PRIMING OF LANDMARKS DURING OBJECT-LOCATION TASKS:

EFFECTS ON SELF-EFFICACY OF

OLDER ADULTS

by

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ABSTRACT

Computer-based training programs are a new way that many personal skills are being developed, maintained, or enhanced. However, in order for a computer-based training program to be effective, users must be highly motivated to complete the required tasks. One way to improve motivation for continuing tasks is through increasing self-efficacy, or a person’s perceived ability in an area. While older adults might greatly benefit from computer-based training programs for memory, low self-efficacy for both memory and computer use can be a barrier to motivation, limiting potential benefits. However, a person’s self-efficacy can be improved by experiencing success in a task. The current study investigated whether priming a landmark could be used to generate such success in an object-location memory task, ultimately enhancing older adults’ self-efficacy. Participants were 62 older adults and 59 younger adults who were shown a series of videos of virtual rooms and had to make memory judgments about where they had seen certain items in those rooms. Half of the participants were primed for spatial landmarks for specific objects in the virtual environment, while half were not. While many previously established effects were replicated, priming of landmarks did not significantly impact memory or self-efficacy. However, exploration of secondary analyses emphasized the importance of improving self-efficacy in older adults for these types of tasks. Specifically, self-efficacy in older adults was lower than younger adults, even after controlling for memory performance. Considerations of the importance of self-efficacy for memory performance and motivation in older adults are explored.
DEDICATION

This thesis is dedicated to all of the people who helped to make this research possible, including my parents, without whom I would not be the person who I am today, my late grandmother, Louise Russert-Kraemer, who taught me that questioning the world is not only acceptable, but a fantastic way to discover the true wonders in the world around us, my wife Melanie, who has always shown me what is most important in life, my brothers, who inspire me, Dr. Black, who helped to mold this project into what it is, and all of the generous people who donated their time so that this research could be done.
LIST OF ABBREVIATIONS AND SYMBOLS

a  Cronbach’s index of internal consistency

df Degrees of freedom: number of values free to vary after certain restrictions have been placed on the data

F  Fisher’s F ratio: A ration of two variances

M  Mean: the sum of a set of measurements divided by the number of measurements in the set

p  Probability associated with the occurrence under the null hypothesis of a value as extreme as or more extreme than the observed value

r  Pearson product moment correlation

t  Computed value of t-test

<  Less than

=  Equal to
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CHAPTER 1

INTRODUCTION

Locating objects is a skill that we often take for granted. Whether you’re paying your bills or just watching television, there are often certain items (glasses, pen, remote control, etc.) that are needed to complete a given task—and the inability to remember where those items are can seriously diminish a person’s ability to act independently and complete regular daily functions. For many of us, this is not usually a problem. However, many older adults have much more difficulty than younger adults in tasks that require spatial cognition, including tasks such as wayfinding and locating objects from memory (Jansen, Schmelter, & Heil, 2010; Meulenbroek et al., 2010; Pertzov, Heider, Liang, & Husain, 2015). Ultimately, successfully utilizing training programs which might increase older adults’ ability to remember where things are located could provide a large benefit to the older adult population.

However, many memory training programs—particularly those that involve new technology or virtual environments—contain subject matter that older adults might rather avoid dealing with, such as memory and new technology. It has been shown that older adults can be subject to a phenomenon called “stereotype threat” when asked to perform memory-related tasks (Chasteen, Bhattacharyya, Horhota, Tam, & Hasher, 2005; Hess, Hinson, & Statham, 2004). Stereotype threat is the name given to the phenomenon that occurs when an individual experiences anxiety about a task that could potentially confirm a negative stereotype about that individual’s group. This anxiety itself frequently results in a stereotype-confirming poor
performance. Stereotype threat has been shown to impact many different kinds of ability on many different groups of people, usually based upon general grouping factors such as gender, race, or age (Appel & Kronberger, 2012; Chasteen et al., 2005; Hartley & Sutton, 2013; Hively & El-Alayli, 2014). For older adults, tests of stereotype threat have shown that, when reminded of their age, older adults exhibit a decrease in performance on memory-related tasks (Chasteen et al., 2005; Hess et al., 2004). In fact, self-efficacy, or one’s perception of one’s own ability to perform tasks in a particular domain, is significantly lower for older adults with regard to memory (Cherry, Brigman, Reese-Melancon, Burton-Chase, & Holland, 2013). This is particularly problematic because self-efficacy for one’s memory has been shown to play an important role in older adults’ ability to benefit from cognitive training programs (Payne et al., 2012). Thus, the low memory self-efficacy that many older adults have seems to be impeding potential progress that they could make in preventing cognitive decline.

Another difficulty for computer-based training programs for older adults is the fact that many older adults report low perceived competence, low feelings of comfort, and low feelings of control for working with computers (Czaja & Sharit, 1998). This is unfortunate because of the many advantages that a computer-based training program might offer over other types of training—convenient access, personalization, and cheap, easy distribution. Fortunately, the relationship between age and computer use has been found to be mediated by anxiety, suggesting that finding a way to make older adults more comfortable with computers would lead to increased computer use (Ellis & Allaire, 1999).

Considering all of the difficulties that older adults face with regard to memory, computer-based memory training programs should be as effective as possible. In order for such programs to be successful, older adults must be motivated to complete them, despite potential anxiety for
technology and having relatively low self-efficacy for memory-related tasks. Through improvement in self-efficacy for a computer-based memory program, older adults may develop the motivation they need in order to complete training programs and see subsequent improvements in memory. Consequently, the proposed study focuses on the improvement of self-efficacy through computer-based memory programs.

**Performance, Self-Efficacy, and Motivation**

One potential way to improve self-efficacy is through increasing perceived performance. According to self-efficacy theory, perceived success at a task should yield higher self-efficacy for that task (Bandura, 1977; Schunk & Pajares, 2009). In other words, if an individual gains experience performing well at a task, their self-efficacy for that task should increase. This effect has been demonstrated across a variety of domains, including anagram tasks, sports, and answering GRE questions (George, 1994; Hackett & Campbell, 1987; Lyman, Prentice-Dunn, Wilson, & Bonfilio, 1984; J. I. K. Park & John, 2014). More specifically, self-efficacy for memory has been found to have a significant relationship with performance on memory tasks. This relationship becomes even stronger in specific circumstances, including when the memory self-efficacy (MSE) assessed is task-specific as opposed to general ability; when MSE involves familiar stimuli; and when measurements use free-recall or cued recall as opposed to other methods (Beaudoin & Desrichard, 2011).

Just as improving performance increases self-efficacy, increasing self-efficacy for a task should increase motivation to continue the task (Bandura, 1977; Schunk & Pajares, 2009). Evidence has supported this relation between self-efficacy and motivation in a variety of tasks. As a few examples, domain-specific and task-specific self-efficacy have been associated with
increased effort in high school baseball players (George, 1994), longer persistence on pattern-matching tasks in 9-14 year-olds (Lyman et al., 1984), and increased intrinsic motivation for STEM fields (which, in turn was related to persistence in the field of science) in undergraduates in junior college (Simon, Aulls, Dedic, Hubbard, & Hall, 2015). Moreover, self-efficacy has been shown to be an important factor in gains made by older adults due to inductive reasoning training—particularly, older adults with higher self-efficacy showed greater perseverance in allocating time to engage in the training, ultimately making greater gains (Payne et al., 2012). Previous memory-specific interventions have also incorporated self-efficacy principles into training, yielding positive results (West, Bagwell, & Dark-Freudeman, 2008). If utilized with older adults through a similar manipulation of performance, an increased motivation to continue working on a memory training program could be generated, which could prove incredibly beneficial to the overall improvements made through the program.

**Priming and Landmarks**

One particular avenue for facilitating improved performance during a task is to use priming to induce participants to choose the correct answer. Although priming has not yet been used to increase the chance of participants selecting the correct answer in an object-location task, different forms of priming have been utilized to either direct or improve performance on other kinds of tasks. For instance, when participants are presented with an ambiguous word, such as “organ,” priming has been used to influence participants to interpret the word through one meaning, such as the musical instrument, instead of another meaning, such as the system of tissues in the human body (Black et al., 2013). Also, in marketing research, priming has led to increased performance during free-recall of brands, and it has also been used to lead participants to select one brand over another (Lee, 2002).
In other studies, priming effects have been shown to be strong enough to directly impact performance by making certain concepts more salient. For example, research focusing on stereotype threat has shown that priming members of a stereotyped group with negative stereotypes about their group results in decrements in performance (Chasteen et al., 2005; Hess et al., 2004). On the other hand, priming participants with positive concepts, such as intelligence, has led to increases in performance (Lowery, Eisenberger, Hardin, & Sinclair, 2007).

Thus, priming shows the potential, if designed and utilized appropriately, to increase the chance of a participant selecting the correct answer during an object-location task. If participants can be led to choose the correct answer in a task due to priming, without being aware of the priming’s helpful effect, then they would likely conclude that their ability on the task is good, and they would subsequently exhibit an increase in self-efficacy. Although many different types of priming might be used for this purpose, the current study focused on the use of conceptual priming, or priming that utilizes an association in semantic meaning, in an attempt to increase self-efficacy in an object-location task, which in turn should improve task motivation.

The ability to remember the location of objects is frequently assessed using object-location tasks. These are tasks in which participants are first presented with a scene and later asked to indicate the location of objects from that previous scene. In such tasks, environmental context, or the presence of surrounding items, has been shown to aid performance of both older and younger adults by providing cues for recall (Meulenbroek et al., 2010). However, previous studies have been unable to completely determine how age affects the benefit from environmental context, and there are a number of issues that have to be considered to advance knowledge on this topic.
It could be hypothesized that older adults might benefit less from environmental context than younger adults, as older adults have been shown to have increased difficulty with binding, or forming an association between two different stimuli (Naveh-Benjamin, 2000). While older adults seem to have relatively unimpaired memory for unique items, they show a deficit relative to younger adults in successfully relating items to one another; this is hypothesized to be a large reason for older adults’ deficiencies in recall of episodic memories. Furthermore, it has been shown that this associative binding deficit affects not only long-term recall, but short-term memory and working memory as well (Chen & Naveh-Benjamin, 2012). If older adults have difficulty associating an object with its context, then that context may prove less beneficial to remembering the object. Indeed, there is some evidence that the increase in memory accuracy gained from the inclusion of environmental context is greater for younger adults than for older adults (Noack, Lövdén, Schmiedek, & Lindenberger, 2013). Also, associative memory is a factor in predicting memory intervention success among older adults (Fairchild, Friedman, Rosen, & Yesavage, 2013), which highlights the importance of associative memory in the ability to take advantage of cues and memory strategies.

Despite the evidence that there are age-associated deficits in the ability to bind cues and targets, there are strong indications that older adults still benefit from environmental support such as cues in a number of circumstances. In fact, there is some evidence to suggest that, specifically for object-location tasks, older adults can benefit from environmental context as much or more than younger adults do. In particular, the type of association that occurs between an object and its location does not seem to be impaired with age, unlike other types of associations (Pertzov et al., 2015). For instance, while temporal binding seems to be greatly disrupted for these types of tasks, spatial binding is not affected nearly as drastically (Noack et
al., 2013). Complicating the situation further for object-location tasks, it has been shown that environmental support leads to activation in different brain regions in older adults when compared to younger adults, indicating differences in how environmental support is used to benefit memory processing (Meulenbroek et al., 2010). As indicated earlier, one study even showed that older adults benefit more from environmental context than younger adults in spatial location (Sharps & Gollin, 1988), although this is controversial, as the effects have failed to be replicated (D. C. Park, Cherry, Smith, & Lafronza, 1990).

Overall, additional studies could help to elucidate the benefit of environmental context for different age groups. And although it is not entirely clear whether older or younger adults benefit more from environmental support, both groups have been consistently shown to benefit from environmental context and landmarks for both object-location memory and spatial cognition (Jansen et al., 2010; Meulenbroek et al., 2010). Taken together, all of this evidence suggests that use of environmental context is a viable way of improving success during object-location memory tasks.

If priming could increase the cognitive accessibility of the environmental context during an object-location task, a participant should be more likely to recall the correct location of the target object when the context is primed in comparison with when the context is not primed. One way for priming to increase the accessibility of the environmental context is by increasing landmark salience. Perceptual landmark salience has been shown to aid spatial cognition. However, until now, landmark salience has been manipulated through changes in the actual landmark itself (Caduff & Timpf, 2008). Landmark salience has not been manipulated through conceptual priming. Theoretically, a conceptually primed landmark should be more accessible and salient than a non-primed landmark. Furthermore, when a person is scanning an
environment, the primed landmark should garner more attention than a non-primed landmark. As a result, the primed landmark should be more apt to serve as a retrieval cue for a to-be-remembered target item. The notion that conceptual priming can enhance the accessibility and effectiveness of a landmark is exciting. In the past, landmark salience has been manipulated by changing the physical appearance of the landmark itself. However, in the current study, I am manipulating landmark saliency, by manipulating its accessibility for participants. As long as cognitive accessibility of a landmark is improved in the primed condition relative to the nonprime condition, participants should be quicker and more accurate in choosing the correct location of the target object in the primed condition. Heretofore, no other published work has manipulated landmark salience via conceptual priming.

Because the interest in memory recall focuses not on the landmark, which would actually be primed, but on an object adjacent to the landmark, the priming effect is said to be “mediated”. That is, the priming of the target occurs through the priming of the landmark. Mediated priming has been shown to be successful in the past with semantically related words—for example, when a person pronounces the word “lion” they are primed for the word “stripes” due to the word “tiger” which semantically mediates the priming. However, the effects are usually not as strong as direct priming (Balota & Lorch, 1986).

The current study had two primary purposes. The first was to determine whether older and younger adults’ performance on an object-location task could be improved by priming participants for a landmark adjacent to a target object. The second was to determine whether older and younger adults experience an increase in self-efficacy as a result of the increased performance. In addition, this study investigated whether older and younger adults respond
similarly to such priming, or whether older adults show diminished benefit due to an associative binding deficit.
CHAPTER 2

METHOD

Design

The design used was a 2 (Young vs. Old) x 2 (Prime Vs. No-Prime) between-subject factorial design with age and priming condition as factors. The primary dependent variables were participants’ scores on an object-location memory task and participants’ change in self-efficacy as measured by an adapted version of the Memory Self-Efficacy Questionnaire. As indicated above, the two prime conditions were labelled “Prime” (Category matching task contained items related to the landmark) and “No prime” (Category matching task did not contain items related to the landmark.)

Participants

Eighty-three older adults (i.e., 60+ years old) and 64 younger adults (i.e., 18-22 years old) participated in the study. Younger adults were recruited through the university subject pool and compensated with course credit. Older adults were recruited from the Tuscaloosa area through a variety of local communities and facilities, including FOCUS on senior citizens, Clara Verner Towers, Capstone Village, and OLLI. I also reached out to older adults through a contact list from the Aging Research Institute of Alabama, and I posted an advertisement in the University Dialogue. Older adults were compensated $15 for their time. A number of participants had to be excluded from the analysis for a variety of reasons: 12 participants did not score at least a 25 on
the MMSE, which was the dementia screening measure; 3 participants averaged lower than 70% on the priming task (described below), indicating either inattention to the task or an inappropriately low literacy level, 7 participants experienced technical problems, and 5 participants were excluded because their responses indicated unreasonable time requirements for the study. Ultimately, 62 older adults with an average age of 69 and 59 younger adults with an average age of 19 were included in the analyses.

Materials

For the object-location task, 33 scenes were designed using the Chief Architect software program Home Designer. The scenes consisted of home interiors, including typical furniture and objects found in homes. Participants watched a 10 second video-walkthrough of each scene during each exposure period.

As indicated earlier, there were two category-matching tasks conditions: prime and no prime. The prime condition consisted of category-matching tasks that would prime the landmark. The category-matching task (i.e., priming task) featured words designed to prime a landmark for a target object. For example, when the target object was a pair of shoes sitting on a bed, then the bed might be considered a landmark. Then, in connected category-matching tasks, a priming word would be a word semantically related to the bed, such as “sleep”. Priming words were chosen using University of South Florida Free Association Norms, in order to ensure semantic relation to the landmark. The University of South Florida Free Association Norms are a measure of how likely a participant is to generate a certain target word when a specific cue word is presented. Only words with a Forward Cue-to-Target relationship with the landmark were used as primes. Words used had an average association strength of .15. Unrelated stimuli, in
contrast, had no such relationship with the landmark or target object. An example of a stimulus that is unrelated to the landmark when the landmark is a bed is the word “lobster”.

The type of category matching task varied with participant condition. For participants in the no prime or “control” condition, all stimuli in the category matching tasks were unrelated to landmarks adjacent to the target object in the virtual scene. However, for participants in the experimental condition, out of each block of 10 category-matching tasks, the fourth, sixth, and tenth tasks were priming tasks, each involving stimuli that are semantically related to a landmark that is directly adjacent to the target object. The reason that only three out of every 10 tasks involved related words was to ensure that participants did not become aware of the relationship between the stimuli in the category-matching tasks and the scenes with which they were presented. A block of 10 category-matching tasks were be presented before each 10-second walkthrough and before each assessment, allowing priming in the experimental condition to affect both the encoding of spatial information and the retrieval of spatial memory.

Measures

**Object-location Memory Task.** Scores on the object-location memory task were calculated as follows. The virtual scene had 5 objects removed from it, all of which were replaced with red letters (A, B, C, D, or E) to mark where each of the objects used to be. Participants were given a specific target object and had to indicate on the keyboard which red letter marked where the target object was located in the original scene. Accuracy scores were determined by the number of objects correctly remembered out of 30, while the amount of time that each participant took to indicate his/her answer was recorded automatically using the SuperLab 5.0 experimental software program.
**Memory Self-Efficacy Questionnaire (MSEQ).** Self-efficacy was assessed using an adapted version of the memory self-efficacy questionnaire (MSEQ) developed by Berry, West, and Dennehey (1989). Two types of self-efficacy were measured as part of the questionnaire. Specifically, items pertaining to memory for the location of objects were retained from the original MSEQ, as a more general measure of memory for item locations in everyday life. To measure task-specific self-efficacy, new task-specific items were created using the same format as typical MSEQ questions. For example, questions from the original questionnaire such as “If I heard it twice, I could remember X items on a grocery list,” were replaced with items specific to the task at hand, such as, “If I saw a 10-second clip of a room, 40 seconds later I could remember the location of at least X items in that room.” Participants were asked to respond to questions with a percentage of confidence that they could successfully complete the given task. The original MSEQ has a Cronbach’s alpha value between .85 and .90, depending upon whether younger or older adults are being tested (Berry et al., 1989). Reliability measures for the exact questionnaire being used have not yet been generated; however, Berry, West, and Dennehey (1989) calculated a test-retest reliability of .89 for an alternate questionnaire, the A-MSEQ, which used different questions than the original questionnaire. This suggests that the general format of the questionnaire is reliable. Face and content validity for the MSEQ are high, considering that the MSEQ was developed by taking concepts from existing measures for self-efficacy. The criterion validity even extends to memory performance in daily life ($R_c = .59$), although it does not extend to memory performance in a laboratory setting ($R_c = .37$ and $R_c = .50$ for self-efficacy level and confidence respectively). However, considering that these are correlations with actual memory performance rather than perceived memory ability, this does not mean that the MSEQ has low validity for a laboratory setting.
Motivation and Enjoyment. In order to gain an understanding of any change that might have occurred in motivation or enjoyment during the course of the experiment, a few explicit questions were asked on a scale of 0 to 10. Participants were explicitly asked, “How much do you enjoy this combination of tasks?” in order to gain a brief understanding of their enjoyment. To gain an understanding of participants’ motivation, they were asked 3 separate questions: “If you knew that performing this combination of tasks for 15 minutes every day could improve your well-being, how likely would you be to work it into your daily routine?”, “If you were asked, how willing would you be to participate in more studies that use this combination of tasks?”, and “Please estimate how long, in minutes, you could comfortably continue to complete this task without interruption.” These were intended to measure different aspects of motivation, with the last question being a measure of intrinsic interest in the task.

Vocabulary. Participants were verbally administered the vocabulary subtest of the Wechsler Adult Intelligence Scale-Revised (WAIS-R) to assess comparability of the older and younger adults groups on this measure. The average internal consistency for the WAIS-R vocabulary subtest has a Cronbach's coefficient alpha of .94. The subtest also has an average standard error measurement (SEM) of .73. The subtest's test-retest reliability has a Pearson r value of .90 and, after correcting for the variability of the normative sample, a corrected r of .89 (Wechsler, 2008). This vocabulary measure allowed us to determine whether the samples were typical for their age.

Mini-Mental State Examination (MMSE). Older participants were screened for dementia using the Mini-Mental State Examination in order to ensure that no individuals in the study demonstrated cognitive impairment. Participants scoring lower than a 25 were excluded.
from the study’s analyses. The MMSE has satisfactory reliability and validity, with test-retest scores typically ranging between .80 and .95 (Tombaugh & McIntyre, 1992).

**Post-Study Survey.** A short survey was administered after the experiment, featuring questions about the participant’s experiences during the experiment. Of primary interest was awareness of any patterns in the Prime Condition that would assist individuals in that condition in identifying answers without using memory. Specifically, I was interested in determining if individuals in the Prime group noticed a relationship between words in the category-matching task and the objects in the object-location tasks. Thus, individuals in the Prime and No Prime conditions received a questionnaire that allowed me to ascertain the extent to which individuals in the Prime condition used a strategy to determine the correct answer. I compared answers from individuals in the Prime and No Prime conditions on a strategy usage questionnaire to determine if the two groups differed with respect to strategy usage. The analysis indicated that the two groups did not differ, with respect to strategy usage. \( X^2(1, N=110) = 0.392, p>.53. \)

**Procedure**

Each participant was placed in either the experimental (prime) or control (no prime) group. Participants were told that the researchers were interested in how well people are able to switch back-and-forth between two different types of tasks, but participants were not informed that primes would be present in the experiment. After answering a few short demographic questions, participants completed a series of three practice trials of the task before the experiment. Each trial proceeded as follows.

First participants completed 10 category-matching tasks. In each category-matching task, two words were presented on the computer screen simultaneously, and the participants were
directed to press “F” on the keyboard if the two words belonged to the same category or “J” on the keyboard when the words belonged to separate categories. After they indicated their answer to each question, a screen came up informing them whether their answer was correct. Participants could press any key to move on from this screen to the next category-matching task. Second, participants watched one 10-second video-walkthrough of an indoor virtual environment. Third, participants completed another 10 category-matching tasks. Then, for the last step in each trial, participants were asked to pick out the location of a target object from their earlier walkthrough. To assess this, they were presented with a still image of the previous virtual environment, but in this image, five objects, including the target object, were replaced with a red letter. Participants were then asked to indicate which of the red letters represented the original location of the target object. Once participants selected a letter to complete the task, the trial was finished, and the next trial began, following the same order, but with a new scene. Participants completed three practice trials, and later completed 30 actual experimental trials of the same procedure.

After the practice trials, participants completed enjoyment and motivation measures, as well as the adapted Memory Self-Efficacy Questionnaire. Participants then completed 30 experimental trials as described above.

After each participant completed the 30 trials, they completed enjoyment and motivation measures and the adapted MSEQ a second time. They also completed a post-study survey, and were administered the vocabulary measure. Afterward, older adults were administered the MMSE, and lastly, all participants were debriefed.
CHAPTER 3

RESULTS

Main Analyses

Three separate ANOVAs were conducted: one for score on the object-location memory task, one for response time on the object-location memory task, and one for change in self-efficacy (calculated by subtracting pre-experiment MSEQ from post-experiment MSEQ). Each was a 2 (young vs. old age) x 2 (prime vs. no primes) ANOVA with an alpha level of .05 that was analyzed using the statistical software package SPSS. However, as shown in Figures 1 and 2, there was no main effect of the priming condition on response accuracy (prime, $M=15.1308$; no prime, $M=14.9695$), $F(1,115) = 0.024$, $p>.87$, or change in task-specific self-efficacy (prime, $M=-17.7414$; no prime, $M=-14.2222$), $F(1,117) = 0.720$, $p>.39$, nor was there any difference in response time between priming groups (prime, $M=6362.5134$; no prime, $M=5908.8054$), $F(1,115)=0.643$, $p>.42$. I also did not find any age-by-condition interaction effects for response accuracy $F(1,115) = 0.417$, $p>.51$, response latency $F(1,115) = 0.003$, $p>.95$, or change in self-efficacy $F(1,117) = 1.350$, $p>.24$.

Age Differences

As shown in Table 1, older adults had significantly higher education (young, $M=12.9333$; older, $M=15.9344$), $F(1,119) = 50.382$, $p<.001$, higher vocabulary scores (young, $M=30.8833$; older, $M=36.9180$), $F(1,119) = 14.548$, $p<.001$, and also correctly responded to a higher percentage of the category-matching tasks than younger adults (young, $M=89.1695$; older,
As expected, I found a main effect of age on response accuracy (young, \(M=18.3983\); older, \(M=11.8633\)), \(F(1,117) = 65.524, p<.001\), response latency (young, \(M=4103.4320\); older, \(M=8122.6737\)), \(F(1,117) = 44.339, p<.001\), and on change in self-efficacy (young, \(M=-12.1167\); older, \(M=-19.6393\)), \(F(1,117) = 3.995, p<.05\) (see Figures 1 and 2). I also found a difference in age in reported change on one of the motivation measures, specifically the estimated time for which participants could comfortably complete the task (young, \(M=-10.0833\); older, \(M=4.3361\)), \(F(1,119) = 24.441, p<.001\). While younger adults reported a decrease in the amount of time they would be willing to comfortably complete the task, older adults reported a small increase.

Among older adults, there were several factors that were related to memory accuracy, as can be seen in Table 2. Education was significantly correlated with response accuracy, \(r(58)=.282, p<.05\), indicating that older adults with more education were more likely to correctly remember the location of an item. This is consistent with previous literature showing education as a protective factor for declines in cognition due to aging (Rentz et al., 2010; Riley, Snowdon, Desrosiers, & Markesbery, 2005). Average computer use also had a significant relationship with response accuracy for older adults \(r(58)=.345, p<.01\). However, education and computer use were significantly correlated themselves, \(r(59)=.338, p<.01\), so some of this effect may be due to overlap. Importantly, a separate ANCOVA also revealed that, after controlling for memory accuracy, age groups still showed significant differences in task self-efficacy \(F(1,115)=7.791, p<.01\).

**Performance, Self-Efficacy, and Motivation**

The relationships between the measures of performance, self-efficacy, and motivation can be found in Table 3. Response accuracy did significantly correlate with post-experiment task
self-efficacy $r(116)=.498$, $p<.001$ and, to a lesser degree, post-experiment general self-efficacy for object-location memory $r(116)=.281$, $p<.001$. Both measures pre-experiment also significantly correlated, $r(116)=.350$, $p<.001$, but not as strongly as post-experiment measures. It appears that participants had better meta-memory skills as a result of this task in that they were better able to predict their performance after engaging in the task than before engaging in the task. That is, there was greater consistency between participants’ estimation of their ability and their actual ability post-test than pre-test. Task-specific self-efficacy, however, did not correlate with any of the motivation measures, $r(117)=.011$, $p>.90$; $r(117)=-.022$, $p>.80$; $r(114)=-151$, $p>.10$. In fact, response accuracy actually correlated negatively with one of the motivation measures—the estimated time that participants could comfortably complete the task, $r(112)=-.259$, $p<.01$ (the others were not significant, $r(115)=-.008$, $p>.92$, $r(115)=-.022$, $p>.81$).
CHAPTER 4

DISCUSSION

There were two main aims of the current study. First, this study aimed to determine whether priming of a landmark could improve performance on an object-location memory task. With my current manipulation, I found that when landmarks were primed, there were no differences in memory for object location or in response time when making a memory decision. Second, this study aimed to assess whether a manipulation that artificially increases performance on an object-location memory task would also improve self-efficacy for the task. Because my manipulation did not increase performance, it is not surprising that the manipulation also did not lead to improvements in task-specific self-efficacy. However, I did find a strong correlation between performance on the memory task and task-specific self-efficacy, which validates my belief that a successful manipulation of performance in follow-up studies should increase self-efficacy.

The finding that younger adults outperformed older adults on the object-location task corroborates previous research on object-location memory (Jansen et al., 2010; Meulenbroek et al., 2010; Pertsov et al., 2015). Furthermore, the fact that older adults tended to have higher vocabulary scores (Kavé & Yafé, 2014) and, in the category-matching task, emphasized accuracy over response latency (Forstmann et al., 2011), has also been shown in previous research, supporting the idea that my population of older adults was typical. Similarly, the fact that education had a positive relationship with object-location memory among older adults fits
nicely with previous literature that education and other “cognitive reserve” elements serve as protective factors for aging-related cognitive decline (Rentz et al., 2010; Riley et al., 2005). Lastly, while it might be argued that low memory self-efficacy for older adults is just an accurate reflection of cognitive decline, my study found that older adults had lower task self-efficacy for the object-location task even after controlling for performance on the task. This suggests that, at least for a computer-based memory task such as mine, the lower self-efficacy of older adults cannot be explained by performance alone. One possibility is that this lower self-efficacy is due to an internalization of negative societal stereotypes about older adults with regard to memory and technology use. Regardless of the cause, it is important to continue searching for ways to alleviate this apparent deficiency in self-efficacy, given the importance of self-efficacy and related concepts for benefits from self-paced training programs (Carretti, Borella, Zavagnin, & De Beni, 2011; Payne et al., 2012).

There are many potential explanations for why I did not see an effect of the priming manipulation. Through much previous research, it seems well-established that environmental context is helpful during object-location memory tasks (Jansen et al., 2010; Meulenbroek et al., 2010), and it also seems well-established that landmarks of increased salience are more helpful than less salient landmarks (Caduff & Timpf, 2008). However, 10 seconds is a relatively small amount of time, and it is possible that, for some scenes, participants may not have successfully encoded the landmark during that time. This may be particularly applicable when the landmark was not consistent with its environment, as previous research has shown that many people commonly overlook stimuli that they do not expect within an environment (Slavich & Zimbardo, 2013). Further analysis could elucidate whether consistent landmarks differed from inconsistent landmarks in how well they were remembered, and in any potential effectiveness of the priming
Another factor that may have limited the effect of priming was the mediated nature of the priming. In previous studies, mediated primes have been shown to be weaker than direct primes (Balota & Lorch, 1986). Furthermore, much of the previous literature on mediated primes used consistent modalities. For instance, “lion” primes “tiger” primes “stripes” all stay within the category of semantic meaning. However, in my paradigm, the semantic meaning of a word primes a visual representation of that word, which then primes a spatially related visual representation. It is possible that switching modalities may weaken the priming, as previous studies have found that either stronger manipulations were required when priming in different modalities (Stevenage, Hale, Morgan, & Neil, 2014) or that in some cases the effect of priming in different modalities was weaker than normal (Loveman, van Hooff, & Gale, 2002). This could be particularly detrimental to my manipulation, considering that my primary dependent variable, response accuracy, is more similar to recall than to recognition. Because recall effects are typically more difficult to demonstrate than recognition priming effects, any factors that weaken the priming manipulation could lead to a loss of visible effect.

Follow-up studies could help to identify the cause of the lack of a priming effect. A study in which the target object is directly primed could help to determine whether conceptual priming is successfully increasing salience of a visual representation of an object. Furthermore, follow-up studies investigating perceptual priming and spatial priming could help to determine whether mediated priming was weakened due to the involvement of multiple modalities. It is also possible that priming did impact salience of the target object, but simply was not powerful enough to affect an explicit memory decision. Implicit decision-making could be determined
with a recognition-based paradigm in which assessment scenes *still contain* the target object, with the primary dependent variable being reaction time.

Although the priming manipulation was not successful, I was able to successfully demonstrate that performance on the task bore a strong relationship with task-specific self-efficacy. Interestingly, task-specific self-efficacy was a better predictor of performance after the object-location task than before the task, which is an indication that the task improved meta-memory for both young and older adults.

In contrast, self-efficacy was not found to be a better predictor of motivation post object-location task in comparison with pre-object-location task. In fact, measures of motivation in our study did not seem to be related to our measures of task-specific self-efficacy at all. This is likely due to a mismatch in measures—that is, although my self-efficacy measure assessed self-efficacy specific only to the object-location task, my motivation measure actually assessed motivation for both the object-location task *and* the category-matching task. Furthermore, as participants usually spent more time on the category-matching task, it may have had a disproportionate effect on the motivation measures. For future studies, it will be important to make sure that both self-efficacy and motivation measures are task-specific.

As it stands, the current method of conceptually priming a landmark does not seem to improve memory performance. However, I did find a strong relationship between task performance and task-specific self-efficacy. Moreover, I found that older adults appear to have a deficit for this type of task self-efficacy, in that older adults are more likely than younger adults to underestimate their performance with respect to the object location memory task. It is clear that investigating a successful method of improving performance still has large potential to
benefit the older adult population. I have outlined several potential reasons why my method of conceptually priming a landmark did not lead to increased performance. Further studies may help ascertain not only why the priming did not lead to increased performance, but also what type of method could successfully accomplish this goal.

Further research might also examine the efficacy of landmark priming as a function of object consistency. There is research that indicates that individuals remember stimuli that are contextually unusual better than stimuli which are consistent with the item’s context (Macklin & McDaniel, 2005). It might be the case that conceptually priming a contextually unusual landmark (given the background) might boost its effectiveness as a retrieval cue more than priming a landmark that is not unusual. There are a number of future studies that need to be conducted to further elucidate the effectiveness of conceptual priming in increasing a landmark’s effectiveness as a retrieval cue.

Overall, investigation of this topic can provide us with valuable information about how age and memory interact. The current study replicated many existing findings—for example, reinforcing the fact that education is a protective factor for cognitive decline—and provided a bit of new information as well—for example, that even when memory ability is taken into account, older adults tend to have lower self-efficacy for their memory than younger adults do. Further investigation of how priming interacts with object-location memory may tell us more about how these factors interact in our everyday life. For example, if you have a conversation about keys, will you implicitly pay more attention to where your keys are when you set them down subsequently? If so, does getting older affect this process? While the current study may not have been sufficient to answer all of our questions on this topic, subsequent studies may build upon
this work to find out more about how our memories work, as well as how that knowledge might be used to benefit people who experience functional deficits in their memory.
REFERENCES


Figure 1. Memory for Object Locations

Figure 1. Bar chart displaying means for older and younger participants of each prime group on memory for the location of objects. Younger adults correctly remembered the location of an item at a rate that was significantly higher than older adults, $F(1,117)=10.945, p<05$. There was no effect of the priming manipulation on response accuracy.
Figure 2. Change in Self-Efficacy Due to Task

Figure 2. Bar chart displaying mean change in task-specific self-efficacy for younger and older adults of both prime conditions. Negative means indicate lower self-efficacy after the task was completed. Older adults showed a significantly greater decrease in self-efficacy than younger adults, $F(1,117)= 3.995, p<.05.$
Figure 3. The Relationship Between Performance, Self-Efficacy, and Motivation.

Figure 3. Model displaying the correlations between performance, self-efficacy, and motivation. The motivation measure that was included measured how willing participants were to participate in future studies involving the same tasks as the current study. Similar relationships were seen for how willing participants would be to work the tasks into their daily routine (task-specific self-efficacy: $r(117)=.011, p>.05$; object-location memory performance: $r(115)=-.008, p>.05$), but relationships for how long participants felt they could continue to complete the task without interruption were quite different (task-specific self-efficacy: $r(114)=-.151, p>.05$; object-location memory performance: $r(112)=-.259, p<.05$).
<table>
<thead>
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<th>Older Adults</th>
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<th>F</th>
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<tr>
<td>Vocabulary</td>
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<td>14.548**</td>
</tr>
<tr>
<td>Percentage Correct on Category-Matching Task</td>
<td>93.27</td>
<td>89.17</td>
<td>10.945**</td>
</tr>
</tbody>
</table>

Note: Means with different superscripts differ at \( p < .05 \).

\( **p < .01, \) two-tailed. \( *p < .05, \) two-tailed.
Table 2.  

*Correlations of Demographics Variables with Memory Accuracy in Older Adults*

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<td>3. Average Computer Use</td>
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<td>.34**</td>
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<td>5. Vocabulary</td>
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</table>

*p < .05, two-tailed. **p < .01, two-tailed.*
Table 3.  
Correlations for Measures of Memory Performance, Self-Efficacy, and Motivation

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<td>6. Post-Study Motivation 3</td>
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<td>13. Pre-Study Enjoyment</td>
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<td>.15</td>
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<td>.27**</td>
<td>.43**</td>
<td>.57</td>
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*p < .05, two-tailed. **p < .01, two-tailed.
APPENDICES

A. Demographics Survey
B. Adapted Memory Self-Efficacy Questionnaire
C. Enjoyment and Motivation Survey
D. Post-Study Survey
E. IRB Approval
APPENDIX A

Demographics Survey

1. How old are you? ______

2. Sex: (Circle One)
   Male    Female

3. What is your highest level of education? ______

4. If you are currently a student, please answer the following questions
   a. What type of degree are you seeking? ________________
   b. What is your current year in your program? ________________

5. How many hours per week do you use a computer? _____

6. Do you typically wear any type of corrective lenses, such as glasses or contacts? (Circle One)
   Yes    No
   
   a. If yes, are you currently wearing your corrective lenses? (Circle One)
      Yes    No
   
   b. If yes, how many years ago did you get your most recent prescription for corrective lenses? ______

7. Do you sometimes have difficulty with vision in your everyday life? If you wear glasses or contacts, please answer according to your vision while wearing them. (Circle One)
   Yes    No
   
   If yes, please explain ________________________________

8. Please rate your vision on the following scale, with 1 being very poor vision and 10 being excellent vision (20/20 vision or better). If you wear glasses or contacts, please answer according to your vision while wearing them.

   1  2  3  4  5  6  7  8  9  10

   Very Poor    Excellent
APPENDIX B

Participant #:_____ Session #:_____  

MEMORY QUESTIONNAIRE

MSEQ

The purpose of these questions is to find out what you think about your own memory ability for certain tasks.

We would like to know your opinions. There are no right or wrong answers.

DIRECTIONS:

Two memory tasks are described on the following pages. Please put your responses on the MSEQ Answer Sheets.

If you know that you cannot do the task described, you circle the 0.

If you are 100% sure that you can do the task described, you circle 100.

If you think you might be able to do it, but you are not 100% sure, your answer would fall in the middle somewhere between 10 and 90, depending on how certain you are.

Use the full scale, from 0 to 100 to show how confident you are that you can do the task described in each statement.

******Do You Have Any Questions?******
These questions ask you about your ability to remember where items are in virtual scenes you are presented with, such as the ones you encountered in the previous task. To help you answer these questions, imagine one of the scenes you were presented with, and think about how well you could remember the location of items in that room about 40 seconds later. Use this to inform your answers to the following questions. These are only examples; you will not be asked to remember any items at this time.

A-1. If I saw a 10-second clip of a room, 40 seconds later I could remember the location of at least 10 items in that room.

<table>
<thead>
<tr>
<th>HOW CERTAIN ARE YOU THAT YOU CAN DO THIS? (circle a percentage)</th>
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<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>I cannot do it</td>
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</table>

A-2. If I saw a 10-second clip of a room, 40 seconds later I could remember the location of at least 8 items in that room.

<table>
<thead>
<tr>
<th>HOW CERTAIN ARE YOU THAT YOU CAN DO THIS? (circle a percentage)</th>
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<tr>
<td>0</td>
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<tr>
<td>I cannot do it</td>
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</table>

go to next page
A-3. If I saw a 10-second clip of a room, 40 seconds later I could remember the location of at least 6 items in that room.

<table>
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<tr>
<th>HOW CERTAIN ARE YOU THAT YOU CAN DO THIS? (circle a percentage)</th>
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<tbody>
<tr>
<td>0     10    20   30   40   50   60   70   80   90   100</td>
</tr>
<tr>
<td>I cannot do it   Moderately certain   I can do it   100% sure I can do it</td>
</tr>
</tbody>
</table>

A-4. If I saw a 10-second clip of a room, 40 seconds later I could remember the location of at least 4 items in that room.

<table>
<thead>
<tr>
<th>HOW CERTAIN ARE YOU THAT YOU CAN DO THIS? (circle a percentage)</th>
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<tbody>
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<td>0     10    20   30   40   50   60   70   80   90   100</td>
</tr>
<tr>
<td>I cannot do it   Moderately certain   I can do it   100% sure I can do it</td>
</tr>
</tbody>
</table>

A-5. If I saw a 10-second clip of a room, 40 seconds later I could remember the location of at least 2 items in that room.

<table>
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<tr>
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<tbody>
<tr>
<td>0     10    20   30   40   50   60   70   80   90   100</td>
</tr>
<tr>
<td>I cannot do it   Moderately certain   I can do it   100% sure I can do it</td>
</tr>
</tbody>
</table>

goto next page
These questions ask you about your ability to remember where you have recently placed common household items. To help you answer these questions, there are some examples below of items that you could put away. Some time later (10-20 minutes later), you would need to find them again. These are only examples; you will not be asked to find these items at this time.

rubber band, scarf, scissors, notepad, thread, stapler, coaster, stamp, keys, matches, book, pencil, magnet, brush, necklace, toothbrush, comb, wallet

B-1. IF I PLACED 18 COMMON EVERYDAY OBJECTS IN DIFFERENT LOCATIONS AT HOME, A FEW MINUTES LATER I COULD REMEMBER WHERE I HAD PUT ALL 18 OF THE ITEMS.

<table>
<thead>
<tr>
<th>HOW CERTAIN ARE YOU THAT YOU CAN DO THIS? (circle a percentage)</th>
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<tbody>
<tr>
<td>0</td>
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<tr>
<td>I cannot do it</td>
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</table>

B-2. IF I PLACED 18 COMMON EVERYDAY OBJECTS IN DIFFERENT LOCATIONS AT HOME, A FEW MINUTES LATER I COULD REMEMBER WHERE I HAD PUT 14 OF THE ITEMS.

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<tr>
<th>HOW CERTAIN ARE YOU THAT YOU CAN DO THIS? (circle a percentage)</th>
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<tr>
<td>0</td>
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<tr>
<td>I cannot do it</td>
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go to next page
B-3. IF I PLACED 18 COMMON EVERYDAY OBJECTS IN DIFFERENT LOCATIONS AT HOME, A FEW MINUTES LATER I COULD REMEMBER WHERE I HAD PUT 10 OF THE ITEMS.

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<td>0</td>
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<tr>
<td>I cannot do it</td>
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B-4. IF I PLACED 18 COMMON EVERYDAY OBJECTS IN DIFFERENT LOCATIONS AT HOME, A FEW MINUTES LATER I COULD REMEMBER WHERE I HAD PUT 6 OF THE ITEMS.

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<th>HOW CERTAIN ARE YOU THAT YOU CAN DO THIS? (circle a percentage)</th>
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<td>I cannot do it</td>
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B-5. IF I PLACED 18 COMMON EVERYDAY OBJECTS IN DIFFERENT LOCATIONS AT HOME, A FEW MINUTES LATER I COULD REMEMBER WHERE I HAD PUT 2 OF THE ITEMS.

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<tr>
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<td>I cannot do it</td>
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Thanks very much!!
Now that you have an understanding of the tasks you’ll be performing, please answer the following questions. For each question, consider the tasks exactly as you have experienced them.

1. **HOW MUCH DO YOU ENJOY THIS COMBINATION OF TASK S** (circle a number)

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<th>10</th>
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   Not at all | Moderately Enjoy | Greatly Enjoy

2. **IF YOU KNEW THAT PERFORMING THIS COMBINATION OF TASKS FOR 15 MINUTES EVERY DAY COULD IMPROVE YOUR WELL-BEING, HOW LIKELY WOULD YOU BE TO WORK IT INTO YOUR DAILY ROUTINE?** (circle a number)

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</table>
   Not at all likely | Moderately likely | Very Likely

3. **IF YOU WERE ASKED, HOW WILLING WOULD YOU BE TO PARTICIPATE IN MORE STUDIES THAT USE THIS COMBINATION OF TASKS?** (circle a number)

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
</table>
   Not at all likely | Moderately likely | Very Likely

4. Below, please estimate how long (in minutes) you could *comfortably* continue to complete this task without interruption. (Please provide only one number)

   ____________________________
Now that you have completed the experimental portion, please answer the following questions. For each question, consider the tasks exactly as you have experienced them.

1. HOW MUCH DO YOU **ENJOY** THIS COMBINATION OF TASKS (circle a number)
   
   0 1 2 3 4 5 6 7 8 9 10
   
   Not at all               Moderately Enjoy               Greatly Enjoy

2. IF YOU KNEW THAT PERFORMING THIS COMBINATION OF TASKS FOR 15 MINUTES EVERY DAY COULD IMPROVE YOUR WELL-BEING, HOW LIKELY WOULD YOU BE TO WORK IT INTO YOUR DAILY ROUTINE? (circle a number)
   
   0 1 2 3 4 5 6 7 8 9 10
   
   Not at all likely         Moderately likely         Very Likely

3. IF YOU WERE ASKED, HOW WILLING WOULD YOU BE TO PARTICIPATE IN MORE STUDIES THAT USE THIS COMBINATION OF TASKS? (circle a number)
   
   0 1 2 3 4 5 6 7 8 9 10
   
   Not at all likely         Moderately likely         Very Likely

4. Below, please estimate how long (in minutes) you could **comfortably** continue to complete this task without interruption. (Please provide only one number)

   ________________________________________________________________
   ________________________________________________________________
   ________________________________________________________________
APPENDIX D

Participant #: 

Post-Study Survey

During this study, you participated in two tasks: a category matching task and an object location memory task. Please answer the following questions about the two tasks.

1. Did you use any strategies to try to remember the location of objects in the scenes that were presented?

   (Circle One)

   Yes/No

   a. If Yes, What strategy did you use?

   


2. Did you notice any repeated patterns from either task that could help you correctly choose the object’s location?

   (Circle One)

   Yes/No

   a. If Yes, What pattern(s) did you notice?

   


b. When did you notice this pattern? __________________________

c. About what percentage of your decisions across the object location tasks was based upon this pattern?

   (Circle One)

   0%  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%
3. Did you notice any repeated patterns from either task that affected your response latencies (speed of responses) in the category-matching task?
    (Circle One)
    Yes/No
    a. If Yes, What pattern(s) did you notice?
    ______________________________________________________
    b. When did you notice this pattern? _____________________
    c. About what percentage of your answers to the questions about categories was based upon this pattern?
    (Circle One)
    10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

4. While performing the experiment, did you notice any relationship between the words in the category-matching tasks and the objects in the object-location tasks?
    (Circle One)
    Yes/No
    a. If Yes, What relationship did you notice?
    ______________________________________________________
    b. When did you notice this relationship? _____________________
    c. Did you use a strategy based on this relationship, to correctly identify where the object was? (Circle One) Yes/No
    d. About what percentage of your decisions across the object location tasks was based upon this strategy?
    (Circle One)
    0%  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%

Thank you for participating in our study!
September 8, 2015

Kyle Rhodes Kaufer
Department of Psychology
College of Arts and Sciences
The University of Alabama
Box 870348

Re: IRB # 14-OR-308-R1 “Performance and Self-Efficacy for Object-Location Tasks”

Dear Mr. Kaufer:

The University of Alabama Institutional Review Board has granted approval for your renewal application.

Your renewal application has been given expedited approval according to 45 CFR part 46. You have also been granted the requested waiver of documentation of informed consent. Approval has been given under expedited review category 7 as outlined below:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your application will expire on September 7, 2016. If your research will continue beyond this date, complete the relevant portions of the IRB Renewal Application. If you wish to modify the application, complete the Modification of an Approved Protocol Form. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, complete the appropriate portions of the IRB Study Closure Form.

Should you need to submit any further correspondence regarding this proposal, please include the above application number.

Good luck with your research.

Sincerely,

358 Rose Administration Building
Box 870127
Tuscaloosa, Alabama 35487-0127
(205) 348-8464
(205) 348-7189
(877) 820-3066

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IRB Project #: 14-OR-308

UNIVERSITY OF ALABAMA
INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS
REQUEST FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

I. Identifying Information

Principal Investigator: Kyle Rhoads Kraemer
Second Investigator: Dr. Sheilla Black
Third Investigator: 

Department: Psychology
College: Arts and Sciences
University: University of Alabama, Tuscaloosa

Address: 1800 Links Blvd.
Apt. 2207
Tuscaloosa, AL 35405

Telephone: 985-351-2748
205-348-0613
Fax: 348-8648
E-mail: krkraemer@crimson.ua.edu sblack@ua.edu

Title of Research Project: Performance and Self-Efficacy for Object-Location Tasks

Date Submitted: 7/15/15
Funding Source: Dr. Black’s PRB Fund, Departmental Research Award matched by Graduate School

Type of Proposal: □ New □ Revision ☑ Renewal □ Completed □ Exempt

Please attach a renewal application

Please attach a continuing review of studies form

Please enter the original IRB # at the top of the page

UA faculty or staff member signature:

II. NOTIFICATION OF IRB ACTION (to be completed by IRB):
Type of Review: ☑ Full board □ Expedited

IRB Action:
☐ Rejected Date:
☐ Tabled Pending Revisions Date:
☐ Approved Pending Revisions Date:

☐ Approved—this proposal complies with University and federal regulations for the protection of human subjects.

Approval is effective until the following date: 4/7/16

Items approved:
☐ Research protocol (dated )
☐ Informed consent (dated )
☐ Recruitment materials

Approval signature:
Informed Consent Statement for Younger Adults

You are being asked to be in a research study called, "Memory Performance." This study is being conducted by Kyle R. Kraemer, a graduate student in experimental psychology at the University of Alabama. Dr. Sheila Black, a professor in the psychology department at the University of Alabama, is overseeing the research study. You are eligible for this study if you 18 years of age or older.

This study is being done to find out whether older and younger adults perform similarly when completing two types of memory tasks and alternating between them. One of the tasks is designed to access short-term, spatial memory, and one of the tasks is designed to access long-term, knowledge-based memory. The study also seeks to determine whether older and younger adults perceive their abilities in these tasks similarly.

In this study, you will be asked to perform two different types of memory tasks. You will first receive a brief video walkthrough of a scene with several objects in it. Then you will be asked to perform a task that accesses your semantic memory, in which you are presented with two words and must indicate whether the two words belong to the same category or belong to different categories. After performing several of these tasks, you will be presented with an image of the original scene, and you will be asked to recall the location of a particular target object from that scene. This process will then be repeated several times. You will also be asked to complete a few surveys about yourself and your memory abilities throughout the experiment. This experiment will last approximately 1.5 hours. You will receive 3 units of credit for participation.

If you have any questions at this point, please feel free to ask. This research can potentially benefit cognitive scientists trying to understand more about memory. Other than course credits, there is no direct benefit to the participants for participating. It is possible that you may experience slight boredom. In addition, you will receive feedback about whether you have answered correctly or incorrectly, and you may sometimes answer incorrectly, which may lead to disappointment. Your participation involves minimal risk, which means that you will not be subject to any more risk than you would experience in everyday life.

Your responses will be strictly confidential. Each participant's responses will be coded by participant number, and there will be no way to associate the name of the participant with the participant's responses. You should know that your participation is strictly voluntary and that you have a right to withdraw your consent to participate at any time without prejudice. You should also know that you have the right to ask questions regarding the procedures. You should only agree to participate if all of your questions have been answered to your satisfaction.

If you have any questions or concerns before or after completing this research projects please contact Dr. Sheila Black at (205) 348-0613. If you have questions about your rights as a person in a research study, call Ms. Tanta Myles, the Research Compliance Officer of the University, at 205-348-8461 or toll-free at 1-877-820-3066.
Adult Consent Form

Study title: Performance and Self-Efficacy for Object-Location Tasks
Kyle R. Kraemer, graduate student in experimental psychology

You are being asked to take part in a research study. This study is called, "Performance and Self-Efficacy for Object-Location Tasks". This study is being done by Kyle R. Kraemer, who is a graduate student at the University of Alabama. Mr. Kraemer is being supervised by Dr. Sheila Black, who is a professor of cognitive psychology at the University of Alabama.

What is this study about? What is the investigator trying to learn?

This study is being done to find out whether older and younger adults perform similarly when completing two types of memory tasks and alternating between them. One of the tasks is designed to accesses short-term, spatial memory, and one of the tasks is designed to access long-term, knowledge-based memory. The study also seeks to determine whether older and younger adults perceive their abilities in these tasks similarly.

Why is this study important or useful?

This knowledge is important because it allows us to learn about the way that older and younger adults learn use their memory. This is useful because both older and younger adults use their memory every day, and finding out how they use their memory can help us find ways of getting people to improve their memory use. The results of this study will help psychologists understand better ways to help older and younger adults’ remember things.

Why have I been asked to be in this study?

You have been asked to be in this study because you are 60 or older, and you expressed interest in this study.

How many people will be in this study?

127 other people are planned to be in this study.

What will I be asked to do in this study?

In this study, you will be asked to perform two different types of memory tasks. You will first receive a brief video walkthrough of a scene with several objects in it. Then you will be asked to perform a task that accesses your semantic memory, in which you are presented with two words and must indicate whether the two words belong to the same category or belong to different categories. After performing several of these tasks, you will be presented with an image of the original scene, and you will be asked to recall the
location of a particular target object from that scene. This process will then be repeated several times. You will also be asked to complete a few surveys about yourself and your memory abilities throughout the experiment. This experiment will last approximately one and a half hours.

**How much time will I spend being in this study?**

You will spend approximately 1.5 hours participating in this study.

**Will I be compensated for being in this study?**

In appreciation of your time, you will receive 15 dollars at the conclusion of your participation. If you start the study but do not finish, you will still receive the 15 dollars.

**Can the investigator take me out of this study?**

The investigator may take you out of the study if something happens which suggests that you no longer meet the study requirements.

**What are the risks (dangers or harms) to me if I am in this study?**

Little or no risk is foreseen as a result of this study.

**What are the benefits (good things) that may happen if I am in this study?**

Although you may feel good about contributing to the science of memory, there are no direct benefits to you personally for participating in this study.

**What are the benefits to science or society?**

This study may provide researchers with information that can help memory training programs for older adults become more effective.

**How will my privacy be protected?**

The experiment will be administered in a private setting; no one will be present while you complete the surveys and tasks involved in this experiment. All surveys and task will be performed without sound on a computer in this setting. If any questions make you feel uncomfortable, feel free not to answer them.

**How will my confidentiality be protected?**

You will be given an identification number; no identifying information will be associated with your responses—only your number will. All computers with your responses on them will be password protected, and only members of the research team will have access to this information.

**What are the alternatives to being in this study? Do I have other choices?**
The alternative to being in this study is not to participate.

What are my rights as a participant in this study?

Taking part in this study is voluntary. It is your free choice. You can refuse to be in it at all. If you start the study, you can stop at any time. There will be no effect on your relations with the University of Alabama.

The University of Alabama Institutional Review Board ("the IRB") is the committee that protects the rights of people in research studies. The IRB may review study records from time to time to be sure that people in research studies are being treated fairly and that the study is being carried out as planned.

Who do I call if I have questions or problems?

If you have questions, concerns, or complaints about the study right now, please ask them. If you have questions, concerns, or complaints about the study later on, please call Kyle Rhoads Kraemer at (985)-351-2748, or Dr. Sheila Black at (205) 348-0613.

If you have questions about your rights as a person in a research study, call Ms. Tanta Myles, the Research Compliance Officer of the University, at 205-348-8461 or toll-free at 1-877-820-3086.

You may also ask questions, make suggestions, or file complaints and concerns through the IRB Outreach website at http://osp.ua.edu/site/PRCO_Welcome.html or email the Research Compliance office at participantoutreach@bama.ua.edu.

After you participate, you are encouraged to complete the survey for research participants that is online at the outreach website or you may ask the investigator for a copy of it and mail it to the University Office for Research Compliance, Box 870127, 358 Rose Administration Building, Tuscaloosa, AL 35487-0127.

I have read this consent form. I have had a chance to ask questions. I agree to take part in it.

I will receive a copy of this consent form to keep.

_________________________    ________________
Signature of Research Participant   Date

_________________________    ________________
Signature of Investigator   Date
What is the best way to remember something?

How does memory change as we age?

Why do some people remember things better than others?

Researchers at the University of Alabama are trying to find answers to all of these questions and more, and they want **YOUR HELP** to participate in their research studies on memory and aging.

If you are age **60 or older**, consider participating in one of our research projects! People who agree to be in the studies will receive $15 as compensation for their time. The studies are enjoyable. They involve memory games, word games, making judgments about people, forming creative images, etc.

Interested in participating? Contact Kyle Kraemer from the Cognitive Aging Lab by phone at (985) 351-2748, or by email at krkraemer@crimson.ua.edu.