suffer decline sooner and more extensively than other regions.

The structural changes to the frontal lobe have an effect on those structures that are the most important for cognitive functioning, for example, the hippocampus (which is responsible for the formation and maintenance of memories) and the amygdala (the centre of emotional memories). In addition to these natural changes to the brain, neuropathology increases with age.

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Strokes (burst blood vessels in the brain) can damage brain structures and interfere with frontal lobe functioning.

Another common condition in older adults is mild cognitive impairment (MCI). The development of MCI can begin at age 50, and a recent study reports that after age 70, 7.2% of men and 5.7% of women will develop MCI every year. A more serious disruption of memory is called dementia. Dementia is characterised by much more severe cognitive impairments coupled with a lack of insight into memory difficulties. Alzheimer's disease is a severe form of dementia. The inability of those with advanced dementia to orient themselves in time and space creates major difficulties in the detection and prosecution of offences committed against them. These changes within the brain cause forgetfulness as well as a decrease in the ability to remember the source of a piece of information.

Knowing where information came from, termed 'source monitoring', is important when witnesses are interviewed or asked to perform an identification task. When people have vague memories, they are less likely to notice discrepancies between their experience and information about an event that was acquired later, which makes those people more susceptible to incorporate false information into their memories.

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