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Vantage Point and Visual Imagery:  
Effects on Recall in Younger and Older Adults

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## Abstract

The current study explored the influence of priming vantage point at retrieval on the recall of younger and older adults, in addition to the effects of visualization ability on recall. Based on McIsaac and Eich's (2002) findings of the effects on younger adults' recall, it was hypothesized that recollections would be more likely to include certain features when retrieved through the field vantage point (FVP) than through the observer vantage point (OVP) and vice-versa. Additionally, it was expected that older adults would recall more detailed memories from the OVP than from the FVP. Finally, it was hypothesized that visualization ability would influence memory vividness and that it would be more influential in older adults than in younger adults. The experiment was conducted across two sessions. In Session 1, participants completed a visual imagery assessment, and memories were created in the laboratory with younger ( $n = 20$ ; 18-21 years old) and older ( $n = 18$ ; 63-88 years old) adults through the completion of two activities. In Session 2, participants recalled the activities from either the FVP or the OVP. Participants' recollections were coded for various memory characteristics, which acted as dependent variables in analyses. A significant interaction effect ( $p = .003$ ) between age and vantage point was found on the characteristic of psychological state, such that older adults referred to their psychological state in FVP memories more than in OVP memories ( $p = .002$ ), while younger adults demonstrated no significant difference. Imagery ability significantly predicted several aspects of participants' subjective recall experience. Overall, the results indicate that retrieval vantage point does not change the content of one's recollections on most measures for either younger or older adults and that visual mental imagery ability predicts several aspects of one's recall experience.

*Keywords:* episodic memory, memory vantage point, visual imagery, aging

### Vantage Point and Visual Imagery: Effects on Recall in Younger and Older Adults

How do you remember events in your life using your mind's eye? Do you recall them from the perspective of your own eyes as though you are reliving the moment? Or do you see yourself as though you are starring in your own movie? Research shows that the majority of people remember their life events from both perspectives (e.g., Rice & Rubin, 2009; Robinson & Swanson, 1993). These perspectives, or vantage points, are commonly referred to as the *field perspective* and the *observer perspective*, respectively (Nigro & Neisser, 1983), although some authors and researchers refer to them as the first- and third-person perspectives (e.g., Rice & Rubin, 2009).

While studies show that people use both visualization methods when retrieving memories, they also indicate that the memories retrieved under each condition are not the same, meaning that the content of recall is impacted by the type of vantage point used. For example, research has demonstrated that the level of emotionality of memories differs between the two vantage points, such that recalling from the field perspective results in more intense emotions than recalling from the observer perspective (Berntsen & Rubin, 2006; Eich, Nelson, Leghari, & Handy, 2009; McIsaac & Eich, 2002). Additionally, vantage point affects the type of information, such as physical sensations and physical actions, that one recalls (Eich et al., 2009; McIsaac & Eich, 2002). Because of its influence on episodic memory recollection, it is important that we expand our understanding of memory vantage point and explore exactly how it affects people's memories.

An extensive research literature describes changes that occur in memory across the lifespan (e.g. Levine, Svoboda, Hay, Winocur, & Moscovitch, 2002; Piolino et al., 2010; St. Jacques & Levine, 2007). However, with the exception of one study, which considers

memory perspective in older adults for autobiographical memories (Piolino et al, 2006), the question of how memory vantage point affects the content of recollections in older adults has yet to be explored. Memory impairment is a common complaint among older individuals and the study of the use of different vantage points during retrieval may allow for new interventions to improve memory access as people age if the research indicates that the vantage point used to retrieve memories influences the quality of older adults' memories.

In researching memory vantage point, researchers require participants to visualize a memory. From the field perspective, participants must recall the images that they saw at the time of the event they are remembering. In contrast, from the observer perspective, participants must mentally create new images of the event. One might expect that retrieving memories using the observer vantage point requires greater visual imagery ability. However, researchers have yet to assess individual differences in the ability to use visual imagery and the effects of memory vantage point in the same study, and therefore, the relationship between visual imagery and vantage point has yet to be explored. It is important to know how these two constructs interact to impact the retrieval of episodic memories if researchers ultimately plan to use their findings on memory vantage point to propose retrieval techniques for memories of greater quality. If, by studying visual mental imagery ability and memory vantage point in the same experiment, researchers learn that the effects of retrieval vantage point on memory quality differ based on visual mental imagery ability, then professionals must take that limiting factor into consideration if they decide to use retrieval vantage point as a memory enhancement technique. Because older adults represent a population that would benefit from a new memory enhancement technique, the research should address the relationship between visual mental imagery and memory vantage point in older adults in

addition to younger adults. As such, the current study aimed to explore the role that visual imagery and aging play on recall during vantage point tasks.

### **Memory Vantage Point**

Both the concept of perspective and the notion that an individual could experience both first- and third-person perspectives have existed for over 100 years and were first proposed by Henri (1897) and Freud (1962) in reference to the psychodynamic implications of memory. However, it was not until Nigro and Neisser (1983) began exploring the phenomenon of perspective that it was studied experimentally. Since that time, the number of research studies on vantage point has slowly increased, some of which have concentrated on the role of vantage point in memory retrieval.

Different aspects of memory vantage point are important to consider, and depending on the research question, various methodologies can be used. For example, some researchers focus on the vantage point that an individual naturally uses to recall a memory and explore what factors influence the unconscious selection of that vantage point (Nigro & Neisser, 1983; Piolino et al., 2006; Rice & Rubin, 2009; Robinson & Swanson, 1993). Research on this point indicates that more recent memories are typically recalled using the field perspective, perhaps due to the ease of accessing the memory (Nigro & Neisser, 1983; Piolino et al., 2006), and that anxiety-provoking memories are more likely to be recalled using the observer perspective, perhaps in an effort made by the individual to distance himself/herself from the event (McIsaac & Eich, 2004; Sutin & Robins, 2010). For these studies, researchers typically instruct participants to use real-life, autobiographical memories, allow them to recall the events using the perspective that comes naturally to them, and then ask them questions regarding the vantage point that they used.

Other researchers have been more interested in the results of retrieving a memory using one of the two vantage points and are concerned with how the memory is different depending on the perspective used during retrieval (Eich, Nelson, Leghari, & Handy, 2009; McIsaac & Eich, 2002; McIsaac & Eich, 2004). In order to explore this question, several researchers have required participants to participate in activities designed by the researchers, thereby creating episodic memories under controlled conditions (Eich et al., 2009; McIsaac & Eich, 2002). They then instruct the participants to recall the memory from a specified vantage point. Using this methodology, which allows them to know the actual content of the event, researchers can analyze the recollections in order to determine the qualities that are more likely to be included in a memory recalled using each vantage point.

McIsaac and Eich (2002) were two of the first researchers to research memory vantage point using memories created in the laboratory. They required their participants, who were undergraduate students, to complete six manual tasks, such as molding a ball of clay or lifting barbells. Upon task completion, participants were instructed to recall each of the tasks using either the field perspective or the observer perspective. Following recall, participants rated statements regarding their experience of remembering with their assigned perspective, such as their ability to maintain the perspective and also the richness of the details and emotions in their recollections. Results from the subjective questionnaire indicated that field memories were rated as being richer in emotion and detail than observer memories. Additionally, although participants indicated that the field perspective was easier to maintain, they did not rate the two perspectives differently in how long they were maintained, how strongly they were held, or the degree to which they influenced recall.

In order to analyze the recollections of their participants, McIsaac and Eich (2002) coded their responses according to 11 different categories: affective reactions, physical sensations, psychological states, associated ideas, participant's personal appearance, physical actions, spatial relations, first-person accounts, third-person accounts, fine details, and peripheral details. After averaging the number of statements in each category for each participant, the researchers found several significant differences in different categories between the two vantage points. Field memories contained more statements of affective reactions, physical sensations, psychological states, and associated ideas. Observer memories were found to include more statements of personal appearance, physical actions, and spatial relations. Significant differences between the two vantage points were not seen in the two categories of fine details and peripheral details; although, it is worth noting that more statements of both categories were contained in observer memories than in field memories. Overall, McIsaac and Eich's (2002) findings indicate that the qualities of a memory are influenced by the vantage point used to retrieve the memory.

Following McIsaac and Eich's (2002) study, other researchers have studied memory vantage point using laboratory-created memories and have also determined that the vantage point used has a significant impact on the content included in a recollection. For example, like McIsaac and Eich (2002), Eich et al. (2009) found that field memories are rated as being significantly more emotional than observer memories and more affective reactions are remembered from the field perspective. Additionally, they corroborated McIsaac and Eich's (2002) conclusions by finding that more physical sensations, psychological states, and first-person accounts occur in field memories and that observer memories include significantly more physical actions, self-observations, and third-person accounts (Eich et al., 2009).

Again, it is important to note that, while the differences were not significant, Eich et al. (2009) also found that more fine details and peripheral details were reported in observer memories than in field memories.

Studies such as McIsaac and Eich's (2002) and Eich et al.'s (2009) demonstrate the impact that memory vantage point has on the qualities included in a memory. However, the research in this area has not yet addressed how memory vantage point affects the recall of memory content in older adults.

### **Episodic Memory and Aging**

Because research indicates that memory changes across the lifespan (e.g. Levine, Svoboda, Hay, Winocur, & Moscovitch, 2002; Piolino et al., 2010; St. Jacques & Levine, 2007), it is important to investigate the existence of potential age differences when considering a concept associated with memory. This is particularly true regarding episodic memory, which refers to a memory that includes oneself and is recollected in the context of a specific time and place, because it is the memory system that most severely declines due to aging ( Craik, 2000). Cognitive aging research indicates that the episodic memories of older adults are not as specific as those of younger adults (Levine, Svoboda, Hay, Winocur, & Moscovitch, 2002; Piolino et al., 2010; St. Jacques & Levine, 2007). However, researchers have yet to explore the effects of retrieval vantage point on the qualities of older adults' memories and to investigate whether one vantage point results in more specific memories than the other. If one vantage point proves to be "better," then it will also be important to determine if the vantage point that results in more content is the same for both older and younger adults. The current study aims to address these gaps in the research because, if one

perspective does prove to be superior than the other, then researchers can work to develop and implement a new memory technique for improving memory specificity in older adults.

### **Neurological explanation of memory decline in older adults**

Moscovitch and Winocur (1992) reviewed the neuropsychological literature on memory and aging, specifically focusing on the roles of age-related changes in hippocampal and frontal systems, and reached conclusions about the contributions of these two structures in memory decline in older adults. They concluded that the hippocampal system was specifically involved in the input and output of explicit memories. At input, strategic processes are involved in selecting and organizing relevant information in the hippocampus; at output, one employs strategic processes in verifying information retrieved from the hippocampus, placing the information in its proper context, and using it to initiate additional memory search. In consideration of these findings, Moscovitch and Winocur (1992) determined that deterioration of the hippocampal region, which has been found to increase with advancing age, is responsible for some age-related memory deficits. However, while the memory processes common to recall are likely to be mediated by the hippocampal system, strategic and self-initiated retrieval is believed to be mediated by the frontal lobes. Therefore, Moscovitch and Winocur (1992) concluded that the large deficit in recall observed in elderly people is likely to be a function of decreased activity in both the hippocampal and frontal systems that occurs as one ages.

Piolono et al. (2010) provided cognitive support for the conclusions of Moscovitch and Winocur (1992) related to the role of the frontal systems in memory decline. The researchers investigated the relationships between age, accessibility to different levels of autobiographical memory specificity, and the functioning of the central executive and the

episodic buffer, which are two main components of working memory. Piolino et al. (2010) saw an age effect on the specificity of autobiographical memory and then found that the performance on executive functions was largely predictive of that age effect and that performance of the episodic buffer was predictive to a lesser degree. More specifically, aging deficits in updating and inhibition processes in retrieval and backward visuospatial span abilities were implicated as having an impact on the specificity of autobiographical memory. Ultimately, due to the commonly accepted knowledge that working memory abilities are related to frontal functioning, Piolino et al. (2010) considered their findings as support for the frontal/executive aging hypothesis that was proposed by Moscovitch and Winocur (1992) as an explanation for memory decline observed in older adults.

Researchers in cognitive neuroscience have also supported the conclusions of Moscovitch and Winocur (1992). Cabeza, Anderson, Houle, Mangels, and Nyberg (2000), using positron emission tomography (PET), investigated frontal function in episodic memory retrieval in younger and older adults. They found that older adults showed weaker activations in the right prefrontal cortex than younger adults but stronger activations in the left prefrontal cortex. The researchers interpreted the increased left prefrontal cortex activity as compensatory for the reduced activity in the right prefrontal cortex (Cabeza et al., 2000).

While Cabeza and his associates focused on the effects of aging on the frontal region, Maguire and Frith (2003) considered how aging affects activation in the hippocampus, which was the other brain region implicated in the conclusions of Moscovitch and Winocur (1992). Using functional MRI, the researchers scanned participants' brains while they retrieved autobiographical memories. Maguire and Frith (2003) found that left hippocampal activation was present in younger adults and that bilateral activation was present in older

adults. Older adults' engagement of the right hippocampal region in addition to the left region was viewed as a way to compensate for the decreased activity in the left hippocampal region. Therefore, the findings of Maguire and Frith (2003), when considered in conjunction with those of Cabeza et al. (2000), support the conclusions offered by Moscovitch and Winocur (1992) proposing that the memory decline associated with aging is explained by decreased activity in the hippocampal and frontal regions where younger adults show activity; however, a finding that was unforeseen by Moscovitch and Winocur was that older adults show increased activity in the homologous contralateral area.

In a study with younger adults, Eich et al. (2009) collected imaging data of the brain regions used during memory recall from the two different vantage points. For field memories, areas of increased blood-oxygenation level dependent (BOLD) activity included the left prefrontal cortex, the angular gyrus bilaterally, the hippocampus bilaterally, the left amygdala, and the precuneus. The same areas showed increased activation during the recall of observer memories. Because Eich et al.'s (2009) findings show the involvements of the prefrontal and the hippocampal regions in the content recall of both field memories and observer memories and these brain areas are both affected by aging, one can expect the recall of memory content using the two different vantage points to be affected by age.

### **Aging and memory vantage point**

Considering the age differences in episodic memory recall, the influence of memory vantage point on the recall of these memories in individuals of different ages is worth exploring. Since the research indicates that the basic process of memory differs with age, researchers cannot assume that the vantage point used to retrieve memories has the same effects in older adults that it has in younger adults. Therefore, investigating the similarities

or differences of the effects of memory vantage point on the memories of individuals of different ages will increase the overall understanding of the phenomenon. In addition, if the exploration of the influence of vantage point at retrieval on the memories of older adults indicates that one of the vantage points leads to improved memories, the results may lead to the development of a memory retrieval technique that can be applied to enhance the recollections of older adults in daily life, interview situations, and therapy sessions.

Before considering the research on aging and memory vantage point specifically, one must first consider the ability of older adults to perform perspective-taking tasks. In a study on the ability to accurately report spatial information, Herman and Coyne (1980) asked participants of three different age groups (20-year-olds, 60-year-olds, and 70-year-olds) to participate in a perspective-taking task in which they were asked to determine the location of target objects. The 20-year-old participants were significantly more accurate at the task than the older participants, but there was no significant difference in accuracy between the 60-year-olds and the 70-year-olds. Herman and Coyne's (1980) results imply that older adults are worse at perspective-taking than younger adults in spatial tasks, and the researchers speculated that the reason was due to the mental operational demands of switching perspectives.

In a later study on age in spatial perspective-taking tasks, De Beni, Pazzaglia, and Gardini (2006) found results that conflicted with those of Herman and Coyne (1980). In a study with younger and older adults, the researchers first compared age group on the Mental Rotation Test (MRT), which requires participants to use visuospatial skills and visual imagery skills to mentally rotate images. The younger adults performed significantly better than the older adults. In a second study, De Beni, Pazzaglia, and Gardini matched each older

adult with a younger adult based on their MRT scores and had each person participate in a perspective-taking task. Their results of this second study indicated that, when matched, older adults performed better than younger adults in a spatial perspective-taking task. In contrast to the findings of Herman and Coyne (1980), De Beni, Pazzaglia, and Gardini's (2006) results show that older adults are able to successfully take different perspectives, and their findings further imply that the cognitive processes required to accurately perform mental rotation may mediate older adults' perspective-taking abilities on spatial tasks.

Piolino et al. (2006) were the first to research memory perspective-taking, or memory vantage point, in older adults by examining the effects of aging on the experience of remembering autobiographical memories across five lifetime periods. While both younger adults and older adults more frequently labeled their recall experiences as being from the field perspective than from the observer perspective, older adults were more likely to categorize their recollections as being from the observer perspective than were the younger adults. Correlational analyses also showed that the proportion of field responses declined with increasing age while observer responses increased with increasing age and that observer memories were less specific than field memories for older adults. However, the authors cautioned that the increase in observer responses versus field responses in older adults may actually be caused by the decrease in the details remembered by older adults, making it difficult for them to remember and relive the event from the field perspective and, therefore, causing them to categorize a generic memory as an observer memory.

In a study with older adults, Dornburg and McDaniel (2006) investigated the potential application of memory vantage point in the Cognitive Interview, which utilizes several retrieval strategies, including the switching of perspectives at retrieval. In their experiment,

the participants read a story and then returned for a second session during which they recalled the story three times. For one of the recall conditions, participants were instructed to consider the experimenter's perspective during the first session and to use that as a guide for recall. Using the experimenter's perspective, participants recalled significantly more information in comparison to participants in the control group who were not interviewed using the Cognitive Interview. It is important to note that the increase in information was seen in both correct and incorrect information, although the difference in correct information between the two groups was significantly greater than the difference in incorrect information. Dornburg and McDaniel's (2006) results indicate that, when applied to the Cognitive Interview technique for story recall, older adults are successfully able to take the observer perspective and that, by taking this perspective, they recall more information.

While Piolino et al.'s (2006) study reveals important information about the interaction of aging and memory vantage point and Dornburg and McDaniel's (2006) study indicates that recall is effected by the vantage point used at retrieval, there is still much to explore in this area. Researchers have yet to discover how aging and vantage point interact to affect qualities such as emotionality and event details of recollections. This area is worth researching in older adults because it is important to know if the effects are different for older adults than for younger adults. For example, if older adults remember significantly more details when instructed to recall their memories from one vantage point than from the other, the implications could lead to improved recall in older adults through the development of a retrieval technique using the better vantage point. Because our memories decrease in detail as we age, it is important to know how to retrieve as many details as possible. If using a specific vantage point at retrieval allows one to access more details, then knowledge of this

technique may allow older adults to provide more detailed recollections in situations such as interviews, therapy, and potentially memory interventions.

### **Visual Mental Imagery, Memory, and Aging**

Another area that has yet to be researched in conjunction with memory vantage point is the role of individual differences in visual mental imagery ability. Several researchers have had participants rate the vividness of the images of their recollections, and their results indicate that field memories are significantly more vivid than observer memories (Eich et al., 2009; McIsaac & Eich, 2002; Rice & Rubin, 2009; Sutin & Robins, 2010). However, researchers have not yet assessed the ability of their participants to create vivid images. Therefore, a gap in the research that needs to be filled is that of how the interaction of visual imagery ability and memory vantage point affects the vividness and specificity of the recollection. Because field memories have consistently been rated as more vivid than observer memories, one may not expect to see a significant impact on the perceived vividness of field memories based on one's visual imagery ability, and therefore, an individual who is low in visual imagery ability may still have field memories high in vividness. However, because the observer perspective requires participants to mentally create an image, then one may expect that individuals with better visual imagery ability will have more vivid observer memories than those with poorer visual imagery ability.

The relationship between imagery and memory extends back in history to the Greek philosophical period. Plato declared that perceptions are stamped on the mind like a "block of wax" and are remembered for as long as the image lasts (as cited in Paivio, 1970). Since that time, researchers have demonstrated the significant role that imagery plays in memory (Bugelski, 1970; Marks, 1973; McKelvie & Demers, 1979; Rubin, 2005). Marks (1973),

using the Vividness of Visual Imagery Questionnaire (VVIQ), found that individuals capable of creating more vivid images recalled stimuli more accurately. More recently, Rubin (2005) found that not only is image vividness the best predictor of the strength of a recollection but that the loss of an image results in temporary amnesia; he, therefore, concluded that visual imagery plays a central role in autobiographical memory, a form of episodic memory.

While the relations of mental imagery to memory are relatively undisputed, the interaction of visual imagery ability and aging is less clear. In a study involving three tests of visual imagery, Craik and Dirks (1992) found that older adults performed more poorly than younger adults on each test. They specifically concluded that there are age differences in individuals' abilities to manipulate mental images, such that older adults' abilities are more impaired than younger adults'. Dror and Kosslyn (1994) studied the interaction between visual imagery and aging in more depth and concluded that aging affects imagery abilities selectively. Although they discovered that older adults had impaired image rotation and image activation, which is defined as the process by which stored visual memories are accessed and activated, older adults could compose and scan mental images as well as younger adults.

Bruyer and Scailquin (2000) confirmed and extended the results of Dror and Kosslyn (1994). They had participants, aged from 18 to 80, complete a task requiring the mental generation of images, which involves the activation of long-term stored representations and their temporary display in a sequential manner on a short-term visuospatial medium, which can be conceptualized as the mind's eye. Like Dror and Kosslyn (1994), Bruyer and Scailquin (2000) found that age selectively affected the activation stage and that the deficit in this stage increased linearly with age. In order to extend the research, the investigators

explored possible mediators of the relationship between aging and imagery generation, and found that imagery generation was mainly dependent upon working memory and speed of processing, both of which are known to be age-sensitive (Salthouse, 1991, as cited in Bruyer & Scailquin, 2000). Therefore, Bruyer and Scailquin (2000) concluded that, although aging and the ability to activate images from long-term memory are inversely related, aging per se does not directly influence the generation of images.

Relevant to the current study, past research indicates that visual mental imagery abilities are directly related to memory function but indirectly related to age. Thus, these conclusions imply that memory quality is greater for individuals with better imagery abilities regardless of age but could still be lower overall in older adults. Additionally, based on visual imagery research and what is involved in the use of the different retrieval vantage points, one may expect an individual's imagery abilities to have a greater influence in observer memories, which require the individual to access the memory and then mentally create a new image of the event; individuals with better imagery abilities may be more successful in this endeavor and, therefore, have more vivid and detailed observer memories than individuals with poorer imagery abilities. Because of their difficulty in activating mental images in general, this difference between field and observer memories may not be seen in older adults.

### **Current Study**

The current study explored questions surrounding the constructs of memory vantage point, aging, and visual mental imagery and their roles in episodic memory recall. More specifically, the question of how memory vantage point affects the memories of older adults differently in comparison to how it affects those of younger adults was explored.

Additionally, the study addressed the question of the influence of individual differences in visual mental imagery ability on memories recalled by the different age groups using the different vantage points and whether or not visual imagery ability also has an effect.

Based on the findings of previous studies on memory vantage point, it was hypothesized that, irrespective of age, there would be a main effect of vantage point. Memories retrieved from the field perspective were expected to include more emotions, physical sensations, and psychological states than those retrieved from the observer perspective. In contrast, memories retrieved from the observer perspective would include more physical actions and self-observations than those retrieved from the field perspective due to the detached manner of recall that results from using the observer vantage point.

In their study on Cognitive Interview techniques and aging, Dornburg and McDaniel (2006) found that older adults recall more information from the observer perspective than from the field perspective. In contrast, McIsaac and Eich (2002) and Eich et al. (2009), in their vantage point studies with younger adults, did not find a difference in the number of details recalled between the two perspectives. Therefore, in the present study, it was hypothesized that there would be an interaction effect between age and vantage point, such that, for older adults, memories retrieved from the observer perspective would include more details than those retrieved from the field perspective while there would be no difference between the memories of younger adults.

Additionally, it was hypothesized that there would be an interaction effect between visual mental imagery ability and vantage point, such that the difference in the number of details recalled from the observer vantage point would be much greater between high visualizers and low visualizers than the difference in the number of details recalled from the

field vantage point. This interaction was predicted because, when retrieving a memory using the field perspective, an individual must only imagine the event as he/she saw it happen; whereas, when retrieving a memory using the observer perspective, an individual must create a new image of the event. Because of this requirement to create a new image, it was expected that there would be a difference in the number of details between visualizers in the observer condition.

It was also hypothesized that there would be a three-way interaction between age, retrieval vantage point, and visual mental imagery ability, such that younger adults who are high visualizers would have more vivid memories with more features in the observer perspective than low visualizers but this difference would not be as great in the field perspective and that this difference would not be seen in older adults. The effect was not expected to be seen in older adults due to their general decreased ability in activating mental images, which would negatively affect both their field memories and observer memories.

It was predicted that visual mental imagery ability would predict the vividness ratings of the memories in both vantage point conditions. Imagery ability has been shown to be predictive of memory accuracy and quality; therefore, individuals with greater visual imagery ability were expected to have more vivid memories from both perspectives. In addition, it was expected that there would be main effects of vantage point and visualizing ability on the experiential characteristics of the memory, such that field memories and high visualizing ability would result in higher ratings of vantage point maintenance, a feeling of reliving the event, remembering the event as a coherent episode, the strength of the emotions re-experienced, seeing the event, hearing the event, remembering the event vividly, recalling the setting, traveling back in time to the event, and remembering the event rather than simply

knowing the event. The findings of previous studies have indicated that field memories are more vivid and emotional than observer memories. Additionally, individuals with greater imagery ability are able to visualize events more clearly and in greater detail. Therefore, it was predicted that individuals would feel as though they re-experienced the event more completely from the field perspective than from the observer perspective and also that high visualizers would evaluate their memories as being greater in the mentioned experiential characteristics than low visualizers.

Finally, an interaction effect among vantage point, visualizer, and age was expected on these measures, such that the differences would be greater for low visualizers than for high visualizers, especially for older adults. One's visual imagery skill level was expected to have more of an effect for older adults because it was anticipated that their imagery ability would generally be poorer than that of the younger adults. Therefore, it was predicted that those older adults who were low visualizers would have significantly less vivid and less detailed recall experiences in the observer condition than in the field condition because of their presumed difficulty in visualizing the memory from the observer perspective.

## **Method**

### **Participants**

Forty-two participants from two different age groups were recruited for this study. The first age group (10 females, 10 males; ages 18-21,  $M = 19.25$  years; average education = 13.3 years) was recruited from the five Claremont Colleges in Claremont, CA. The second age group consisted of older adults, and originally, 22 participants were recruited throughout the Claremont, CA community, including at the McAlister Center for Religious Activities and Pilgrim Place. Three participants were unable to attend the second session and one was

excluded from analysis due to unusable data. Therefore, 18 older adults were included in analyses (9 females, 9 males; ages 63-88,  $M = 73.44$  years; average education = 17.69 years). Participants differed significantly in their educational level ( $t(36) = 7.48, p < .001$ ), such that older adults had significantly more years of education than younger adults. Participants were either paid \$5.00 or received academic extra credit upon their completion of the experiment.

### **Materials and Procedure**

Before beginning the first of two sessions, informed consent was obtained from each participant. The participants were required to read the form and, if they consented to participate, they then signed and dated the form before moving on to session one. Upon completion of the second session, each participant was paid and debriefed.

#### **Session One**

Each participant completed Session One individually. At the start of the session, each participant completed the list recall task from the Repeatable Battery of Neuropsychological Status (RBANS; see Appendix A) in order to assess his/her memory abilities. The list recall task, which researchers have demonstrated to be reliable (e.g., Duff et al., 2005), requires the researcher to read aloud a list of 10 unrelated words for four trials. After the researcher reads the list, the participant is asked to recall the words aloud in any order. A participant can score a maximum of 40 points on this task, one for each correctly recalled word.

After completing the RBANS list recall task, participants completed the Vividness of Visual Imagery Questionnaire (VVIQ; Marks, 1973), which has been found to be reliable (Marks, 1973) and internally consistent (Eton, Gilner, & Munz, 1998). The VVIQ (see Appendix B) was administered in order to assess each participant's ability to produce vivid mental imagery and consists of 16 items. For each item, each participant has to produce a

mental image of the described item and then rate the vividness of his/her image on a scale of 1 to 5, with a higher rating indicating a more vivid image. There are four main sections, each containing four items, on the VVIQ; the following is an example of statements from the first section:

Think of a friend or relative whom you frequently see (but who is not with you at present) and consider carefully the picture that comes before your mind's eye.

1. The exact contour of the face, head, shoulders, body \_\_\_\_\_
2. Characteristic poses or head, attitudes of body, etc. \_\_\_\_\_
3. The precise carriage, length of step etc. in walking \_\_\_\_\_
4. The different colors worn in some familiar clothes \_\_\_\_\_

Once each participant finished the VVIQ, he/she then completed two physical tasks for 90 seconds each in a lab space that included a table with six chairs, two desks with computers, and a wall of cabinets. Before the first task and between the first and the second, the researcher altered the decorations of the lab space by changing the color of the tablecloth and switching wall posters. While she was changing the decorations, the participant waited outside of the lab space for a short period of time. The physical tasks that each participant had to complete were referred to as the "Stacking Task" and the "Molding Task". During the Stacking Task, the participants were instructed to line up colored dominoes in a pattern/design of their choice. During the Molding Task, the participants selected one of three colors of Play-Doh and molded the shape(s) of their choosing. The order of the tasks was counterbalanced across participants in order to avoid any order effects.

### **Session Two**

Session Two, which was conducted in a computer laboratory, required participants to complete an online survey through [surveymonkey.com](https://www.surveymonkey.com). Some participants completed the survey individually, while others did so with others in the room. Due to a lack of familiarity

with computers, four participants dictated their responses to the questionnaire while the researcher completed it for them. The survey consisted of a questionnaire requiring them to recall each task once from either the field or observer vantage point. As part of their instructions, participants were introduced to the distinction between field and observer perspectives through an explanation and an example. The investigator encouraged the participants to ask for further explanation if necessary, which she then provided until they indicated a complete understanding of the difference between the two perspectives.

Each participant was asked to type his memory of one of the two tasks, the Molding Task or the Stacking Task, using one of the two perspectives; he/she would then be asked to describe the other task using the alternative perspective. For example, if a participant was first instructed to remember the Stacking Task from the field vantage point, then he/she was then instructed to remember the Molding Task from the observer vantage point. Question assignment was counterbalanced across participants.

After typing each memory recollection, participants were asked to rate twelve statements (see Appendix C) about the recollection using the Likert scale of 1-7 (strongly disagree – strongly agree). The following are two examples of the types of statements that participants were asked to rate:

- |   |  |
|---|--|
| 1. While remembering the event, I was able to maintain the instructed vantage point the <b><u>entire time</u></b> . | 1   2   3   4   5   6   7<br>Strongly Disagree                      Strongly Agree |
| 2. While remembering the event, I felt as though I was <b><u>reliving</u></b> it.                                   | 1   2   3   4   5   6   7<br>Strongly Disagree                      Strongly Agree |

### Design and Analysis

Due to the nature of the independent variables, this experiment was a two (age: younger adults versus older adults) x two (vantage point: field versus observer) mixed design

with age as a between subjects quasi-independent variable and vantage point as a within subjects independent variable. VVIQ scores were also considered as a quasi-independent variable and the RBANS list recall scores acted as a covariate.

The recollections collected in Session Two had to first be coded. The researcher coded the recollections for 13 qualitative features and her reliability ( $r = .96, p < .001$ ) was first calculated using Pearson's correlational analysis in comparison to another experienced coder from a previous study using three of the participants' data. The coding guide, developed in a previous study (Rice et al., in prep) consisted of 13 categories (see Table 1).

Table 1

*Coding Guide*

Category	Description
Affective reaction	Emotional or motivational in nature (e.g., it was fun playing with the Play-Doh)
Physical sensation	Sensation from any sensory modality (e.g., the dominoes felt smooth)
Visual sensation	Reference to sight (e.g., I saw a poster on the wall)
Psychological state	Reference to mental process (e.g., I thought about what to make)
Associated idea	Knowledge or experiences gained outside current experiential context (e.g., I played with Play-Doh as a child)
Personal descriptions/ self-observation	Description of self (body parts, shape, clothing, etc.)
Physical action	Actions made in the course of performing the tasks by anyone (e.g., I molded the Play-Doh into a person)
Spatial relation	Objects used in the tasks, relative to other objects or to subject (e.g., the dominoes were in front of me)
First-person account	I, me, myself

*(Table 1 continues)*

(Table 1 continued)

Category	Description
Third-person account	She, he, they, etc.
First-person plural account	We, us
Fine detail	Characteristics of the task objects and of the event (e.g., the dominoes had <i>colored dots</i> )
Peripheral detail	Characteristics of the room/environment that were not central to the tasks/unfolding action (e.g., there were two computers in the room)

In order to analyze the main effects of age and vantage point and also their interaction effect, 13 ANCOVAs were conducted with both age and vantage point included as independent variables and the coding categories as dependent variables. The covariate in the analysis was list recall score in order to account for the memory difference between the two age groups. In order to counteract the increased Type I error from performing multiple ANCOVAs, a Bonferroni correction was performed, resulting in an alpha level of .004. Significant main effects and interaction effects were further analyzed for simple main effects.

VVIQ scores were used to create visualizer groups of “high visualizers” (scores above the median) and “low visualizers” (scores under the median). In order to analyze the main effects of age, vantage point, and visual mental imagery ability and their interaction effects, an ANCOVA was carried out with age group, vantage point, and visualizer group as independent variables and with the number of memory features as the dependent variable. Again, list recall score was included as a covariate. A second group of ANCOVAs was conducted with the memory experiential statements from Session Two as dependent variables. The covariate in the analysis was list recall score in order to account for the

memory difference between the two age groups. In order to counteract the increased Type I error from performing multiple ANCOVAs, a Bonferroni correction was performed.

Significant main effects and interaction effects were further analyzed for simple main effects.

Finally, the VVIQ scores and the ratings from the experiential statements on the Session Two questionnaire were correlated in order to determine the relationship between visual mental imagery ability and qualities of the recall experience.

## Results

### List Recall

It was expected that younger adults would have significantly better memory recall abilities and would score higher than older adults on a list recall assessment. An independent samples  $t$  test that compared the mean list recall scores of the younger adults ( $M = 33.10$ ,  $SD = 2.83$ ) and the older adults ( $M = 25.22$ ,  $SD = 5.65$ ) was found to be statistically significant at an alpha level of .05,  $t(24) = 5.34$ ,  $p < .001$ ,  $\eta^2 = .54$ , indicating that younger adults have better memory recall than older adults, as expected.

### VVIQ

It was expected that younger adults would have significantly better visual imagery ability and would score higher on the visual imagery assessment. An independent samples  $t$  test that compared the mean VVIQ scores of the younger adults ( $M = 59.10$ ,  $SD = 8.41$ ) and the older adults ( $M = 66.83$ ,  $SD = 9.26$ ) was found to be statistically significant at an alpha level of .05,  $t(36) = -2.70$ ,  $p = .01$ ,  $\eta^2 = .17$ , indicating that older adults have better visual mental imagery abilities than younger adults, contrary to expectations.

### Age and Memory Vantage Point

It was predicted that there would be main effects of both age and memory vantage

point on the inclusion of the 13 coded memory characteristics. The memory characteristics were subjected to a two-way mixed analysis of covariance (ANCOVA) having two levels of age (younger and older) and two levels of vantage point (field and observer). The effect of memory recall was controlled by including list recall score as a covariate. Using Bonferroni's correction, all effects were compared to an alpha level of .004. Table 2 shows the means and standard deviations for each coded memory characteristic.

Table 2

*Means (and Standard Errors) for the Coded Memory Characteristics for Young and Older Adults in the Field and Observer Vantage Points*

Characteristic	Younger Adults		Older Adults	
	Field	Observer	Field	Observer
Affective reaction	0.50 (0.34)	0.51 (0.25)	1.61 (0.36)	0.82 (0.27)
Physical sensation	0.03 (0.15)	0.08 (0.10)	0.46 (0.17)	0.25 (0.11)
Visual sensation	0.06 (0.12)	0.14 (0.09)	0.38 (0.13)	0.12 (0.10)
Psychological state	0.73 (0.37)	1.25 (0.32)	2.47 (0.39)	0.55 (0.34)
Associated idea	1.11 (0.37)	1.08 (0.28)	1.32 (0.40)	0.41 (0.30)
Self-observation	0.42 (0.11)	0.84 (0.22)	(0.08) (0.12)	0.18 (0.24)
Action reference	7.81 (1.13)	8.73 (1.27)	5.04 (1.21)	5.85 (1.36)
Spatial description	3.03 (0.55)	2.28 (0.59)	1.25 (0.59)	1.91 (0.63)
First person	12.13 (2.15)	11.04 (1.87)	13.53 (2.30)	5.62 (2.00)

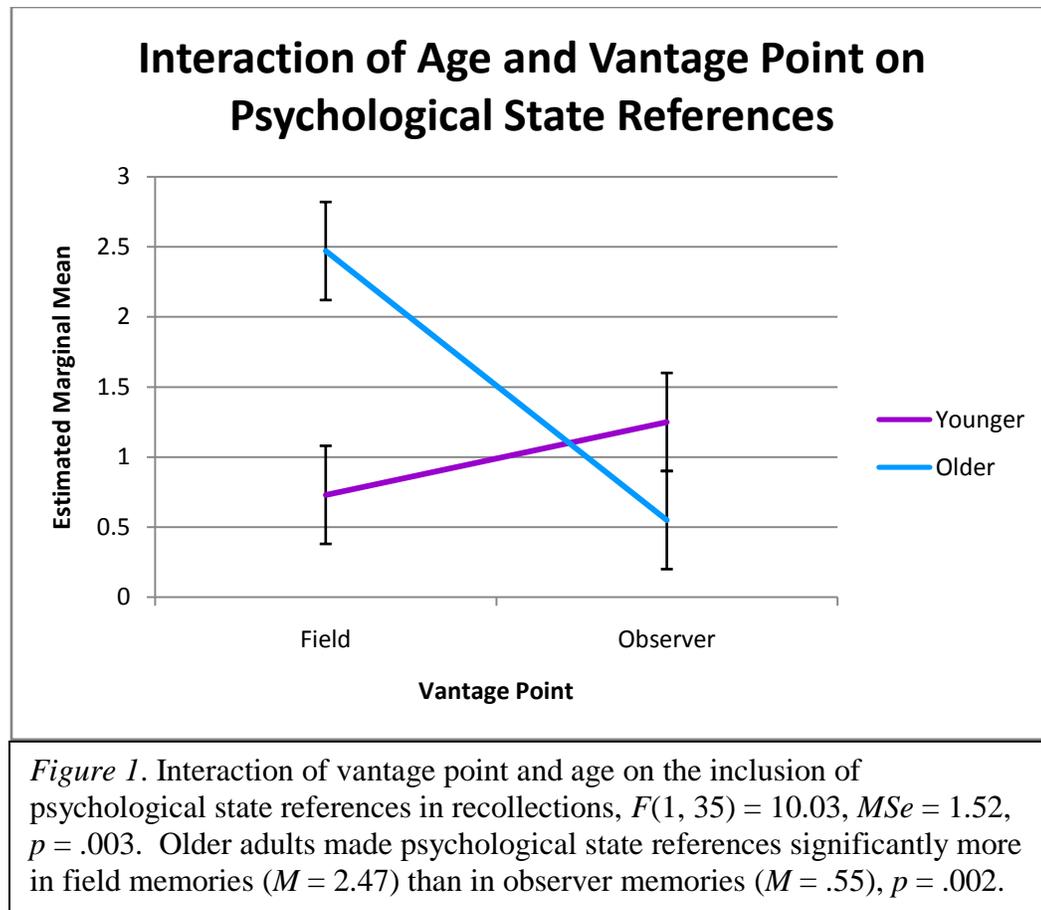
*(Table 1 continues)*

(Table 2 continued)

Characteristic	Younger Adults		Older Adults	
	Field	Observer	Field	Observer
Third person	0.33 (0.39)	2.16 (1.41)	1.52 (5.10)	5.10 (1.51)
First person plural	0.21 (0.10)	0.00 (0.04)	(0.01) (0.11)	0.05 (0.05)
Fine detail	7.17 (0.91)	7.48 (1.21)	7.60 (0.97)	7.58 (1.30)
Peripheral detail	1.02 (0.45)	1.40 (0.46)	1.98 (0.48)	2.34 (0.49)

No significant main effects or interaction effects were found for the memory characteristics of affective reactions, physical sensations, visual sensations, associated ideas, personal appearance, physical actions, spatial relations, first-person accounts, third-person accounts, first-person plural accounts, fine details, or peripheral details,  $p > .004$ .

There was a significant interaction between age group and vantage point on the memory characteristic of psychological state,  $F(1, 35) = 10.03$ ,  $MSe = 1.52$ ,  $p = .003$  (see Figure 1). Older adults included significantly more references to their psychological state in their field memories (estimated marginal mean = 2.47,  $SE = .39$ ) than in their observer memories (estimated marginal mean = .55,  $SE = .34$ ),  $F(1, 17) = 14.12$ ,  $MSe = 1.542$ ,  $p = .002$ . Younger adults did not show a significant difference in the number of psychological state references made between the two vantage points. Neither the main effect for vantage point,  $F(1, 35) = .90$ ,  $MSe = 1.52$ ,  $p = .35$ , nor the main effect for age,  $F(1, 35) = 1.48$ ,  $MSe = 1.85$ ,  $p = .23$ , were significant.



### Age, Memory Vantage Point, and Education Level

In order to determine whether or not the lack of significant effects of age and memory vantage point was due to the significant difference between age groups in their level of education, the 13 coded memory characteristics were subjected to a two-way mixed analysis of covariance (ANCOVA) having two levels of age (younger and older) and two levels of vantage point (field and observer). The effect of memory recall was controlled by including list recall score as a covariate and the effect of education level was controlled by including years of education as a covariate. Using Bonferroni's correction, all effects were compared to an alpha level of .004.

No significant main effects or interaction effects were found for the memory characteristics of affective reactions, physical sensations, visual sensations, psychological state, associated ideas, personal appearance, physical actions, spatial relations, first-person accounts, third-person accounts, first-person plural accounts, fine details, or peripheral details,  $p > .004$ , when list recall and years of education were included as covariates.

### **Age, Memory Vantage Point, and Visual Mental Imagery**

The VVIQ scores were summed for each participant and divided by 16 in order to obtain an average VVIQ score per item. Then, the median VVIQ average was identified,  $Mdn = 3.75$ . Individuals above the median were categorized as *high visualizers* and individuals below the median were categorized as *low visualizers* (see Table 3). Following this categorization, high versus low visualizer was used as a quasi-independent variable.

Table 3

*Representation by Total Number (and Percentage) of Each Age Group in High and Low Visualizer Categories*

Visualizer	Age Group	
	Young ( $n = 20$ )	Old ( $n = 18$ )
High	6 (30.00)	12 (66.67)
Low	14 (70.00)	6 (33.33)

It was hypothesized that there would be a three-way interaction between age, retrieval vantage point, and visual mental imagery ability, such that younger adults who are high visualizers would have more vivid memories with more features in the observer perspective than low visualizers but this difference would not be as great in the field perspective and that

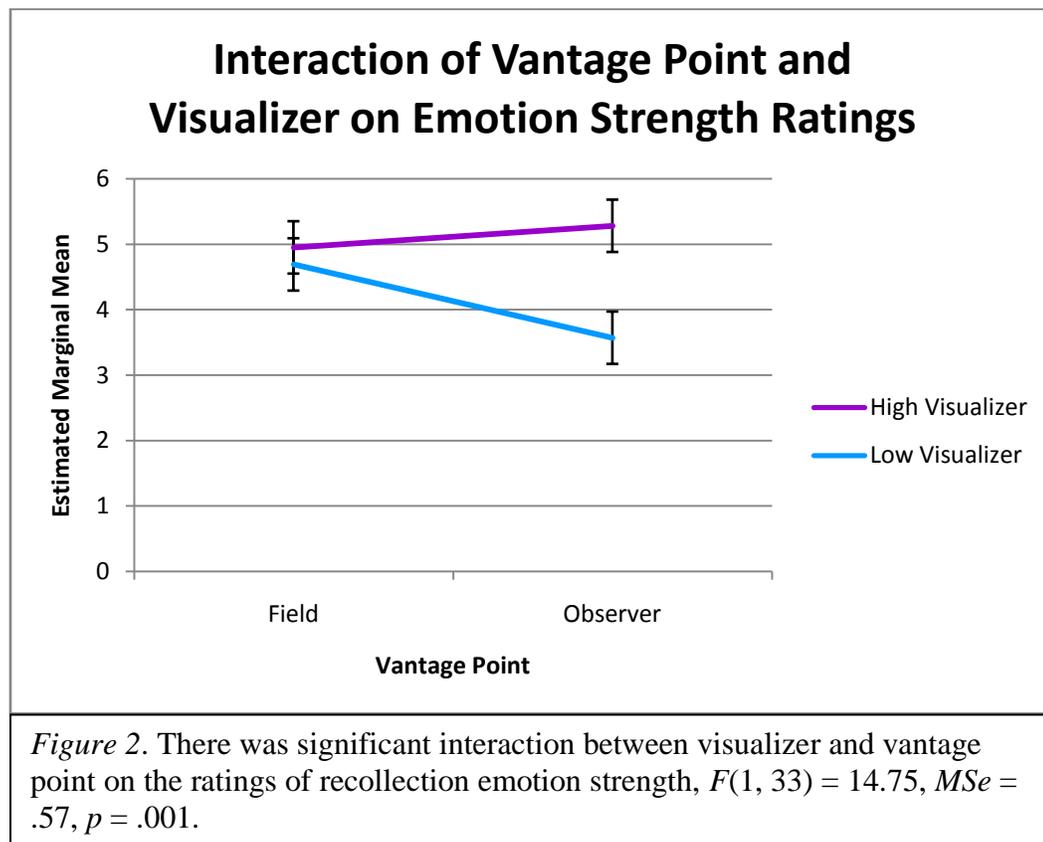
this difference would not be seen in older adults due to their general decreased ability in activating mental images. The 13 coded memory characteristics were collapsed across each vantage point in order to create a sum of memory features for field memories and observer memories. The newly created dependent variable of memory features was then subjected to a three-way mixed ANCOVA with two levels of age (younger and older), two levels of vantage point (field and observer), and two levels of visualizer (high and low). The effect of memory recall was controlled by including list recall score as a covariate. With alpha level set at .05, there were neither significant main effects nor significant interaction effects contrary to the hypothesis.

In order to explore the predictions that there would be main effects of vantage point and visual imagery ability and an interaction effect on the individual experiential characteristics of the memories, the same analyses were carried out on the 11 rated memory statements, with the exception that all effects were compared to an alpha level of .005.

Contrary to the hypothesis, no significant main effects or interaction effects were found for the statement ratings of vantage point maintenance, reliving of the event, memory as a coherent episode, memory presented in pieces, seeing the event, memory vividness, hearing the event, recollection of the setting, or the feeling that one remembered rather than simply knew of the event,  $p > .005$ .

Consistent with predictions, there was a significant interaction between vantage point and visualizer on the strength of the episode emotions experienced during recall,  $F(1, 33) = 14.75$ ,  $MSe = .57$ ,  $p = .001$  (see Figure 2). Low visualizers rated the strength of their emotions higher in their field memories (estimated marginal mean = 4.69, SE = .42) than in their observer memories (estimated marginal mean = 3.58, SE = .38),  $t(19) = 4.27$ ,  $p < .001$ .

High visualizers did not rate the strength of their emotions in their observer memories significantly differently than in their field memories,  $t(17) = -1.23, p = .24$ . High visualizers ( $M = 5.33, SD = 1.23$ ) rated the emotions experienced through the observer perspective as stronger than low visualizers ( $M = 3.35, SD = 1.23$ ),  $t(36) = -4.03, p < .001$ . High and low visualizers did not differ on their ratings of emotion strength in the field condition,  $t(36) = -1.20, p = .238$ . Neither the main effect for vantage point,  $F(1, 33) = .32, MSe = .57, p = .58$ , nor the main effect for age,  $F(1, 33) = 1.87, MSe = 4.61, p = .18$ , were significant. Additionally, neither the interaction of age group and vantage point,  $F(1, 33) = .32, MSe = .57, p = .58$ , the interaction of age group and high versus low visualizer,  $F(1, 33) = .50, MSe = 4.61, p = .48$ , nor the interaction of vantage point, age group, and high versus low visualizer,  $F(1, 33) = .01, MSe = .57, p = .94$ , were significant.



There was a significant main effect of visualization ability on participants' ratings of how strongly they felt as though they traveled back to the time of the event,  $F(1, 33) = 10.69$ ,  $MSe = 5.01$ ,  $p = .003$ , such that high visualizers (estimated marginal mean = 5.84,  $SE = .40$ ) agreed with the statement that they felt as though they had traveled back in time more strongly than low visualizers (estimated marginal mean = 4.01,  $SE = .39$ ). There were no significant main effects of vantage point,  $F(1, 33) = .05$ ,  $MSe = .47$ ,  $p = .83$ , or age group,  $F(1, 33) = .01$ ,  $MSe = 5.01$ ,  $p = .92$ . There were no significant interaction effects of age and visualizer,  $F(1, 33) = .67$ ,  $MSe = 5.01$ ,  $p = .42$ , vantage point and age,  $F(1, 33) = .295$ ,  $MSe = .47$ ,  $p = .10$ , vantage point and visualizer,  $F(1, 33) = 6.00$ ,  $MSe = .47$ ,  $p = .02$ , or vantage point, age, and visualizer,  $F(1, 33) = .31$ ,  $MSe = .47$ ,  $p = .58$ .

### **Visual Mental Imagery and Memory Ratings**

In order to more thoroughly explore the relationship between visual imagery ability and the experiential characteristics of the memories, correlational analyses between VVIQ scores and the experiential characteristics were conducted. Effects were compared to an alpha level of .05 and then, in order to counteract the increased risk of Type 1 error resulting from performing multiple analyses, effects were compared to the more conservative alpha level of .005, which was calculated using Bonferroni's correction.

#### **Reliving**

A Pearson correlation between visual mental imagery ability ( $M = 62.76$ ,  $SD = 9.54$ ) and the field perspective rating of the experience of reliving the event ( $M = 5.05$ ,  $SD = 1.75$ ) was found to be statistically significant at an alpha level of .05,  $r(38) = .33$ ,  $p = .04$ , indicating that the two variables are related. A Pearson correlation between visual mental imagery ability ( $M = 62.76$ ,  $SD = 9.54$ ) and the observer perspective maintenance rating ( $M =$

4.79  $SD = 1.92$ ) was found to be statistically significant at an alpha level of .05,  $r(38) = .40$ ,  $p = .01$ , indicating that the two variables are related.

### **Coherent episode**

A Pearson correlation between visual mental imagery ability ( $M = 62.76$ ,  $SD = 9.54$ ) and the field perspective coherency rating ( $M = 4.92$ ,  $SD = 1.75$ ) was found to be statistically significant at an alpha level of .05,  $r(38) = .35$ ,  $p = .03$ , indicating that the two variables are related. A Pearson correlation between visual mental imagery ability ( $M = 62.76$ ,  $SD = 9.54$ ) and the observer coherent episode rating ( $M = 4.60$ ,  $SD = 2.03$ ) was found to be statistically significant at an alpha level of .05,  $r(38) = .42$ ,  $p = .01$ , indicating that the two variables are related.

### **Emotion strength**

A Pearson correlation between visual mental imagery ability ( $M = 62.76$ ,  $SD = 9.54$ ) and the observer perspective maintenance rating ( $M = 4.50$ ,  $SD = 1.91$ ) was found to be statistically significant at the Bonferroni corrected alpha level of .005,  $r(38) = .55$ ,  $p < .001$ , indicating that the two variables are related.

### **Seeing it**

A Pearson correlation between visual mental imagery ability ( $M = 62.76$ ,  $SD = 9.54$ ) and ratings of seeing the memory from the field perspective ( $M = 6.05$ ,  $SD = 1.27$ ) was found to be statistically significant at an alpha level of .05,  $r(38) = .43$ ,  $p = .01$ , indicating that the two variables are related.

### **Vividness**

A Pearson correlation between visual mental imagery ability ( $M = 62.76$ ,  $SD = 9.54$ ) and the observer memory vividness rating ( $M = 5.21$ ,  $SD = 1.89$ ) was found to be statistically

significant at an alpha level of .05,  $r(38) = .36$ ,  $p = .03$ , indicating that the two variables are positively related.

### **Hearing the event**

A Pearson correlation between visual mental imagery ability ( $M = 62.76$ ,  $SD = 9.54$ ) and ratings of hearing the event from the field perspective ( $M = 3.61$ ,  $SD = 1.99$ ) was found to be statistically significant at an alpha level of .05,  $r(38) = .36$ ,  $p = .03$ , indicating that the two variables are related.

### **Knowledge of setting**

A Pearson correlation between visual mental imagery ability ( $M = 62.76$ ,  $SD = 9.54$ ) and the observer memory setting knowledge rating ( $M = 5.84$ ,  $SD = 1.57$ ) was found to be statistically significant at an alpha level of .05,  $r(38) = .42$ ,  $p = .01$ , indicating that the two

### **Travel back to the event**

A Pearson correlation between visual mental imagery ability ( $M = 62.76$ ,  $SD = 9.54$ ) and the field perspective “travel back” rating ( $M = 5.03$ ,  $SD = 1.70$ ) was found to be statistically significant at the Bonferroni corrected alpha level of .05,  $r(38) = .54$ ,  $p < .001$ , indicating that the two variables are related. A Pearson correlation between visual mental imagery ability ( $M = 62.76$ ,  $SD = 9.54$ ) and the observer “travel back” rating ( $M = 4.90$ ,  $SD = 1.97$ ) was found to be statistically significant at the Bonferroni corrected alpha level of .05,  $r(38) = .61$ ,  $p < .001$ , indicating that the two variables are related.

### **Remembering versus knowing**

A Pearson correlation between visual mental imagery ability ( $M = 62.76$ ,  $SD = 9.54$ ) and the rating of remembering the event rather than knowing the event from the observer perspective ( $M = 5.89$ ,  $SD = 1.33$ ) was found to be statistically significant at an alpha level

of .05,  $r(38) = .35$ ,  $p = .03$ , indicating that the two variables are positively related.

Table 4

*Correlational Analyses of Experiential Memory Qualities and VVIQ Scores*

Experiential Characteristic	Correlational Relationship to VVIQ Scores			
	Field Vantage Point		Observer Vantage Point	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
Vantage point maintenance	0.14	0.40	0.2	0.23
Feeling of reliving	0.33	0.04*	0.40	0.01*
Coherent episode	0.35	0.03*	0.42	0.01*
Memory in pieces	0.26	0.11	-0.20	0.22
Emotion strength	0.14	0.4	0.55	<.001**
Saw the event	0.43	0.01*	0.25	0.13
Vividness	0.26	0.12	0.36	0.03*
Heard the event	0.36	0.03*	0.25	0.13
Knowledge of the setting	0.27	0.10	0.42	0.01*
Traveled back to the event	0.54	<.001**	0.61	<.001**
Remember vs. know	0.25	0.13	0.35	0.03*

*Note.* \* $p < .05$ , \*\* $p < .001$ .

### Discussion

The present study was conducted in order to investigate the effects of retrieval perspective on the content of memories and whether or not the effects differed in younger and older adults. Previous research conducted with younger adults as participants suggests that the vantage point used at retrieval has an impact on the characteristics of one's recollections, such that field memories include more affective reactions, physical sensations, and psychological states and include fewer physical actions and self-observations than observer memories (Eich et al., 2009; McIsaac & Eich, 2002). It was hypothesized that, irrespective of age, there would be a main effect of vantage point on the inclusion of the different memory characteristics such that the findings would corroborate the differences found in previous research. Contrary to expectations, there were no significant main effects of vantage point; these differences, based on predictions from prior research, were not observed. In fact, even when the conservative alpha level was relaxed and Bonferroni's correction was not used, there still were no main effects of vantage point.

It was also hypothesized that there would be an interaction effect between age and vantage point such that older adults would recall more total details from the observer perspective than from the field perspective but that this difference would not be seen in the memories of younger adults. However, this interaction effect was not significant, and the only significant interaction effect between age and vantage point was on the memory feature of psychological state. Investigation of this interaction showed that, while there was no difference between the two vantage points for younger adults, older adults included more references to their psychological state in the field perspective than in the observer perspective. Previous research has demonstrated this difference in younger adults (Eich et

al., 2009; McIsaac & Eich, 2002). Whereas an individual retrieving a memory from the observer perspective recalls the memory as a detached spectator would, an individual using the field perspective would be aware of his/her thought processes and mental activity. Therefore, it is a reasonable result that the older adults referred to their psychological processes in their field memories more than in their observer memories.

In addition to considering age and memory vantage point, visual mental imagery ability and its influence on memory recall were also explored. It was predicted that there would be a main effect of visual imagery ability such that high visualizers would include more content in their memories than low visualizers. It was also expected that there would be an interaction effect among age, vantage point, and imagery ability, such that younger adults who were high visualizers would have memories with more content in the observer perspective than low visualizers but that this difference would not be as great in the field perspective and that the difference would not be observed in older adults. In contrast to expectations, no significant interaction effect between the three variables was found.

Age, vantage point, and visual imagery ability were also expected to influence participants' experience of remembering. Analysis of participants' responses to the post-recall questionnaire revealed no influence of age, vantage point, or imagery ability on vantage point maintenance, the feeling of reliving the event, the recall of the memory as a coherent episode or in pieces, seeing or hearing the event as it occurred, the vividness of the memory, the recollection of the setting, or the feeling that one remembered rather than simply knew of the event. However, vantage point and visual imagery ability interacted on the measurement of the strength of the emotions experienced during recall, such that low visualizers experienced stronger emotions in their field memories than in their observer

memories, whereas high visualizers did not experience a difference in emotion strength based on vantage point. Based on these results, one may conclude that both low visualizers and high visualizers re-experience their emotions strongly when retrieving a memory from the field perspective but that low visualizers lose that sense of emotionality when retrieving a memory from the detached perspective of an observer while a high visualizer retains that strength of emotion.

Visual imagery ability was found to have an impact on participants' feelings of traveling back to the time of the event, such that high visualizers were more likely to feel as though they had traveled back to the time of the event than low visualizers. This effect may occur if, as one might expect, a high visualizer is more likely to be able to successfully re-create the setting, emotions, and sensations of the event to a higher degree than a low visualizer (Davis & Loftus, 2009; Hollingworth, 2009). It is understandable that, if this supposition is true, these abilities result in a sensation of traveling back to the event.

After analyzing the results, I determined that visual mental imagery had a stronger relationship with the participants' subjective experience of remembering than I had initially considered. Analyses showed that visual imagery ability significantly predicted several of the experiential aspects of recall in both perspectives. From both vantage points, visual imagery ability predicted participants' feeling of reliving the event, their recollection of a coherent episode, and their feeling of traveling back to the time of the event. From the field perspective, visual imagery ability predicted participants' sensations of seeing and hearing the event as it first occurred; whereas, from the observer perspective, visual imagery ability predicted the strength of participants' re-experience of emotions, the vividness of the episode, and their recall of the setting.

The statements regarding participants' experience of remembering refer to characteristics of recall that can be plausibly related to visual imagery and, therefore, the significant relationships between visual imagery ability and the experiential aspects in both vantage point conditions is unsurprising. It is interesting to note that visual imagery ability only predicted visual and auditory sensations in the field condition. In previous research, field memories were more likely to include references to visual and physical sensations than observer memories (Eich et al., 2009; McIsaac & Eich, 2002). Based on the results from the present study, which suggest that there is a relationship between visual imagery ability and visual and physical sensations in field memories but not in observer memories, one might conclude that the inclusion of references to visual and physical sensations in memories is influenced by visual imagery ability when the memories are retrieved using the field perspective but not when they are retrieved using the observer perspective.

From the observer perspective, visual imagery ability was found to predict the experience of emotion strength, memory vividness, and the recall of setting. While it is not surprising that visual imagery ability predicted these aspects of recall experience, it is not immediately obvious why this would occur for memories in the observer perspective but not for memories in the field perspective. In reference to the characteristic of emotion strength, perhaps emotion strength for memories retrieved using the field perspective is strong regardless of one's imagery ability, but, for observer memories, one's emotional experience is dependent on one's imagery ability, such that greater imagery ability results in stronger emotions. A similar explanation may also be true for memory vividness and setting recall, such that everyone's field memories are vivid and include a strong sense of recalling the setting while the vividness and setting recall of one's observer memories is dependent on

his/her visual imagery ability.

Although the inspiration of the current study was the idea that the priming of vantage point at retrieval could be used to create a memory enhancement technique for older adults, the results of the study indicate that such a technique would not be effective in improving older adults' memories. A difference was not seen in memory content in either older or younger adults between the two vantage points.

Not only do the findings of the current study contradict the hypotheses, but they also contradict the results found by other researchers in previous studies on memory vantage point (Eich et al., 2009; McIsaac & Eich, 2002). Possible explanations for the discrepancy may be found in the different methodologies used. For example, participants only had to complete two activities for 90 seconds each in the current study. In Eich et al.'s (2009) study, participants completed four activities for 15 minutes each. In McIsaac and Eich's (2002) experiment, participants completed six tasks for one to three minutes each. While the tasks in each study, including the current one, were designed to be physical tasks with creative elements, the differences in quantity and duration may partially explain the different results between studies.

Another difference between the methodologies is the delay between when the events occurred and when they were remembered. Although the delay of one week used in the current study is the same as that of Eich et al.'s (2009) study, it differs from that of McIsaac and Eich's (2002), in which participants recalled the tasks immediately after performing them. The recall conditions also differ among the studies. Whereas participants in the current study recalled one task from the field perspective and one from the observer perspective, participants in Eich et al.'s (2009) study recalled each task twice using a

different perspective each time, and participants from McIsaac and Eich's (2002) study recalled all of the tasks using the same perspective. Additionally, in contrast to the current study, participants in both of the other studies recalled their memories aloud.

The differences in methodologies previously described may explain why the results of the current study differ from those of other studies on memory vantage point. However, the differences may not indicate a flaw in the current study. The results of Eich et al.'s (2009) experiment may have been confounded by a rehearsal effect since each task was recalled twice and the earlier recall would certainly have influenced the later one. Also, participants in McIsaac and Eich's (2002) study recalled tasks immediately after they happened. Although this reduced memory decay, it is not a very realistic way to explore the effect of memory vantage point on the qualities remembered because the events occurred very recently. Finally, both Eich et al. (2009) and McIsaac and Eich (2009) required participants to orally recall their memories while the researcher of the current study asked participants to type them. This difference most likely contributes to the contradictory results between the current study and the previous ones, as King (1968) has demonstrated that there are significant differences between written and oral recall. However, his results showed that written recall is superior to oral recall in the amount of information included, and therefore, the current study's use of written recall may have resulted in memories superior to those that would have resulted from oral recall.

The current study was the first to consider memory vantage point and visual mental imagery ability simultaneously. The two interacted, such that they affected participants' sensation of traveling back to the time of the event. For participants who have poorer visual imagery ability, this sensation is significantly stronger in their field memories than in their

observer memories. This result may have clinical implications for the use of memories in treatment. In certain cases, it is important for an individual to re-experience an event that has affected his/her life significantly. If patients with poor imagery ability are unable to feel as though they are re-experiencing the event from the observer perspective, it is important that the clinician prime them to retrieve the memory using the field perspective. However, clinicians must be aware that, for victims of trauma, this would not be the best method to use. While treatment theories in the past have emphasized the re-experiencing of distressing events (e.g., Foa & Hearst-Ikeda, 1996), more recent research indicates that distancing oneself from a traumatic experience leads to adaptive outcomes (Ayduk & Kross, 2010). Therefore, priming a patient to recall an event using the field perspective rather than the observer perspective may be useful in certain instances but not in those memories that are of a distressing event.

The current study has a number of limitations that should be considered when interpreting the results and also when conducting future research. The first is that the participants recalled memories about activities performed in the laboratory with no personal relevance. These memories do not share the same degree of personal importance to individuals as influential events that occur in their lives. Therefore, vantage point may have more of an impact on autobiographical memories and an age effect may be more likely to occur.

McIsaac and Eich (2004) explored memory vantage point in the traumatic memories recalled by individuals suffering from posttraumatic stress disorder (PTSD). The vantage point primed at retrieval affected the content of participants' memories, such that field memories contained more affective reactions, somatic sensations, and psychological states

and observer memories contained more self-observation references, action information, and spatial descriptions. Obviously, the recollection of traumatic memories is different from the memories of the tasks performed in the current study, but it is worth noting that the vantage point differences were observed in these personally relevant, autobiographical memories. It would be worth exploring the effects of vantage point on non-traumatic, personally relevant events.

Piolino et al.'s (2010) study explored the effects of vantage point and aging on memory specificity in autobiographical memories. He found that both younger adults and older adults had more specific memories when they were retrieved from the field condition, but that older adults used the observer perspective more than younger adults did. However, it is important to note that Piolino et al. (2010) did not prime the memory vantage point at retrieval; participants spontaneously recalled their memories and then reported the vantage point that they used. Additionally, the researchers did not look at the content characteristics of the memory. Therefore, it is difficult to compare the results of the current study to those of Piolino et al. (2010) regarding age and vantage point effects on memory.

Another limitation is that the older adults in the sample had an average of over 17 years of education, which is greater than a bachelor's degree. This average is significantly greater than the national education average. Research has shown that educational level plays a protective role in episodic memory for older adults (Angel, Faw, Bouazzaoui, Baudouin, & Isingrini, 2010). Therefore, the lack of a significant age difference may be due to the high educational level of the older participants, and the results may differ with older participants with a lower educational level. This alternative hypothesis was statistically explored. When I controlled for years of education in the analyses of the effects of age and vantage point on

memory content, I found no significant effects. Therefore, educational level of the participants does not explain the lack of significant results.

In reference to the exploration of visual mental imagery ability, it is important to note that, with the exception of one individual, all participants in the study scored above the midpoint on the visual imagery assessment. Therefore, when participants were classified as *high visualizers* or *low visualizers* based on where their scores fell in relation to the median score, even those in the category of low visualizers actually had strong visual imagery ability. In the future, if researchers are investigating visual imagery ability and memory and want to group participants by their imagery ability, it may be advisable to use a larger sample in order to increase the chances of including participants who are truly weak in imagery ability.

This study makes an important contribution to the collection of research on memory vantage point by being the first to explore its effects on memory content in older adults. Although the results did not demonstrate significant effects on any of the content measures, with the exception of psychological state, the study identifies the importance of considering the role of this retrieval method in the memories of older adults. Additionally, the findings demonstrate the predictive role that visual mental imagery plays in the subjective experience of remembering through the two memory vantage points. Future studies should expand the research in this area in order to clarify the relationship between vantage point, aging, and visual mental imagery. Specifically, as previously mentioned, future studies should address the relationship between these three variables and their effects on the recall of personally relevant memories.

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Appendix A

<p><b>List Learning - RBANS</b></p> <p><b>Trial 1</b>  <i>Say I am going to read you a list of words. I want you to listen carefully and, when I finish, repeat back as many words as you can. You don't have to say them in the same order that I do - just repeat back as many words as you can remember, in any order. Okay?</i></p> <p><b>Trials 2 - 4</b>  <i>Say I am going to read the list again. When I finish, repeat back as many words as you can, even if you have already said them before. Okay?</i></p> <p style="text-align: center;">Record responses in order.                      Scoring: 1 point for each word correctly recalled on each trial.</p>
---

List	Trial 1	Trial 2	Trial 3	Trial 4
Market				
Package				
Elbow				
Apple				
Story				
Carpet				
Bubble				
Highway				
Saddle				
Powder				

Number Correct	+	+	+	=	
	Total Trial 1	Total Trial 2	Total Trial 3	Total Trial 4	Total Score
	Range = 0-40				

Appendix B

**Vividness of Visual Imagery Questionnaire (VVIQ)**

**Instructions**

Visual imagery refers to the ability to visualize, that is, the ability to form mental pictures or to “see in the mind’s eye.” The aim of this test is to determine the vividness of your visual imagery. The items of the test will possibly bring certain images to your mind. You are asked to rate the vividness of each image by reference to the 5-point scale given below. For example, if your image is “vague and dim” then give it a rating of 2. After each item write the appropriate number on the line provided. Please familiarize yourself with the different categories on the rating scale and refer to the rating scale when judging the vividness of each image. Try to do each item separately, independently of how you may have done other items.

**Scale**

- 1...No image at all, you only “know” you are thinking of an object
- 2...Vague and dim
- 3...Moderately clear and vivid
- 4...Clear and reasonably vivid
- 5...Perfectly clear and as vivid as normal vision

**Items**

Think of a friend or relative whom you frequently see (but who is not with you at present) and consider carefully the picture that comes before your mind’s eye.

- 1. The exact contour of the face, head, shoulders, body \_\_\_\_\_
- 2. Characteristic poses or head, attitudes of body, etc. \_\_\_\_\_
- 3. The precise carriage, length of step etc. in walking \_\_\_\_\_
- 4. The different colors worn in some familiar clothes \_\_\_\_\_

Visualize the rising sun. Consider carefully the picture that comes before your mind’s eye.

- 5. The sun is rising above the horizon into a hazy sky \_\_\_\_\_
- 6. The sky clears and surrounds the sun with blueness \_\_\_\_\_
- 7. Clouds. A storm blows up, with flashes of lightning \_\_\_\_\_
- 8. A rainbow appears \_\_\_\_\_

Think of the front of a shop which you often visit. Consider the image before your mind’s eye.

- 9. The overall appearance of the shop from the other side of the road \_\_\_\_\_

- 10. A window display including colors, shapes and details of the individual items on sale. \_\_\_\_\_
- 11. You are near the entrance. The color and the shape of the door \_\_\_\_\_
- 12. You enter the shop and go to the counter. The counter assistant serves you. \_\_\_\_\_  
Money changes hands.

Think of a country scene which involves trees, mountains and a lake. Consider the picture that comes before your mind's eye.

- 13. The contours of the landscape \_\_\_\_\_
- 14. The color and the shape of the trees \_\_\_\_\_
- 15. The color and the shape of the lake \_\_\_\_\_
- 16. A strong wind blows on the trees and on the lake causing waves \_\_\_\_\_

**Thank you for taking part.**

## Appendix C

## MEMORY QUESTIONNAIRE

- |  |                   |   |   |   |                |   |   |
|--|-------------------|---|---|---|----------------|---|---|
| 1. While remembering the event, I was able to maintain the instructed vantage point the <b><u>entire time</u></b> .  | 1                 | 2 | 3 | 4 | 5              | 6 | 7 |
|  | Strongly Disagree |   |   |   | Strongly Agree |   |   |
| 2. While remembering the event, I felt as though I was <b><u>reliving</u></b> it.  | 1                 | 2 | 3 | 4 | 5              | 6 | 7 |
|  | Strongly Disagree |   |   |   | Strongly Agree |   |   |
| 3. While remembering the event, it came to me in words or in pictures <b><u>as a coherent story</u></b> or episode and not as an isolated fact, observation, or scene. | 1                 | 2 | 3 | 4 | 5              | 6 | 7 |
|  | Strongly Disagree |   |   |   | Strongly Agree |   |   |
| 4. My memory came in <b><u>pieces</u></b> with missing bits.   | 1                 | 2 | 3 | 4 | 5              | 6 | 7 |
|  | Strongly Disagree |   |   |   | Strongly Agree |   |   |
| 5. While remembering the event, I felt the <b><u>emotions as strongly</u></b> as I did then.   | 1                 | 2 | 3 | 4 | 5              | 6 | 7 |
|  | Strongly Disagree |   |   |   | Strongly Agree |   |   |
| 6. While remembering the event, I <b><u>saw</u></b> it in my mind.   | 1                 | 2 | 3 | 4 | 5              | 6 | 7 |
|  | Strongly Disagree |   |   |   | Strongly Agree |   |   |
| 7. When I saw the event in my mind, it is extremely <b><u>vivid</u></b> .  | 1                 | 2 | 3 | 4 | 5              | 6 | 7 |
|  | Strongly Disagree |   |   |   | Strongly Agree |   |   |
| 8. While remembering the event, I could <b><u>hear</u></b> it in my mind.  | 1                 | 2 | 3 | 4 | 5              | 6 | 7 |
|  | Strongly Disagree |   |   |   | Strongly Agree |   |   |
| 9. While remembering the event, I knew the <b><u>setting</u></b> where it occurred.  | 1                 | 2 | 3 | 4 | 5              | 6 | 7 |
|  | Strongly Disagree |   |   |   | Strongly Agree |   |   |
| 10. While remembering the event, I felt that I traveled <b><u>back to the time</u></b> when it happened.   | 1                 | 2 | 3 | 4 | 5              | 6 | 7 |
|  | Strongly Disagree |   |   |   | Strongly Agree |   |   |
| 11. As I thought about the event, I could actually <b><u>remember</u></b> it rather than just knowing that it happened.  | 1                 | 2 | 3 | 4 | 5              | 6 | 7 |
|  | Strongly Disagree |   |   |   | Strongly Agree |   |   |