COGNITIVE STRATEGY INTERVENTION FOR
ELDERS LIVING IN A RESIDENTIAL
CARE FACILITY

By

Thomas Michael Vorwerk

Jill Talley Shelton
Associate Professor of Psychology
(Chair)

Ralph W. Hood
Professor of Psychology
(Committee Member)

Cathy Scott
Assistant Professor of Social Work
(Committee Member)
ABSTRACT

Residential care facilities are communities for elders that encourage residents to maintain their independence for everyday activities. These individuals may experience memory dysfunction which can negatively impact their confidence and wellbeing. Through the implementation of an intervention focusing on teaching elders strategies to improve everyday memory functioning, older adults’ knowledge of memory strategies, confidence in their memory, and quality of life may improve. The present study examines the efficacy of a five-session cognitive strategy program for elders on memory self-efficacy, quality of life, and memory strategy knowledge. The memory self-efficacy of participants of elders in the intervention group improved significantly relative to a control group. Additionally, participants’ knowledge of memory strategies improved overall after completion of this program; but no significant improvement in quality of life was observed. Such findings highlight the benefits of cognitive-behavioral interventions for bolstering elders’ confidence and knowledge for memory strategies, thereby reducing age-related stigma.
DEDICATION

This thesis is dedicated to my parents, who have been a never-ending source of support and encouragement for me, as well as my wonderful girlfriend, Lisa, who has helped keep me sane through my graduate school journey. I love you all!

I also want to dedicate this thesis to my academic advisor and mentor, Dr. Jill Shelton. Without you, I would have never realized my passion for working with older adults, nor my skills as a researcher. Thank you for pushing me to try my hardest, and always being a source of support through both the ups and downs.
ACKNOWLEDGEMENTS

First and foremost, I would like to thank my academic and thesis mentor, Dr. Jill Shelton, for her guidance through my academic career and this thesis process. She kept me encouraged and helped me push through the more difficult parts of my career and this project. Without her guidance, I would not be as successful as I am today. Thank you to my committee members, Dr. Ralph Hood and Dr. Cathy Scott, who provided invaluable feedback and guidance on this project. When times were tough, they helped guide me to success, and it was an honor to work with them both. I also want to thank Ashlyn Pace for assisting me with the memory workshop; without her, the intervention would not have gone nearly as smoothly as it did. Finally, I want to give special thanks to the staff of Summit View for allowing me to conduct this project at their facility, as well as the residents of Summit View, who were wholly supportive throughout the process.
# TABLE OF CONTENTS

ABSTRACT ........................................................................................................ iv

DEDICATION ..................................................................................................... v

ACKNOWLEDGEMENTS ................................................................................... vi

LIST OF TABLES ................................................................................................ ix

CHAPTER

I. INTRODUCTION .............................................................................................. 1

II. LITERATURE REVIEW ..................................................................................... 5

- Cognitive-Based Interventions ........................................................................... 5
- Intervention Curriculum .................................................................................. 10
  - Goal Planning Strategies ............................................................................. 10
  - Level of Processing ...................................................................................... 13
  - Spaced Retrieval ......................................................................................... 16
- Present Study .................................................................................................. 17

III. METHODOLOGY ............................................................................................ 18

- Participants ................................................................................................... 18
- Materials ........................................................................................................ 20
- Assessments .................................................................................................. 20
  - Memory Self-efficacy ............................................................................... 20
  - Quality of Life ............................................................................................ 20
  - Memory Strategy Assessments ................................................................... 21
- Lessons and Activities ................................................................................... 21
  - “Tips for Maximizing Memory“ ................................................................... 21
  - Goal Planning Strategies .......................................................................... 22
  - Level of Processing Strategies ................................................................. 23
  - Retrieval Practice ....................................................................................... 24
- Procedure ....................................................................................................... 25

IV. RESULTS ...................................................................................................... 28
LIST OF TABLES

1 Participant Characteristics ........................................................................................................19

2 Memory Self-Efficacy and Quality of Life .............................................................................30
CHAPTER I
INTRODUCTION

Residential care facilities are homes or communities for older adults that provide a safe environment and opportunities for social interaction with other elders. These facilities offer long-term support for older adults with physical or neurological impairments that affect independent living, but do not require the strenuous levels of care associated with nursing homes (Khatutsky et al., 2016). If needed, elders receive assistance for impaired activities of daily living, but are encouraged to maintain their independence by continuing to complete preserved everyday activities on their own. In 2016, approximately 811,500 individuals in the United States lived in a residential care facility; a rate which is increasing as the population of adults over 60 years also rises (Caffrey & Sengupta, 2018). The prevalence of cognitive impairment among residents ranges from around 20% to 50%, suggesting many individuals living in residential care facilities either possess no impairment or mild cognitive impairment (Caffrey & Sengupta, 2018; Jagger & Lindesay, 1997; Khatutsky et al., 2016; Ravona-Springer et al., 2011). However, elders with mild or no cognitive impairment may still possess troubles with memory, which can negatively affect their ability to complete everyday tasks, as well as their confidence regarding their memory and quality of life. In fact, between 20% and 56% of older adults report experiencing memory problems, suggesting this population may benefit from interventions targeting their memory (St. John & Montgomery, 2003). Through increasing elders’ “toolbox” of known
memory strategies, an intervention teaching cognitive strategies may be beneficial for their memory performance, memory self-efficacy, and quality of life.

Cognitive strategies can assist elders to cope with loss of cognitive ability, most prominently through the improvement of memory. Cognitive interventions use a method of teaching memory strategies and modeling their usage in everyday situations to assist elders’ functioning in memory and activities of daily living (Schmitter-Edgecombe, Howard, Pavawalla, Howell, & Rueda, 2008). Forms of memory targeted for improvement include working memory, also known as short-term memory, and prospective memory, the memory to complete actions in the future. These forms of memory can be enhanced through the use of strategies to strengthen encoding and retrieval functioning, called internal strategies, or by manipulating one’s environment to assist in retrieval of memories, known as external strategies (Hutchens et al., 2012). Examples of external strategies include using post-it notes or alarms to remember a future action, while examples of internal strategies include using clustering to remember a phone number. The strategies are most effective when taught and practiced under a variety of everyday conditions and situations, are easy to remember, and are realistic and useful to carry out in everyday life (Cavallini, Dunlosky, Bottiroli, Hertzog, & Vecchi, 2010; McDaniel & Bugg, 2012). These strategies can result in improvements to independence and ability to complete everyday tasks, which can be significantly impactful to elders’ quality of life, the self-perceived wellbeing of an individual (Bárrios et al., 2013), and memory self-efficacy, confidence in one’s memory abilities (Berry, Hastings, West, Courtney, & Cavanaugh, 2010).

While most academic literature in which these interventions are found use labels of “dementia”, “cognitive decline” and “Alzheimer’s disease” to describe their participant sample, these terms hold stigma that may negatively impact elders. Stigma is defined as a set of
discriminatory beliefs about oneself or others that is perpetuated by society which can create a loss of status, self-worth, and perceived quality of life in affected individuals (Herrmann et al., 2018; Swaffer, 2014). Stigma relating to older adults with dementia is well reported within the United States, as well as the negative effects the labels can bring. Commonly reported consequences of stigma include shame, self-perceived incompetence to complete everyday tasks, decreased confidence in memory, social rejection or isolation, and increased anxiety and depressive emotions and behaviors (Burgener, Buckwalter, Perkhounkova, & Liu, 2015; Swaffer, 2014). Additionally, stereotype threat can impair older adults’ performance on cognitive screening tests and memory assessments, further enforcing negative views towards their self-perceived cognitive abilities (Chasteen, Pichora-Fuller, Dupuis, Smith, & Singh, 2015; Mazerolle et al., 2016). Stigma can also affect an individual’s willingness to seek support or participate in social activities, as they wish to avoid feeling embarrassed or incompetent to their family members, friends, and healthcare providers, which can further increase social isolation and depressive symptoms (Burgener et al., 2015). However, these stigmas are reinforced by healthcare professionals and the media, which often describe or depict elders with cognitive impairment as incompetent, burdensome, and as “victims” or “sufferers” (Herrmann et al., 2018; Swaffer, 2014), which heightens fear and negative stereotypes about the condition, as well as their self-perceived level of functional ability and independence (Chasteen et al., 2015). Because of this negative focus towards any form of elderly cognitive impairment in the medical community and the media, dementia has been referred to as a “social disease,” in which societies’ beliefs and stigmas largely contribute to the disempowerment of elders, perhaps as much or more than actual cognitive problems (Kitwood, 1997).
I will be replicating the labeling and stigmatizing language used in previous studies to accurately represent operational definitions found in other studies; however, it should be noted that I actively avoided using this language in practice. Specifically, I did not use any stigmatizing label throughout the intervention, including “dementia,” “Alzheimer’s disease,” and “impairment.” I wish to avoid the language that strips elders of dignity and identity, emphasizes and reinforces stereotypes, and is associated with a label. Instead, I wish to create an environment that reinforces independence and self-worth by focusing on what individuals can do, rather than what they cannot do. Thus, the purpose of this study is to design and test the effectiveness of a non-stigmatizing educational intervention to improve knowledge of memory strategies, memory self-efficacy, and quality of life of older adults living in a residential care facility.
CHAPTER II
LITERATURE REVIEW

Cognitive-Based Interventions

The main focus of cognitive interventions is to help individuals maintain their independence in everyday functioning by teaching memory strategies and guiding participants to practice the strategies in order to help compensate for deficits in “everyday memory” (Troyer, Murphy, Anderson, Moscovitch, & Craik, 2008). In a recent meta-analysis of memory training studies, participation in memory training was associated with a significant increase in strategy use post-intervention as compared to control groups (Hudes, Rich, Troyer, Yusupov, & Vandermorris, 2019). For example, after completing a 10-session memory intervention in which participants practiced and applied memory strategies to everyday life, patients with mild cognitive impairment in the intervention group saw improvements to both memory strategy knowledge and use which remained after a three month period (Troyer et al., 2008). Also, Kinsella et al. (2009) used a problem-solving approach to teach memory strategies, in which they saw significant improvements in strategy use and knowledge in patients with mild dementia after completing the intervention; however, these effects were not observed at a four-month follow-up (Kinsella et al., 2009). Additionally, Kinsella et al. (2016) used a similar memory intervention and also observed significant improvements to memory strategy knowledge and use in participants but, as before, the effects did not persist at a six-month follow-up (Kinsella et al., 2016). Such results suggest cognitive interventions may improve memory strategy use and...
knowledge, but as time progresses, booster sessions may be required to promote continued strategy usage (Kinsella et al., 2016; Kinsella et al., 2009). Booster sessions that occur several weeks or months following completion of the program, can be effective at refreshing and reminding participants about the memory strategies taught (Willis et al., 2006). Additionally, informative packets regarding memory strategies can be provided to participants following completion of the intervention to refresh their knowledge (Greenaway, Hanna, Lepore, & Smith, 2008).

As expected, the benefits of cognitive interventions to improve memory strategy knowledge and usage have been associated with enhancements to everyday functioning. A four-week cognitive intervention that included lessons on problem-solving, stress management, and memory training was conducted for individuals with mild cognitive impairment (Kurz, Pohl, Ramsenthaler, & Sorg, 2009). An informant interview after the intervention suggested that participants improved on their ability to complete activities of daily living. After completing a six-week cognitive intervention, experimental participants in Greenaway et al. (2013) also had higher outcome scores on a measure of everyday functional ability compared to controls (Greenaway, Duncan, & Smith, 2013). It was reported in another study that after a cognitive intervention, patients performed better on two assessments of everyday memory functioning relating to medication management and bill paying in comparison to a control group (Schmitter-Edgecombe & Dyck, 2014). Self-reported everyday functioning did not improve, but care-partners reported significant improvements in the care receivers’ everyday functioning as compared to the control group, which suggests older adults may be negatively biased towards their beliefs of their functional abilities, potentially caused by negative beliefs about aging and their diagnosis. Finally, in a post-test for a cognitive intervention focused on planning aids for
future intentions, participants were significantly more likely to carry out the planning strategy taught in the program at the appropriate time than a control group (Kliegel, Martin, McDaniel, Einstein, & Moor, 2007). Improving everyday functioning is important for all elders, as impairments in the ability to independently perform activities of daily living can cause a significant loss of quality of life (Troyer et al., 2008).

Although cognitive based interventions often do not aim to directly manipulate quality of life, this does not mean they are ineffective at improving wellbeing. Indeed, a recent meta-analysis examining quality of life changes in elders after attending a memory intervention found significant improvements post-intervention throughout various studies (Hudes et al., 2019). For example, after completing a four-week cognitive intervention, participants with mild cognitive impairment scored lower on a scale of depression by around 50%, suggesting the intervention improved mood in this population (Kurz et al., 2009). Additionally, in a combined cognitive and motor intervention, participants’ ratings of quality of life increased post-intervention (Olazaran et al., 2004). The cognitive intervention in Greenaway, Duncan, and Smith (2013) led to improved self-perceived quality of life in elders with mild cognitive impairment (Greenaway et al., 2013); however, a similar intervention produced no significant effect on quality of life (Schmitter-Edgecombe & Dyck, 2014). Also, Kinsella et al. (2016) found higher levels of wellbeing at post-test in their memory intervention group, but the effect did not last at a six-month follow-up assessment (Kinsella et al., 2016).

Along with wellbeing, memory self-efficacy of older adults has also improved after attending a memory-focused intervention. In a meta-analysis of memory-training intervention studies, participants who participated in a cognitive intervention reported significantly higher memory self-efficacy post-completion (Hudes et al., 2019). For example, in a multifactorial
memory training program developed for older adults, in which memory strategies were taught and practiced, significant improvements in memory self-efficacy, as well as objective measures of cognition, were reported for the experimental group, while no changes were present in the control group (West, Bagwell, & Dark-Freudeman, 2008). Additionally, in the cognitive intervention described in Greenaway, Duncan, and Smith (2013), elders with mild cognitive impairment experienced improvements in memory self-efficacy post intervention, suggesting cognitive interventions may support positive beliefs regarding one’s own memory (Greenaway et al., 2013).

Improving one’s confidence in their memory is important for the memory functioning of older adults, as memory self-efficacy scores can positively predict memory performance on a variety of memory tasks (Beaudoin & Desrichard, 2016). According to the Self-Efficacy Theory (Bandura, 2003), lower scores of memory self-efficacy lead to lower effort, less persistence, and higher anxiety, all of which having the potential to impair memory performance. The theory explains that individuals’ beliefs of their memory abilities influence how much effort they will engage towards the memory task and how quickly they will discontinue such efforts. Indeed, in a study examining memory self-efficacy scores and persistence, measured by study time for a memory task, older adults with higher confidence studied longer for the memory task, resulting in greater memory performance (Beaudoin & Desrichard, 2016). Additionally, in a separate study, elders with low memory self-efficacy scores had significantly higher scores of anxiety, which was associated with reduced memory processing efficiency (Beaudoin, 2018). The effects of low self-efficacy on anxiety is likely so impactful in older adults due to increasingly common concerns of age-related cognitive impairments and the negative stereotypes of aging regarding memory performance (Burgener et al., 2015; Molden & Maxfield, 2017; Swaffer, 2014).
Because of these commonly held beliefs, it is speculated that many memory concerns of older adults are more related to their self-confidence in memory, and not their actual change in objective memory performance (Hudes et al., 2019). Thus, memory interventions should strive to foster confidence in memory abilities, lower anxiety regarding memory performance, and encourage persistence in completing difficult tasks, rather than aiming to improve objective measures of memory performance.

If possible, it is best for cognitive interventions to be group-based in design, as socialization may provide greater benefits than the interventions alone. A socially-active lifestyle has been associated with a lessened risk of developing a dementia-related disease in older adulthood (Fratiglioni et al., 1991; Lövden, Ghisletta, & Lindenberger, 2005). Additionally, in various studies, participants mentioned developing friendships with others that persisted after the intervention, which, if supportive, can have a positive effect on mental health, stress, and mood (Kinsella et al., 2009; Snyder, Quayhagen, Shepherd, & Bower, 1995). Supportive social relationships can help elders cope with age-related stressors, assist in recovery during health ailments, and provide opportunities for elders to learn from one another (Schaie, Boron, & Willin, 2005). This suggests that a group-based format could provide a further benefit than an individually-based intervention for older adults with dementia (Scott & Clare, 2003). Because of the importance of socialization, interventions should aim to foster healthy relationships between participants by including an appropriate amount of group-based learning.
Intervention Curriculum

Goal Planning Strategies

To improve the likelihood of completing future intentions, also known as prospective memory tasks, memory strategies utilizing the environment can be beneficial. For example, in everyday life, it is commonplace for individuals to “offload” future intentions into the external environment to support prospective remembering. Through the use of to-do lists, calendars, alarms, post-it notes, electronics, and more, individuals can rely on these external memory aids to assist in the perceptual triggering of the intention, or the retrieval of an intention due to exposure to specific environmental stimuli (Gilbert, 2015). An example of utilizing the offloading of intentions would be a shopping list, which assists in the recollection of needed food items by referring back to the list when needed. Although age-related deficits in memory functioning can impair older adults’ execution of future intentions, there is much evidence to suggest that older adults can use external reminders or memory aids to compensate for these declines (de Frias & Dixon, 2005).

Based on Craik’s (1992) environmental support theory, external reminders act as strong environmental cues, also known as context, to support retrieval of a prospective memory intention (Craik, 1992). To complete prospective memory tasks, according to the dynamic multiprocess framework, individuals often have to monitor, or maintain attention, for the opportunity to execute future intentions, which is cognitively demanding and particularly difficult for older adults (Shelton & Scullin, 2017). However, by associating contextual information with a goal, future intentions are more likely to be reflexively recalled when in that context, through a spontaneous retrieval process. Spontaneous retrieval spurs monitoring for the intention when relevant, reducing the attentional resources required and improving the
probability to complete the task. This was evidenced in Kominsky & Reese-Melancon (2017), in which older adults completed an ongoing task while also told to remember to execute an additional prospective memory task (Kominsky & Reese-Melancon, 2017). Some participants were given a contextual hint as to when the prospective memory tasks would occur, while others were not. In comparison to those who did not receive the contextual information, participants who were given the hint directed significantly more attention towards the future intention when in the appropriate context compared to when in an irrelevant context, as well as performed significantly better on the prospective memory task (Kominsky & Reese-Melancon, 2017). These findings are especially important for older adults, as age-related declines in executive attention are associated with impairments in attention allocation, suggesting older adults are less likely to monitor when needed (McDaniel & Einstein, 2011). However, external reminders can assist in the strategic allocation of attention for these cues, reducing the cognitive load required to prompt retrieval of the intention, improving prospective memory performance (Ball & Bugg, 2018; McDaniel & Einstein, 2000).

Indeed, numerous studies have provided evidence in favor of the environmental support theory and multiprocess framework, with older adults performing better on prospective memory tasks when allowed to utilize external reminders (Einstein & McDaniel, 1990; Gilbert, 2015; Guynn, McDaniel, & Einstein, 1998; Henry, Rendell, Phillips, Dunlop, & Kliegel, 2012; Moscovitch, 1982; Schryer & Ross, 2013). Interestingly, in some of these studies, older adults benefitted more than younger adults from the use of external reminders (Gilbert, 2015; Moscovitch, 1982; Schryer & Ross, 2013) suggesting older adults may perform better when completing intentions that rely on spontaneous retrieval (McDaniel & Einstein, 2000). However, according to Guynn and associates (1998), the external reminders were only beneficial to
memory performance when they referred to both the target event and intended activity (Guynn et al., 1998). This may suggest external reminders’ benefit to prospective memory performance is produced, in large, by facilitating strategic monitoring, which is more likely to occur when contextual information is associated with a future goal (Guynn et al., 1998; Kominsky & Reese-Melancon, 2017).

Like external reminders, another memory strategy, called implementation intentions, have also been shown to be beneficial for completing future goals. An implementation intention is a strategy in which goal-directed verbalization of intentions is used in the format, “If x arises, then I will perform y” (Gollwitzer, 1999). Often, individuals with say the “If x arises, then I will perform y” phrase multiple times, while imagining themselves completing that task.

Implementation intentions may be beneficial to prospective memory, as rehearsal of an explicit intention that is tied to specific situational cues encourages the facilitation strategic monitoring when that situation is encountered (McDaniel & Scullin, 2010). Indeed, in healthy older adult populations, implementation intention encoding can improve prospective memory performance (Chasteen, Park, & Schwarz, 2001; Chen et al., 2015; Lee, Shelton, Scullin, & McDaniel, 2016; Schnitzspahn & Kliegel, 2009; Shelton et al., 2016; Zimmermann & Meier, 2010), even leading to improvements in planned daily tasks, including medication adherence (Liu & Park, 2004) and blood pressure monitoring (Brom et al., 2013). However, the benefit of implementation intentions on prospective memory performance may be reduced in older-old adults (age 76-90 years) as compared to younger-old adults (age 60-75 years), potentially suggesting fluid intelligence and working memory deficits associated with older-old adulthood may inhibit their ability to successfully carry out more difficult memory strategies (Chen et al., 2015).
While the amount of literature is not as robust, there is evidence that implementation intentions may also be beneficial to older adults with cognitive deficits. In laboratory prospective memory tasks, implementation intentions bolstered performance in individuals with mild cognitive impairment (Lee et al., 2016), with the strategy leading to improved prospective memory regardless of the participants’ episodic memory ability (Shelton et al., 2016). Additionally, when combined with physical enactment of the intended action, implementation intentions led to superior prospective memory performance in elders with cognitive declines (Pereira et al., 2015). To achieve greater benefits to daily functioning, memory training specifically focused on using implementation intentions in daily life would likely provide additional benefits. In a study involving an implementation intention-based memory clinic, participants with memory complaints, mild cognitive impairment, and dementia did report improved usage of the strategy in everyday life post-intervention; however, only those without a significant working memory deficit benefitted (Burkard, Rochat, Van der Linden, Gold, & Van der Linden, 2014). These findings suggest implementation intentions can be beneficial for older adults’ execution of future tasks, but may not be the best choice for all individuals with significant fluid intelligence or working memory deficits (Chen et al., 2015).

**Level of Processing**

Level of processing is a term used to describe the degree of cognitive effort implemented in the analysis of information. According to the levels-of-processing theory, by encoding stimuli in a “deeper,” more semantic manner, the memory of that material will be more detailed, longer lasting, and easier to recall than information analyzed “shallowly” (Craik, 2002; Craik & Lockhart, 1972). Stimuli that is processed “deeper” is analyzed by meaning and association,
while “shallow” analysis refers to the physical, auditory, or verbal characteristics of the material (Craik, 2002; Fu, Maes, Varma, Kessels, & Daselaar, 2017). It is believed more elaborate analysis will make the memory of the stimuli more distinctive, which may support future recollection of that information when encountered among distractors. Additionally, semantic analysis of stimuli may also create stronger neural connections with previously learned and organized knowledge, suggesting previous knowledge can facilitate and strengthen the encoding of new learning (Craik, 2002). For example, if attempting to remember a list of dates, one will be more likely to remember the list if they associate the dates with other world events, rather than if they just try to memorize the list.

The benefits of elaborate, semantic encoding may be influenced by the self-generation effect, in which self-generated information created in the analysis of stimuli produces stronger recollection of that material as compared to experimenter-generated information (Bertsch, Pesta, Wiscott, & McDaniel, 2007). For example, individuals are more likely to remember items on a grocery list they created from themselves, in comparison to a list their mother created. The self-generation effect in older adults was evidenced in Multhaup & Balota (1997), in which participants remembered significantly more self-generated words than experimenter-generated words (Multhaup & Balota, 1997). Semantic encoding can also be affected by the self-reference effect, which suggests encoded information in reference to oneself will produce a stronger, more easily remembered memory, in comparison to non-self-referencing information (Rogers, Kuiper, & Kirker, 1977). For example, a list of errands one must complete will likely be more easily remembered than a list of errands another individual must complete. In older adults, research has suggested both visual and verbal stimuli which is self-referenced displays improved recognition
as compared to other-referencing information (Gutchess, Kensinger, Yoon, & Schacter, 2007; Hamami, Serbun, & Gutchess, 2011).

Evidence supporting the level-of-processing framework is present in several studies, with consistent reports of both younger and older adults performing greater on the recall of study items when encoded semantically compared to items encoded non-semantically (Dixon & von Eye, 1984; Fu et al., 2017; Sauzeon, N’Kaoua, Lespinet, Guillem, & Claverie, 2000; Simon, 1979). For example, through the use of semantic analysis of a list of name-face pairs, younger and older adults recollected significantly more pairs than participants who analyzed the same name-face pairs in a shallow manner (Troyer, Häfliger, Cadieux, & Craik, 2006). While a more novel approach, drawing has also been utilized as a method of semantic encoding, as the act of drawing creates a strong visuo-perceptual memory, leading to improved recall in younger and older adults (Meade, Wammes, & Fernandes, 2018). The benefit of drawing, as well as semantic encoding, is also believed to be influenced through the incorporation of contextual details, which improve the likelihood of future intentions being reflexively recalled when the related context is encountered. Research suggests the more deeply context is encoded, the greater the likelihood of successfully connecting contextual details to the to-be-remembered information to form a detailed memory (Lövdén, Rönnlund, & Nilsson, 2002; Perfect & Dasgupta, 1997; Prior & Bentin, 2003; Skinner & Fernandes, 2009). Indeed, when older adults were instructed to encode face-word pairs using either shallow or semantic, contextual details, older adults who used contextual details while encoding were significantly more likely to correctly remember the face-word pair (Skinner & Fernandes, 2009).
Spaced Retrieval

Spaced retrieval is a cognitive strategy which supports memory by testing an individual’s recall several times over a period of time, with expanding delays in-between each testing session (Creighton, van der Ploeg, & O’Connor, 2013). In spaced retrieval practice, individuals learn a response to a question, and then must actively recall the target response to that question. If correct, the participant must retrieve the information again at increasingly longer intervals, but if incorrect, they are immediately told the correct answer and asked to repeat it. For example, if attempting to remember a phone number, actively recalling the digits repeatedly, spaced over an extended period of time, may foster a stronger memory of the number. In fact, spaced retrieval can improve performance on a wide variety of memory tasks, including remembering to use an external reminder or assistive device, face-name associations, biographical information, and orientation (Creighton et al., 2013; Small, 2012). The spaced-retrieval effect is caused by priming, in which previous exposure to stimuli influences the future recognition of that information (Sohlberg & Turkstra, 2011), the spacing effect, in which information is learned more effectively when recognition is distributed over time (C. Camp, Bird, & Cherry, 2000), and the testing effect, in which repeated retrieval of material can strengthen one’s memory of that retrieved stimuli (Rowland, 2014).

Spaced retrieval practice has been found to be beneficial for elders with cognitive impairment in a wide variety of settings (Anderson, Arens, Arens, & Coppens, 2001; Creighton et al., 2013; Small, 2012). Most predominately, spaced retrieval has been used to assist elders with cognitive impairment learn and retain associations between names and faces for nurses, colleagues, and family members (C. J. Camp, 1989; Cherry, Walvoord, & Hawley, 2010). However, spaced retrieval (Cherry et al., 2010) has also been used with elders to address aberrant
behavior and learn other strategies to improve everyday functioning (Creighton et al., 2013). Because of the ease of implementation in daily life, spaced retrieval may be an advantageous strategy that individuals of all levels of cognitive functioning could benefit from using. At the beginning of each intervention session in this study, participants completed a short quiz relating to material learned in previous sessions, promoting retrieval practice of the learned material.

**Present Study**

Due to the increasing prevalence of elders living in a residential care facility in the United States, it is imperative that methods to assist elders with age or neurological-based impairments are developed (Roberts & Silverio, 2009). Cognitive interventions have been developed to assist impaired elders maintain independence, promote quality of life, and bolster memory-related confidence (Hudes et al., 2019). Within these lessons, a wide variety of strategies can be taught to improve everyday memory functioning, including deepening encoding, using external reminders, and implementation intentions. These interventions have led to improvements to memory strategy knowledge and use, as well as everyday functioning. Additionally, measures of quality of life and memory self-efficacy are evidenced to improve following completion of a cognitive intervention. Importantly, by improving upon these variables, older adults may lead more independent and confident lives, fighting off the negative effects of ageist stigma. I hypothesized that, following completion of the cognitive intervention, older adult participants would report higher self-perceived quality of life and memory self-efficacy, as well as improve performance on relevant assessments of memory strategy knowledge.
CHAPTER III

METHODOLOGY

Participants

This study included older adults living in a continuing care retirement community located in Chattanooga, TN. All residents of the continuing care retirement community were eligible to participate in the experimental condition of the study, which included the memory-training intervention. They were informed they could participate in as many educational sessions as desired; however, they were encouraged to complete all sessions. Additionally participants who did not wish to enroll in the intervention were informed they could participate in the control condition. Participants in the control condition did not take part in the educational intervention, but completed the pre- and post-session surveys. Individuals in the experimental group received $5 as compensation for every session they attended, with a bonus $5 added if participants attended all sessions (up to $30). Individuals in the control group received $5 as compensation for each session of surveys they attended (up to $10). The study was approved by the Institutional Review Board of the University of Tennessee at Chattanooga.

Participant characteristics are summarized in Table 1. In this study, 51 individuals participated in the study (30 in experimental and 21 in control). Of these participants, 21 are included in the analysis for the experimental group, and 16 are included in the analysis for the control group. Participants not included in the final analysis were left out due to missing pre-intervention or post-intervention data. In this sample, there were eight participants with a
diagnosis of neurological impairment (Control = 2, Experimental = 6), 15 participants who had experienced a cardiovascular accident (Control = 6, Experimental = 9), and one participant who experienced a brain injury (Control = 0, Experimental = 1).

Table 1
Participant Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Experimental</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>Age (M (SD))</td>
<td>79.8 (12.1)</td>
<td>82.1 (9.29)</td>
</tr>
<tr>
<td>Sex (% Female)</td>
<td>68.8</td>
<td>71.4</td>
</tr>
<tr>
<td>Years of Education</td>
<td>13.6 (3.88)</td>
<td>11.7 (4.77)</td>
</tr>
<tr>
<td>Race (% Caucasian)</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Neurological Disorder Diagnosis (%)</td>
<td>12.5</td>
<td>28.6</td>
</tr>
<tr>
<td>History of Brain Damage (%)</td>
<td>0</td>
<td>4.76</td>
</tr>
<tr>
<td>History of Cerebrovascular Accident (%)</td>
<td>37.5</td>
<td>42.9</td>
</tr>
<tr>
<td>Average Hours of Sleep</td>
<td>6.80 (1.58)</td>
<td>6.90 (1.26)</td>
</tr>
<tr>
<td>Average Naps per Week</td>
<td>4.27 (3.84)</td>
<td>2.19 (2.52)</td>
</tr>
<tr>
<td>Average Exercise per Week</td>
<td>2.21 (2.64)</td>
<td>2.85 (2.74)</td>
</tr>
</tbody>
</table>

Information in this table was gathered from the demographic questionnaire and the de-identified health information provided by the residential facility director.
Materials

Assessments

A demographic questionnaire was used in this study to assess the characteristics of the Summit View population sample. The questionnaire asked for participants’ age, sex, race, years of education, current or past occupation, and sleep and exercise frequency. Additionally, de-identified health information of the participants was provided by the residential facility director. De-identified health information included the presence of a neurological impairment, a personal history of a brain injury, and a personal history of a cerebrovascular accident.

Memory Self-efficacy

To assess participants’ self-efficacy regarding their memory performance, the Satisfaction sub-scale of the Multifactorial Memory Questionnaire was utilized (Troyer & Rich, 2018). In this assessment, participants rate 18 statements regarding their satisfaction, concern, and overall appraisal of their memory on a 1-5 (strongly disagree to strongly agree) Likert scale. The internal consistency, test-retest reliability, and content, convergent, discriminant, and concurrent validity are all strong for the Multifactorial Memory Questionnaire (Troyer & Rich, 2018).

Quality of Life

A 16-item version of the Quality of Life Scale was used to assess the self-perceived wellbeing of participants (Burckhardt & Anderson, 2003). This assessment is used in populations with chronic conditions or diseases, and measures five domains of quality of life: physical wellbeing, relationships, social activities, personal development and fulfillment, and recreation.
The 16-item version of the test contains an added question regarding “independence.” Internal consistency, test-retest reliability, and discriminant and concurrent validity of this test were all strong (Burckhardt & Anderson, 2003).

Memory Strategy Assessments

To gauge potential memory strategy knowledge improvement, self-made quantitative assessments of participants’ knowledge of memory strategies covered during that day’s session was completed at the beginning and end of every session. Participants received three multiple choice questions before the intervention lessons begin, which consisted of one correct answer and two distractors. At the end of each lesson, a similar set of three questions were asked to gauge knowledge learned. Questions covered everyday scenarios in which the memory strategies discussed may be used, and prompted participants to respond how appropriate the strategy is for that scenario.

Lessons and Activities

In this section, the lessons and activities that were implemented in this intervention are briefly discussed. All lessons and activities were based on the strategies outlined in the curriculum, which can be found in Appendix D.

“Tips for Maximizing Memory”

Before beginning lessons on memory strategies, participants were provided with “tips for maximizing your memory,” comprising education regarding lifestyle changes that could be made to promote cognitive health. Participants were informed of the potential cognitive benefits of
mental stimulation, physical activity, socialization, adequate sleep, and proper nutrition, and were given examples of how these changes could be applied (Einstein & McDaniel, 2004). The purpose of this education was to inform participants of methods for maintaining cognition which could be implemented in everyday life, as well as encourage participants that they have control over their memory abilities and can make active improvements if they choose to do so.

**Goal Planning Strategies**

Using external reminders to assist in recall primarily included discussion of different types of external reminders, different contexts they can be used in, and tips for improving their effectiveness. Examples of forms of external reminders include calendars, daily planners, post-it notes, alarms, and to-do lists, all of which were discussed in an activity. This activity exposed participants to a particular issue, for which they had to decide the most appropriate method of external reminder that could be used. Using contextual information alongside these external reminders was taught as methods of improving the value of the technique. To explain using contextual information with external reminders, an activity was conducted in which participants were asked to think of a task they need to complete in the near future, and describe what relevant contextual details could be used to help them remember to complete such a task. It was explained that individuals can improve their ability to remember intentions and utilize external reminders by including a contextual detail with their reminder (Ball & Bugg, 2018; Kominsky & Reese-Melancon, 2017; McDaniel & Einstein, 2000). In addition, tips on how to improve external reminder effectiveness and usage was described, such as the inclusion of visuals, putting the reminder in a relevant place, and planning.
Before explaining the purpose and utility of implementation intentions for improving prospective memory, the strategy was introduced, demonstrated, and given everyday situations in which it may be used. Participants practiced using implementation intentions by coming up with their own implementation intentions to complete various everyday tasks.

*Level of Processing Strategies*

To explain the purpose of the level of processing strategies and the benefits of semantic encoding, both a deep processing activity and a “penny-identification” activity was completed. In the deep processing activity, participants heard 7 words one at a time, and answered a shallow “yes-or-no” question for each word (“Does the word start with the letter ‘S’?”). Afterwards, participants attempted to remember as many words as possible, using the answers to the “yes-or-no” questions as hints. Then, participants heard 7 new words one at a time, and answered a semantic “yes-or-no” question for each word (“Does the word fit in the sentence, ‘The ___ was found in the kitchen.’?”). Based on previous studies, participants who encoded deeper will most likely perform superiorly to participants who encoded shallowly, providing evidence towards the level of processing theory (Craik, 2002; Fu et al., 2017). In the “penny-identification” activity (May & Einstein, 2013), participants were asked shallow questions regarding the penny, including “Who is the man on the front of the penny?”, “What color is a penny?”, and “What building is on the back of the penny?”. Then, participants were asked more semantic questions regarding the penny, including “What word is on the penny, next to Lincoln’s head?”, “What side is this word on?”, and “What way is Lincoln facing?” As participants may have difficulty with the semantic questions, but not the shallow questions, this example can be used to explain
that repeated exposure to information without deep processing will cause likely recall errors in memory, highlighting the importance of paying attention.

Level of processing strategies covered in the intervention included name-face learning, drawing for memory, and remembering where they put items. The name-face method is a strategy used to assist in the learning of new names by making meaningful and semantic associations between names and faces. Participants were informed of semantic “hints” to help remember names, including describing a prominent facial feature, a perceived personality or job, or a hobby, occupation, or famous person associated with the name. An activity followed, in which multiple descriptions of individuals were read aloud, and participants were asked to mention an association with the name (Einstein & McDaniel, 2004). In addition, participants learned other strategies to help them remember names, including paying attention and repetition of the name (Troyer et al., 2006). Next, introducing the drawing for memory activity, participants were informed that, if they like to draw or “doodle”, this hobby can be used to improve memory to complete future intentions. Information regarding drawing’s use in deepening encoding was discussed, as well as how it can be included with external reminders (Meade et al., 2018). Lastly, tips on helping individuals remember where they put used items, like glasses, books, and television remotes, were mentioned, including the usage of deep encoding techniques, such as coming up with a story for putting an item in a specific place (Einstein & McDaniel, 2004).

**Retrieval Practice**

The utility of spaced retrieval as a strategy to facilitate memory was explained using a testing-effect activity. In this activity, participants heard a list of seven words read aloud one at a
time, and were required to write down as many of the words they could remember. Following a performance check and a brief delay, participants were again required to write down as many of the words they could remember. This process repeated three times more, until afterwards, when participants were asked to compare the scores from each recall. As participants were tested multiple times on the same set of questions, their performance should improve with each following recall, providing evidence for the strategy (Creighton et al., 2013). Spaced retrieval was discussed in the contexts of assisting oneself in remembering name-face pairs and future intentions, with a short activity covering the use of spaced retrieval to assist in the remembering of name-face pairs. In this activity, participants viewed five faces and heard the names associated with these faces. Then, participants saw the faces again, and were asked to write down the names associated with the faces. This process repeated three times more, and then participants were asked to compare the scores from each recall. Again, their performance should improve with each following recall (C. J. Camp, 1989; Cherry et al., 2010; Creighton et al., 2013). Lastly, participants heard tips on how to improve one’s memory regarding how to use electronic devices, including practicing, translating the directions into one’s own words, and commenting on the steps (Einstein & McDaniel, 2004).

Procedure

Participants were either included in the experimental or control conditions based on their preference. Participants in the experimental condition attended the educational intervention program, which occurred once a week for five weeks, with each session lasting approximately one hour. Participants were encouraged to participate in as many intervention sessions as possible, but were allowed to complete as many as they preferred. Participants in the control
condition did not participate in the five week intervention. The control group participants were not prevented from participating in the intervention; however, their results were not included in the analyses of the control condition. Instead, they were asked to complete the same pre-test and post-test variables as the experimental group.

For pre-test scores, participants completed a demographic questionnaire, the Satisfaction sub-scale of the Multifactorial Memory Questionnaire to assess self-efficacy regarding their memory performance, and the 16-item version of the Quality of Life Scale to assess self-perceived wellbeing. At the end of the final session, or five weeks after pre-test scores were gathered, participants completed the Satisfaction sub-scale of the Multifactorial Memory Questionnaire and the 16-item version of the Quality of Life Scale to gather post-test scores of the variables of interest. Additionally, at the beginning and end of each individual session, participants in the experimental condition completed three multiple choice questions regarding material covered during the lesson to assess memory strategy knowledge learned from the intervention.

Sessions always began with a particular lesson, which included relevant activities and discussions regarding how these methods may be useful in everyday life, or experiences in which participants used a similar strategy to solve a specific problem. Each session participants were given a lesson-specific packet (see Appendix D), which contained material regarding the information covered that day for future reference, as well as materials for the relevant activities (see Appendix F). Participants were also given lesson-specific homework assignments to complete by the next session, with the purpose of encouraging participants to practice the strategies covered (see Appendix G). The first session included a general overview of the intervention goals and lessons that would be covered, as well as included relevant interesting
information about aging and tips for facilitating memory performance, including sleep, social activity, and exercise. Alongside this, to engage participants, a discussion regarding what they would like to learn or cover over the intervention schedule took place. The second session covered goal planning strategies using external reminders and implementation intentions, the third lesson discussed level of processing memory strategies, and the fourth intervention session covered a lesson on spaced retrieval. The final session included general overview and synopsis of all of the lessons covered. During this time, participants were encouraged to ask questions, make comments regarding what they liked or did not like about the intervention, and discuss what they would like to learn in the future.
CHAPTER IV
RESULTS

Participant Characteristics

A Type 1 error rate of .05 was set for all analyses. Participant characteristics are summarized in Table 1. Between the two groups, there were no significant differences in mean age or years of education (all p's > .2). For the pre-intervention scores, there was a marginally significant difference between memory self-efficacy scores between the two groups (p = .048), but not in quality of life scores (p = .755). Between the two groups for the post-intervention scores, there was no significant difference for memory self-efficacy scores (p = .527), nor for the quality of life scores (p = .143).

In the experimental condition, attendance was scored depending on the number of sessions the participant attended. The mean attendance was 4.48 days (SD = .75, Min. = 3, Max. = 5). Of these participants, three individuals attended three sessions (14.3%), five participants attended four sessions (23.8%), and thirteen attended all five sessions (61.9%).

Memory Self-Efficacy

Change in memory self-efficacy was operationalized as the total number of points out of 90 scored on the Satisfaction sub-scale of the Multifactorial Memory Questionnaire. Memory self-efficacy data were analyzed using a 2 (Condition: Experimental/Control) x 2 (Time: Pre-Intervention/Post-Intervention) mixed-factor analysis of Variance (ANOVA) with Condition as
the between-participants factor and Time as the within-participants factor. Descriptive statistics for Memory Self-efficacy scores are displayed on Table 2. There was not a significant main effect of Time, \( F(1,34) = 2.05, p = .161, \eta^2_p = .057 \), or Condition, \( F(1,34) = 1.99, p = 1.66, \eta^2_p = .056 \). However, there was a significant interaction between Memory score and Condition, \( F(1,34) = 6.33, p = .017, \eta^2_p = .157 \). In the experimental condition, memory self-efficacy scores increased significantly from pre-test to post-test, while in the control condition, memory self-efficacy scores did not change significantly.

To assess whether the amount of sessions attended influenced memory-self efficacy in the experimental condition, an Analysis of Covariance was used, with the Total Attendance of participants in the experimental condition included as a covariate. There was no significant main effect of Time, \( F(1,19) = .013, p = .910, \eta^2_p = .001 \), nor of Total Attendance, \( F(1,19) = .407, p = .531, \eta^2_p = .021 \). Additionally, there was no significant interaction between memory score and total attendance, \( F(1,33) = .967, p = .333, \eta^2_p = .028 \). These findings suggest the level of attendance moderated the effect on memory self-efficacy in the experimental group.
Table 2

Memory Self-Efficacy and Quality of Life

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Experimental</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>95% CI</td>
</tr>
<tr>
<td>n</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Satisfaction- MMQ</td>
<td>65.9 (13.9)</td>
<td>[59.2, 72.7]</td>
</tr>
<tr>
<td>(Pre-Test)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfaction- MMQ</td>
<td>64.6 (11.2)</td>
<td>[58.3, 70.9]</td>
</tr>
<tr>
<td>(Post-Test)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-item QoL Scale</td>
<td>82.5 (7.63)</td>
<td>[76.9, 88.1]</td>
</tr>
<tr>
<td>(Pre-Test)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16-item QoL Scale</td>
<td>80.9 (11.1)</td>
<td>[74.7, 87.0]</td>
</tr>
<tr>
<td>(Post-Test)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independence- QoL</td>
<td>5.53 (1.06)</td>
<td>[4.87, 6.20]</td>
</tr>
<tr>
<td>Scale (Pre-test)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independence- QoL</td>
<td>5.27 (.884)</td>
<td>[4.84, 5.69]</td>
</tr>
<tr>
<td>Scale (Post-test)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Satisfaction- MMQ = Satisfaction subscale of Multifactorial Memory Questionnaire, 16-item QoL Scale = 16-item Quality of Life Scale, Independence- QoL Scale = The question regarding independence on the 16-item Quality of Life Scale

Quality of Life

Change in self-perceived quality of life was operationalized as the total number of points out of 112 scored on the 16-item version of the Quality of Life Scale, and analyzed using a 2 (Condition: Experimental/Control) x 2 (Time: Pre-Intervention/Post-Intervention) mixed-factor ANOVA with Condition as the between-participants factor and Time as the within-participants factor. Descriptive statistics for Quality of Life scores are displayed in Table 2. There was no main effect of Time, \( F(1,34) = .001, p = .976, \eta^2_p > .000 \), or of Condition, \( F(1,34) = 1.58, p = \)
.218, $\eta^2_p = .044$. Also, there was no significant interaction between Quality of Life score and Condition, $F(1,34) = 1.04, p = .316, \eta^2_p = .030$.

Of the 16 questions within the Quality of Life Scale, the most relevant question to this study is the rating of one’s satisfaction with their independence. Improvements to memory functioning or self-efficacy may lead to participants to view their level of independence as more satisfactory than before. A 2 (Condition: Experimental/Control) x 2 (Time: Pre-Intervention/Post-Intervention) mixed-factor ANOVA with Condition as the between-participants factor and Time as the within-participants factor was used to analyze whether scores on the Independence Question changed after the intervention. Descriptive statistics for Independence Question scores are displayed in Table 2. There was no main effect of Time $F(1,34) = .445, p = .509, \eta^2_p = .013$, or of Condition, $F(1,34) = 3.05, p = .90, \eta^2_p = .082$. There was, however, a significant interaction between the Independence Question and Condition, with participants in the experimental group improving significantly post-intervention, $F(1,34) = 4.21, p = .048, \eta^2_p = .110$, and no significant change being present in the control group.

**Memory Strategy Knowledge**

Memory strategy knowledge was operationalized by the differences in average performance scores from pre-test to post-test on the weekly memory strategy quizzes. Each test has three questions, for a total of three points possible. For each week, the change in scores was analyzed using a paired-samples t-test. For Week 2 ($n = 17$), the lesson on goal planning strategies, there was a significant increase from mean pre-test scores ($M = 1.82, SD = .39$) to mean posttest scores ($M = 2.53, SD = .62$), $t(16) = -4.95, p < .001, d = 1.35, 95\% \text{ CI} [-1.01, -.40]$. For Week 3 ($n = 14$), which focused level of processing strategies, there was also a significant
increase in test scores from pre-test \((M = 2.29, SD = .61)\) to post-test \((M = 2.64, SD = .50, t(13) = -2.69, p = .019, d = .641, 95\% CI [-.64, -.07])\). For Week 4, which focused on retrieval practice \((n = 15)\), there was not a significant change in test scores from pre-test \((M = 2.20, SD = .775)\) to post-test \((M = 2.60, SD = .83), t(14) = -1.25, p = .233, d = .499, 95\% CI [-1.09, .29]\).

On Week 5, the cumulative review of previous sessions’ material, a seven question cumulative memory strategy quiz was administered. The average score \((n = 17)\) was 84.0\%, \(SD = 18.8\%\), with the highest score 100\%, and the lowest score 50\%.
CHAPTER V
DISCUSSION

The purpose of this study was to investigate the efficacy of a five-week memory training intervention for improving memory self-efficacy quality of life, and knowledge of the specific memory strategies in older adults living in a residential care facility. Throughout the memory workshop, participants were taught various strategies for improving everyday memory functioning, which included hints on improving the strategy effectiveness, naturalistic uses and scenarios in which the strategies could be implemented, and activities to explain and practice using the strategies. The results suggested that attending the memory intervention resulted in significant improvements to memory self-efficacy and notable improvements to covered memory strategy knowledge; however, quality of life was not impacted.

Memory Self-Efficacy

Recent efforts have been dedicated to facilitating memory functioning by improving the memory self-efficacy of older adults. The recent focus on memory confidence is based upon empirical and theoretical work, such as the Self-efficacy Theory (Bandura, 2003), which suggests one’s beliefs about their memory influence their persistence, effort, and anxiety towards the memory task, which moderates their memory performance (Beaudoin, 2018; Beaudoin & Desrichard, 2016; Hudes et al., 2019). In the current study, evidence suggested that attending a
cognitive intervention was associated with a significant improvement to memory-self efficacy in older adults, as compared to a control group.

This finding is consistent with a recent meta-analysis (Hudes et al., 2019), the results of which confirmed that participation in memory-training and cognitive interventions for elders has been associated with increased memory-self efficacy. According to Bandura’s Self-Efficacy Theory (Bandura, 2003), these results could suggest memory-related anxiety decreased in those who participated, or the level of effort or persistence participants were willing to put forth towards memory task improved. Measures of anxiety, persistence, and effort towards memory were not included in the present study, (nor were they examined in the meta-analysis of Hudes et al., 2019), and can, therefore, not be evaluated as the sources of the memory self-efficacy damage.

Another possibility is that the improvements to memory self-efficacy may have been influenced by fostering optimistic beliefs regarding participants’ ability to control their memory. In a recent study investigating beliefs about aging and memory and memory self-efficacy in older adults, beliefs regarding memory controllability were significantly associated with weaker memory self-efficacy, most specifically, the sub-measure of potential improvement of memory abilities (Cherry et al., 2019). Perhaps, because the focus of the current intervention regarded strategies to improve everyday memory functioning, this led to more optimistic beliefs regarding their ability to potentially improve their memory, thus raising memory self-efficacy scores. Additionally, because the intervention included methods of improving memory to complete everyday tasks instead of laboratory-based tasks, the evidence of the effectiveness of the strategies may have been more apparent, resulting in improved memory confidence.
Furthermore, there is evidence to suggest beliefs regarding one’s own control over their memory become more negative with increasing age, with likely factors including age-related memory difficulties and negative ageist stereotypes regarding older adults’ memory control over their memory abilities and “inevitability” of developing dementia (Dark-Freudeman, West, & Viverito, 2006). Notably, the significance of this age-effect is debated, and may be moderated by depressive symptoms (Cherry et al., 2019; Crane, Bogner, Brown, & Gallo, 2007; Dark-Freudeman et al., 2006; Zelinski & Gilewski, 2004). Even so, the optimistic focus of the study may have resulted in less depressive symptoms in participants, but this is uncertain due to not assessing depressive symptoms in the current study.

In the current study, all participants attended at least three out of the five 60-minute sessions, which was associated with improvements to memory self-efficacy. However, due to the small amount of participants that attended only three sessions (14.8%) and four sessions (23.8%), compared to all five sessions (61.9%), and the lack of participants who participated in two or less sessions, it cannot be accurately assessed what the most effective amount of sessions was. However, due to the moderating effect of attendance on memory self-efficacy, it can most confidently be suggested that attending the full five-week intervention was associated with the most gains to memory-self efficacy that was observed in this study. This is an important finding, as the total length of time of this study (5 hours) is considerably less than many other memory intervention studies which revealed similar improvements to memory confidence, with some examples of studies lasting 10-14 hours (McDougall et al., 2010; Mohs et al., 1998; West et al., 2008; Wiegand, Troyer, Gojmerac, & Murphy, 2013), and even up to 32 hours (Mendoza-Ruvalcaba & Arias-Merino, 2015). It can be argued that this shorter intervention schedule is more practical than longer interventions, as it requires fewer resources, is less burdensome on
participants, and may lead to higher attrition. Unfortunately, it is unclear how the length of interventions influences attrition considering many studies do not report attrition, or define it as the amount of participants who completed both pre- and post-intervention assessments, instead of the amount of sessions attended (Hastings & West, 2009; West et al., 2008).

**Memory Strategy Knowledge**

One of the main goals of memory interventions is to teach strategies that individuals can use to assist in their daily memory functioning. It is hoped that improvements to strategy knowledge will result in increased use, ease of use, and effectiveness of the strategy, leading to advancements in everyday functioning. In several studies and a recent meta-analysis, results suggest that cognitive interventions do improve memory strategy knowledge and use (Hudes et al., 2019; Kinsella et al., 2009; Troyer et al., 2008). These findings are important, as they suggest participants are learning the presented material and have the potential to use these strategies in everyday life. However, it should be noted that booster sessions occurring several weeks or months following completion of the program are often needed to remind participants about the strategies taught. If refresher courses are not provided, participants could forget the learned strategies (Kinsella et al., 2016; Kinsella et al., 2009; Willis et al., 2006).

In the present study, memory strategy knowledge was measured using daily pre- and post-intervention tests. These tests consisted of three multiple-choice questions that gave a hypothetical scenario, and asked participants to choose the strategy that would be most effective for assisting in remembering to complete that task. This approach was novel, as it allowed us to test participants’ memory strategy knowledge using real-life examples, as well as the efficacy of the specific lessons within the curriculum, which has not been seen in other studies. Naturalistic
examples are more relevant to older adults’ everyday lives than lab-based assessments, which may make it easier for elders to incorporate the strategies into daily life. These questions also were an effective method of assessing a cognitive variable in a way that it was quick and not obvious to the participants that an assessment was taking place, which was important for the non-stigmatizing focus of the study.

In this study, on the second session, which covered strategies for future goal and task completion, and on the third session, which covered strategies utilizing depth of processing, there were significant improvements to memory strategy knowledge. These findings are encouraging, as they suggest the participants in this study understood most of the material I presented. While session two and three were deemed “effective,” this positive effect was not observed on the fourth session, which covered retrieval practice. The difference in performance between sessions two and three and session four is not known, but there are several possible explanations. The difference in performance may be due to the questions or lesson material being more difficult, the lesson being perceived as less interesting or not as effective by participants, or poor question quality.

It could be argued the improvements on the post-intervention quizzes were due to participants taking the quizzes at the end of the session, after just hearing the material. To test this possibility, a seven-question cumulative test was completed on the fifth session by participants, who scored an average of 84%. This finding is encouraging as it suggests participants retained most of their knowledge of the material learned throughout the intervention. Ultimately, the goal of cognitive interventions is to encourage long-term retention of the information learned. While a booster session was not included in the present study, a memory workshop binder was provided to all participants, including control participants (after the
intervention period was completed). The binder contained handouts for every session’s material and strategies covered. It is hoped that participants will review this binder often, or when they are in need of assistance for memory tasks, however, it is unclear if providing a binder is as effective as a formal refresher session.

Quality of Life

Using cognitive interventions which focus on memory skills, the quality of life, or the self-perceived wellbeing, of older adults can improve through the advancement of memory ability. Indeed, in several studies and a recent meta-analysis, participants in memory training interventions reported significant improvements to quality of life, potentially stemming from several sources (Hudes et al., 2019). One source of the effects to quality of life may be improved ratings of mood, improved coping abilities, or decreased feelings of loneliness (Kurz et al., 2009; Olazaran et al., 2004; Winocur et al., 2007). Additionally, improved beliefs about ones’ own memory, including improved memory self-efficacy and memory strategy knowledge, may also cause individuals to rate their wellbeing higher (Greenaway et al., 2013; Kinsella et al., 2016; Kwok et al., 2013; Mendoza-Ruvalcaba & Arias-Merino, 2015).

In the current study; however, no effect of intervention was observed for participant’s quality of life. This finding contrasts those of other cognitive-rehabilitation programs, many of which reported improvements to quality of life. However, this lack of effect may have been a result of the focus of the intervention. The emphasis of the current intervention was strictly on improving memory through the use of memory strategies, and had little focus on other factors of wellbeing, including social life, health, and mood. Indeed, in past studies in which an effect on quality of life was present, improvements to quality of life, or a facet of quality of life, were
noted as a main focus of the intervention (Kurz et al., 2009; Mendoza-Ruvalcaba & Arias-Merino, 2015; Olazaran et al., 2004; Winocur et al., 2007). This does not explain, however, other memory training-focused interventions which led to improvements to quality of life (Greenaway et al., 2013; Kinsella et al., 2016; Kwok et al., 2013). Perhaps, due to the generally longer intervention programs of these studies, there were more opportunities to focus on improving aspects of quality of life, or a longer intervention period is needed to adequately improve wellbeing.

The lack of effect may also stem from the quality of life measure used in this study, the 16-item version of the Quality of Life Scale. In this scale, several questions regard aspects of quality of life we could not have improved based on the material covered, such as satisfaction of material comforts, health family relationships, working, and expressing oneself creatively (Burckhardt & Anderson, 2003). Interestingly, for the one most relevant question of this study, rating one’s satisfaction with independence, a significant improvement was observed for the intervention group from pre- to post-test sessions. This finding could either suggest participating in the cognitive intervention resulted in improvements only to self-perceived independence, or that a more relevant measure of quality of life is needed to see improvements in overall wellbeing.

**Limitations & Future Directions**

There are several limitations of this study that should be noted. For instance, the measure of quality of life used in this study did not comprise elements of one’s life that were directly addressed in the curriculum, such as health, family relationships, and enjoyment in various forms of entertainment. Because the focus of this intervention was on memory, in future studies, we
would use a more suitable measure of quality of life centered on memory abilities, rather than a
general measure of wellbeing. Additionally, activities and lessons participants were exposed to in
the week of retrieval practice, week four, did not go as planned. In future implementations of this
intervention, lessons and activities for this would be reworked to be more engaging or easier to
understand. It is also possible that the questions developed to assess spaced retrieval strategy
knowledge need to be improved.

Due to time restraints and sacrifices made to gather and ensure continued participant
participation, several limitations were present in the study. First, I was unable to administer
individualized measures of cognitive performance, which prevented me from assessing whether
the objective memory performance of participants improved post-intervention. However, in the
present study, the goal was to create an intervention that was non-stigmatizing and enjoyable for
residents. Long, objective measures of cognition are not only time-consuming and lead to
participant fatigue, but could also set up a stigmatizing environment in which participants feel
they are being “measured and observed,” rather than participating in an enjoyable learning
experience. Because of this, as well as the association between memory self-efficacy and
cognitive performance (Bandura, 2003; Beaudoin & Desrichard, 2016), forgoing an objective
measure of cognition was best suited for this study.

Second, due to only gathering information in one residence, many of the residents come
from a similar background, as seen in the completely Caucasian sample. However, diversity in
age, level of education, and level of cognitive impairment of the sample was present. In future
implementations of this intervention, completing the memory workshop at additional residential
care facilities with more diverse backgrounds of residents would be advantageous, as well as
increase the sample size of both conditions, which was small in this study. Lastly, selection bias
may be present in this sample, due to the process of gathering participants. Assisted by the Summit View management and staff, we invited those who we believed would enjoy and be willing to participate in the intervention, which may have influenced who decided to participate. While the intervention was open to all in the facility, there is a possibility those who decided to participate are individuals more willing to attempt to improve their memory, thus are more likely to see improvements in memory self-efficacy. While this issue cannot be completely avoided, inviting all residents to participate, as well as completing the intervention at multiple residencies may reduce bias in future studies.

Conclusions

The current study investigated the influence of a non-stigmatizing, memory strategy-focused cognitive intervention for older adults on memory self-efficacy, memory strategy knowledge, and quality of life. Upon completion, participants who attended the workshop reported improvements to memory confidence, replicating the results of previous memory-focused interventions. These findings are important, as more positive beliefs regarding one’s own memory will encourage elders to remain independent and challenge their memory abilities, and may even affect objective memory performance. Furthermore, the improvement to memory strategy knowledge will expand the “mental toolbox” of strategies elders can use to complete more difficult memory tasks, hopefully improving elders’ confidence in their functional abilities. While quality of life of participants did not improve, this may be due to the strictly memory strategy focus of the workshop, and should be investigated further in future studies. As the population of older adults increases worldwide, the need for strategies to support everyday functioning and nurture positive beliefs about one’s own abilities will become increasingly
apparent. Future studies should consider this approach of short, non-stigmatizing workshops as potential avenues of improving the confidence and wellbeing of older adults, as opposed to long, strenuous, and objective-focused interventions. Furthermore, future memory interventions could investigate the effect of the workshops on memory-based anxiety, persistence, and effort, and whether these variables moderate improvements to memory self-efficacy, to better understand what influences elder’s beliefs regarding their memory.
REFERENCES


Craik, F. I. (2002). Levels of processing: Past, present... and future?. Memory, 10(5-6), 305-318.


including those with mild cognitive impairment. *Journal of Alzheimer's Disease, 49*(1), 31-43.


APPENDIX A

IRB APPROVAL LETTER
TO: Thomas Vorwerk  
Ashley May, Ashlyn Pace, Claudia Craig, Dr. Jill Shelton

FROM: Lindsay Pardue, Director of Research Integrity  
Dr. Amy Doolittle, IRB Committee Chair

DATE: 3/11/19

SUBJECT: IRB #19-041: Cognitive Strategy Intervention for Elders Living in a Senior Community

Thank you for submitting your application for research involving human subjects to The University of Tennessee at Chattanooga Institutional Review Board. Your proposal was evaluated in light of the federal regulations that govern the protection of human subjects and approved via the expedited review procedure authorized by 45 CFR 46.110 and 21 CFR 56.110.

You must include the following approval statement on research materials seen by participants and used in research reports:

The Institutional Review Board of the University of Tennessee at Chattanooga (FWA00004149) has approved this research project #19-041.

Please keep in mind that all research must be conducted according to the proposal submitted to the UTC IRB. If changes to the approved protocol occur, a revised protocol must be reviewed and approved by the IRB before implementation. For any proposed changes in your research protocol, please submit an Application for Changes, Annual Review, or Project Termination/Completion form to the UTC IRB. Please bear in mind that significant changes could result in having to develop a new application for submission and approval. Your protocol will be automatically closed at the end of the proposed research period unless a change request application is submitted. No research may take place under a closed or expired protocol.

A goal of the IRB is to prevent negative occurrences during any research study. However, despite our best intent, unforeseen circumstances or events may arise during the research. If an unexpected situation or adverse event happens during your investigation, please notify the UTC IRB as soon as possible. Once notified, we will ask for a complete explanation of the event and your response. Other actions also may be required depending on the nature of the event.

The University of Tennessee at Chattanooga is a comprehensive, community-engaged campus of the University of Tennessee System.
APPENDIX B

MEASURES
**Demographic Form**

Please fill out this form to the best of your abilities. If there is any information you do not wish to provide, feel free to leave it blank.

Age: ____________

Sex: ____________

Race: ____________

Years of Education: ____________

Current/Past Occupation: ____________

How many Hours do you Sleep per night (on average)? ______

How many naps do you take per week (on average)? ______

How many days per week do you exercise for 15 minutes or longer? ______
How I Feel About My Memory

Below are statements about feelings that people may have about their memory. Read each statement and think about your feelings over the past two weeks. Then, circle the response that best describes how much you agree or disagree.

1. I am generally pleased with my memory ability.
   5 Strongly Agree  4 Agree  3 Undecided  2 Disagree  1 Strongly Disagree

2. There is something seriously wrong with my memory.
   5 Strongly Agree  4 Agree  3 Undecided  2 Disagree  1 Strongly Disagree

3. If something is important, I will probably remember it.
   5 Strongly Agree  4 Agree  3 Undecided  2 Disagree  1 Strongly Disagree

4. When I forget something, I fear that I may have a serious memory problem.
   5 Strongly Agree  4 Agree  3 Undecided  2 Disagree  1 Strongly Disagree

5. My memory is worse than most other people my age.
   5 Strongly Agree  4 Agree  3 Undecided  2 Disagree  1 Strongly Disagree

6. I have confidence in my ability to remember things.
   5 Strongly Agree  4 Agree  3 Undecided  2 Disagree  1 Strongly Disagree

7. I feel unhappy when I think about my memory ability.
   5 Strongly Agree  4 Agree  3 Undecided  2 Disagree  1 Strongly Disagree

8. I worry that others will notice that my memory is not very good.
   5 Strongly Agree  4 Agree  3 Undecided  2 Disagree  1 Strongly Disagree
9. When I have trouble remembering something, I’m not too hard on myself.
   | 5 Strongly Agree | 4 Agree | 3 Undecided | 2 Disagree | 1 Strongly Disagree |

10. I am concerned about my memory.
   | 5 Strongly Agree | 4 Agree | 3 Undecided | 2 Disagree | 1 Strongly Disagree |

11. My memory is going downhill lately.
   | 5 Strongly Agree | 4 Agree | 3 Undecided | 2 Disagree | 1 Strongly Disagree |

12. I am generally satisfied with my memory ability.
   | 5 Strongly Agree | 4 Agree | 3 Undecided | 2 Disagree | 1 Strongly Disagree |

13. I don’t get upset when I have trouble remembering something.
   | 5 Strongly Agree | 4 Agree | 3 Undecided | 2 Disagree | 1 Strongly Disagree |

14. I worry that I will forget something important.
   | 5 Strongly Agree | 4 Agree | 3 Undecided | 2 Disagree | 1 Strongly Disagree |

15. I am embarrassed about my memory ability.
   | 5 Strongly Agree | 4 Agree | 3 Undecided | 2 Disagree | 1 Strongly Disagree |

16. I get annoyed or irritated with myself when I am forgetful.
   | 5 Strongly Agree | 4 Agree | 3 Undecided | 2 Disagree | 1 Strongly Disagree |

17. My memory is good for my age.
   | 5 Strongly Agree | 4 Agree | 3 Undecided | 2 Disagree | 1 Strongly Disagree |

18. I worry about my memory ability.
   | 5 Strongly Agree | 4 Agree | 3 Undecided | 2 Disagree | 1 Strongly Disagree |
Quality of Life Scale

Please read each item and circle the number that best describes how satisfied you are at this time. Please answer each item even if you do not currently participate in an activity or have a relationship. You can be satisfied or dissatisfied with not doing the activity or having the relationship.

<table>
<thead>
<tr>
<th></th>
<th>Delighted</th>
<th>Pleased</th>
<th>Mostly Satisfied</th>
<th>Mixed</th>
<th>Mostly Dissatisfied</th>
<th>Unhappy</th>
<th>Terrible</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Material comforts</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>(Home, Food, Conveniences,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial security)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Health</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>(Being physically fit and</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>vigorous)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Relationships with</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>parents, siblings &amp; other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>relatives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Communicating, Visiting,</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helping)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Having and rearing</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>children</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Delighted</td>
<td>Pleased</td>
<td>Mostly Satisfied</td>
<td>Mixed</td>
<td>Mostly Dissatisfied</td>
<td>Unhappy</td>
<td>Terrible</td>
</tr>
<tr>
<td>--------------------------------------</td>
<td>-----------</td>
<td>---------</td>
<td>------------------</td>
<td>-------</td>
<td>---------------------</td>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>5. Close relationships with spouse or significant other</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>6. Close friends</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>7. Helping and encouraging others, Volunteering, Giving advice</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>8. Participating in organizations and public affairs</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>9. Learning (Attending school, Improving understanding, Getting additional knowledge)</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Delighted</td>
<td>Pleased</td>
<td>Mostly Satisfied</td>
<td>Mixed</td>
<td>Mostly Dissatisfied</td>
<td>Unhappy</td>
<td>Terrible</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------</td>
<td>---------</td>
<td>------------------</td>
<td>-------</td>
<td>---------------------</td>
<td>---------</td>
<td>----------</td>
</tr>
<tr>
<td>10. Understanding yourself, Knowing your assets and limitations, Knowing what life is about</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>11. Work - job or in home</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>12. Expressing yourself creatively</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>13. Socializing (Meeting other people, Doing things, Parties, etc.)</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>14. Reading, Listening to music, or Observing entertainment</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>15. Participating in active recreation</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>16. Independence, Doing for yourself</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
APPENDIX C

WEEKLY ASSESSMENTS
Week 1 Pre-Test

Instructions: Please read each question and circle the option (A, B, or C) that you think best answers the question.

1. You want to stay healthy, so you decide to start exercising! How often is it recommended you should exercise per week?
   A. 60 minutes a day, 2 days a week
   B. 30 minutes a day, 5 days a week
   C. 30 minutes a day, 7 days a week

2. Exercising your brain is just as important as exercising your body! What is the best example of a mentally-stimulating activity?
   A. Completing word puzzles
   B. Listening to music
   C. Washing dishes

3. What is the best example of an activity you can use to help you fall asleep?
   A. Reading a book
   B. Watching TV
   C. Eating a large snack
Week 1 Post-Test

Instructions: Please read each question and circle the option (A, B, or C) that you think best answers the question.

1. To get a good night’s sleep, what should you do before going to bed?
   A. Watch TV to help you fall asleep.
   B. Drinks lots of water.
   C. Relax in a dim-lighted room.

2. Exercise is important for keeping both your body and brain healthy! How often is it recommended you should exercise a week?
   A. 60 minutes a day, 2 days a week
   B. 30 minutes a day, 5 days a week
   C. 30 minutes a day, 7 days a week

3. What would NOT be a good example of an activity that is healthy for your brain?
   A. Watching TV alone in your room
   B. Attending a book club with friends.
   C. Exercising in a group.
Week 2 Pre-Test

Instructions: Please read each question and circle the option (A, B, or C) that you think best answers the question.

1. While on the way to a church service, you remember you need to stop by the front office to pick up a letter, but you do not have any way to write this down. What strategy would be best to help you remember to go to the front office?

   A. Try your hardest to keep the memory in your head.
   B. Say aloud to yourself, “When I leave the church service, then I will go to the office to pick up my letter” three times.
   C. Ask a friend to remind you.

2. You need to remember to stop by a friend’s room in the morning as you are leaving for breakfast to return an item you borrowed. What strategy would be best to help you remember to take the item to your friend?

   A. Make a post-it note and stick it on your bedroom dresser.
   B. Mark it down on your calendar.
   C. Put the borrowed item next to the front door.

3. You hear about an interesting exercise program that is held every Wednesday at 10:00 on A2. You decide to make a note of it on your calendar to help remind you to go. What would be the best information to write down?

   A. For every Wednesday of the month, write down “Exercise”
   B. For every Wednesday of the month, write down “Exercise at 10”
   C. For every Wednesday of the month, write down “Exercise at 10 on A2”
Week 2 Post-Test

Instructions: Please read each question and circle the option (A, B, or C) that you think best answers the question.

1. You need to remember to drop off a letter in the mailbox whenever you leave your apartment. What strategy would be best to help you remember to mail the letter?

   A. Make a post-it note and put it on your front door.
   B. Make a note on your calendar.
   C. Put the letter beside your bed.

2. You have a hair appointment at the parlor on the first Monday of May at 1:00. The parlor is located on the first floor near the fireplace. You decide to make a note of it on your calendar to help remind you to go. What would be the best information to write down?

   A. For the first Monday of May, write down “Haircut”.
   B. For the first Monday of May, write down “Haircut at 1”.
   C. For the first Monday of May, write down “Haircut at 1 near the fireplace”.

3. While on the way to Walmart, you remember you need to pick up sugar, but you do not have any way to write this down. What strategy would be best to help you remember to pick up sugar?

   A. Try your hardest to keep the memory in your head.
   B. Say aloud to yourself, “When I walk into Walmart, then I will go pick up sugar” three times.
   C. Ask a friend to remind you.
Week 3 Pre-Test

Instructions: Please read each question and circle the option (A, B, or C) that you think best answers the question.

1. While watching the news, you hear a segment about the benefits of taking Vitamin B pills for your health. You are interested, but you first need to discuss taking the vitamin with your doctor. What would be the best example of deeply mentally processing the information, so that you will be able to remember it later?

A. Learning how the vitamin will help your personal health issues.
B. Learning how much the vitamin pill will cost.
C. Learning what company sells the vitamin pill.

2. You meet an older man named John Snow while out with friends. What about John could best you associate him with, that would help you remember his name for later?

A. Think about who was with you when you met him.
B. Associate his name with a physical characteristic.
C. Think how old he is.

3. You are constantly forgetting where you put your keys! What strategy would be best to help you remember where you placed your keys?

A. Come up with a story of where and why you placed down your keys.
B. Tell yourself you won’t forget where you put it.
C. Put it in a place you normally wouldn’t, so the random spot is easier to remember.
Week 3 Post-Test

Instructions: Please read each question and circle the option (A, B, or C) that you think best answers the question.

1. You meet a woman named Betty when going to get a haircut. She mentions she loves to cook. What about Betty would be best to associate with her in order to remember her name for later?

A. Think how old she is.
B. Think about where you met her.
C. Associate her name with a famous chef.

2. While reading the Bible for a bible study class, you read a particularly inspiring passage, and want to share it with others. What would be the best example of deeply mentally processing the information, so that you will be able to remember it later?

A. What page the text was on.
B. How the passage was meaningful to you
C. Who in the Bible said the passage.

3. You are sitting on the couch reading the newspaper, when you get called in for a haircut. You decide you will put the newspaper down on the table, and will get back to it later. What strategy could you use to help you remember where you placed the newspaper?

A. Come up with a story of where and why you placed down the paper.
B. Tell yourself you won’t forget where you put it.
C. Ask a friend to remind you.
Week 4 Pre-Test

Instructions: Please read each question and circle the option (A, B, or C) that you think best answers the question.

1. While looking into your family history, you learn that your family is descended from a few famous historical people. You want to remember them so that you can tell your family all about them. What would be the best way to help you remember who the famous people were?

A. Regularly test yourself to try to remember the names and occupations off the top of your head.
B. Try to remember the book you found it in.
C. Repeat their name in your head a few times.

2. You need to remember some medical information, like medications you are taking and surgeries you’ve had, for a doctor’s appointment next week. What would be the best way to remember your medical information for the doctor’s appointment?

A. Go over the medical info as much as possible an hour before.
B. Ask a family member to remember for you.
C. Test yourself to remember your medical information every day before the appointment.

3. You are trying to help yourself remember how to work your new TV remote. What strategy would be easiest way to help you remember how to use the TV remote?

A. Call a child or relative to ask for help.
B. Cover the unimportant buttons with tape.
C. Try to memorize the instruction booklet.
Week 4 Post-Test

Instructions: Please read each question and circle the option (A, B, or C) that you think best answers the question.

1. You have a week to try and learn trivia answers for a trivia night! What would be the best way to remember as many answers as possible before the trivia session?

A. Try to memorize all of the answers.
B. Go over the answers as much as possible an hour before.
C. Test yourself over a portion of the answers every day before the trivia night.

2. You always want to remember your child’s phone number off the top of your head, in case there is an emergency. What would be the best way to help you remember their number?

A. Repeat the number in your head a few times.
B. Regularly test yourself to try to remember their number off the top of your head.
C. Keep a note with their number on it in your bedroom.

3. You have a new phone that can take pictures! You want to do your best at remembering all of the steps of how to take a picture on your phone. What would be the best way to help you remember this?

A. Cover the buttons on the phone for all other features.
B. Just keep trying until you get it right.
C. Explain to or teach someone else how to take pictures on your phone.
Week 5 Test

Instructions: Please read each question and circle the option (A, B, or C) that you think best answers the question.

1. To get a good night’s sleep, what should you do before going to bed?
   A. Watch TV to help you fall asleep.
   B. Drinks lots of water.
   C. Read a book in a dim-lighted room.

2. It is important to exercise your brain with activities that make you think! What is the best example of a mentally-stimulating activity?
   A. Completing word puzzles
   B. Watching TV
   C. Washing dishes

3. As you are getting ready to go to a meeting, you remember you need to drop off a bill in the postbox. What strategy would be best to help you remember to go to the postbox?
   A. Make a post-it note and stick it on your bedroom dresser.
   B. Mark it down on your calendar.
   C. Put the bill next to the front door.

5. You are talking with a close friend with likes to manage a garden. They mention they need new gardening gloves, as they have worn their old gloves out. It’s their birthday soon, so you want to pick up gloves for them the next time you are shopping. What would be the best example of deeply mentally processing this goal, so that you will be able to remember to get gloves later?
   A. Remembering why your friend will need the gloves.
   B. Learning how much the gloves will cost.
   C. Learning what companies sell gardening gloves.
6. You always want to remember a relative’s phone number off the top of your head, in case there is an emergency. What would be the best way to help you remember their number?
A. Repeat the number in your head a few times.
B. Regularly test yourself to try to remember their number off the top of your head.
C. Keep a note with their number on it in your bedroom.

7. In a week, you will be visiting with distant family, but you can’t remember all of their names off the top of your head! Luckily, you have their pictures and names, so you decide to review their names before you visit them. What would be the best way to remember the names before you meet them?
A. Go over their names/look at their pictures an hour before.
B. Ask a family member to remember for you.
C. Test yourself to remember the names with the faces every day before you meet them.
APPENDIX D

HANDOUTS
Week 1

Tips for Maximizing Your Memory!
1. **Exercise your body.**
   - Exercise doesn’t have to be difficult! It can include walking and even completing household chores!
   - 30 minutes of exercise a day, 5 days a week.

**Benefits of Exercise:**
- Gives you more energy, allowing you to stay focused.
- Relieves stress and can improve your mood.
- Reduces the risk of cardiovascular disease (heart attacks).
- Improves your balance.

**A healthy heart is a healthy brain:**
- Increases blood flow and oxygen in the brain, which improves brain functioning and keeps your brain healthy.
- Improves your brain’s ability to adapt to changes.
- Improves memory and learning abilities.

It’s never too late to start exercising—benefits have been found from children to adults over 80 years old!
2. **Exercise your mind.**

- The brain is like a muscle- exercise it to keep it healthy!
- Mentally-stimulating activities help protect the brain by making it more resilient and more able to adapt to changes.
  - The more you use your brain, the more your brain creates synapses, which allow brain cells to communicate with each other.
  - More synapses = stronger and more reliable communication!
- Learning new things is one of the best ways to strengthen your brain- like you are doing in this program!

### Fun Ways to Exercise Your Brain

- Reading books/newspaper
- Word Puzzles
  - Sudoku
- “Brain Games”
- Jigsaw Puzzles
- Photography
- Taking Care of a Plant
- Drawing/Painting/Creating Art
- Learning a new language
- Learning a New Skill
- Learning to play an instrument
3. **Get enough sleep.**

- It is recommended you get about 7-9 hours a night.
- Naps are important too! 30 min-1 hour daily naps can improve memory performance.

**Benefits of Sleep:**
- Memory and Learning
- Attention & Alertness
- Processing Speed
- Decision making
- Mood & Stress

**Tips for a Good Night’s Sleep**
- Get more natural sunlight during the day.
- Exercise regularly.
- Don’t drink coffee or soda after 4 PM.
- Don’t go to bed hungry or stuffed.
- Go to bed and wake up at the same time every day.
- At night, stop watching TV and turn off bright lights at least an hour before bed.
- Relax before you go to bed- read a book, listen to music, pray, deep breathing.
4. Socialize

- A socially active lifestyle can help prevent cognitive decline and improve memory functioning!
  - Social activity is mental activity!
  - Opens up opportunities for collaborative problem solving and more mentally-stimulating activities.
  - Learning from one another.
  - Helping remind each other.
- Reduces stress and improves mood!

Many Ways to be Social:
- Bible Study/Church Services
- Listening to Music/Singing
  - Exercising
  - Book Club
  - Creating Art
  - Playing Games
- Sitting Outside together
- Watching Movies together
- Activities at Summit View
  - Volunteering
**What about Memory Drugs?**
- “Cognitive-enhancing” drugs may work for a short period of time, but overall are ineffective.
  - Additionally, they can come with side effects, including headaches, nausea, confusion, and insomnia.
- There is no conclusive evidence whether supplements can improve memory functioning.

**Vitamin B may be the Key!**
- Keeps your brain healthy, as well as your skin!
- Helps the body break down and release energy from food.

---

**Vitamin B: What’s on the Menu?**

<table>
<thead>
<tr>
<th>Rice</th>
<th>Beans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholegrain breads</td>
<td>Fruit</td>
</tr>
<tr>
<td>Peas</td>
<td>Milk</td>
</tr>
<tr>
<td>Leafy greens</td>
<td>Eggs</td>
</tr>
<tr>
<td>Broccoli</td>
<td>Fish</td>
</tr>
<tr>
<td>Potatoes</td>
<td>Poultry</td>
</tr>
</tbody>
</table>
**Omega-3 Fatty Acids are also Important!**
- Fish Oil Pills
- Helps keep brain cells and tissue healthy
- Helps prevent cognitive decline
- Use has been linked to better memory performance & mood

**Vitamin E Keeps you Healthy**
- Helps maintain healthy cells and tissues, including your brain
- Strengthens the immune system—helping protect against illness and infection

**Iron for your Blood**
- Important in making red blood cells, which carry oxygen throughout the body—including the brain!
- Increased blood flow in the brain improves brain functioning and keeps your brain healthy.

**Fatty Acids:**
- What’s on the Menu?
  - Fish
  - Walnuts
  - Plant Oils (Vegetable Oil, Olive Oil, Sunflower Oil)

**Vitamin E:**
- What’s on the Menu?
  - Nuts & Seeds
  - Plant Oils
  - Wheat
  - Plant Oils
  - Whole Grains

**Iron:**
- What’s on the Menu?
  - Liver
  - Beans
  - Nuts
  - Fruit
  - Whole Grains
  - Meat
  - Eggs
  - Potatoes
  - Leafy Green Vegetables
Week 2

Goal Planning Strategies
Remembering Future Goals: We do it every day!

- From daily tasks to long-term plans, the ability to remember to complete future intentions is important for everyday living.
  - Remember to go get a haircut.
  - Remember to exercise.
  - Remember to take your medicine.

- Because of the many other tasks you may need to complete during the day, it can be difficult to remember all of the things you need to do!
  - Multi-tasking is hard! You only have so much “brain power.”

- Strategies can be used to help you remember to complete future goals!
  - Help you pay attention for the opportunity to complete the task when appropriate.
    - All future intentions require you to pay attention for the opportunity to complete it- or else you will forget what you were supposed to be doing!
External Reminders

- Using cues in your environment to help you remember to complete future tasks, such as calling a friend on their birthday.

Types of External Reminders
- Post-it Notes
- Alarms
- Calendars
- To-Do Lists
- Daily Planners

- Choose what works best for you!

- Using external reminders allows you to better preserve the memory by offloading the memory onto something more permanent!
  - Trying to multi-task between current activities while also remembering to complete future tasks can be cognitively demanding!
  - But, creating a reminder can help you remember to complete future tasks with minimal cognitive effort!

- Using external reminders acts as a form of “rehearsal”, meaning you will be more likely to automatically remember to do a task when you come in contact with the opportunity to complete it!
  - Creating and encountering reminders numerous times strengthens the memory to complete the future task!
Using Context to Improve External Reminders

- All future tasks or goals consist of two parts:
  - **Action** (what the task is)
    - To get a haircut
  - **Context** (information about the goal completion scenario)
    - At 1:00/ On Monday/ On the 1st floor/ When my hair gets too long

- **Using context is like using hints!** By including context information in external reminders, it helps you automatically remember the future task when you come in contact with that context.
  - The more “hints” you give your memory, the more likely you are to remember!

**What Information to Include:**

- **Event**
  - Go to the barber/hair dresser

- **Activity**
  - To get a haircut; To get my hair colored

- **Time/Date**
  - At 11:00; On Monday; Before lunch

- **Location**
  - On the 1st floor; Near the fireplace

- **People**
  - With your friend; by the barber Linda Crowley

- **Why**
  - Because my hair is too long; Because I want my hair colored

- **Sensory Information (What will you see, hear, smell, taste)**
  - What TV programs are playing; Who will you see; Is food cooking?

- **Emotions/Feelings**
  - How will you feel? Relaxed, anxious, happy, sad? Are you hungry or full?
More Tips for External Reminders

- Put the reminder in a place that is relevant/ you know you will see it!
  - Post-it notes on the front door.
  - To do lists or daily planners on top of purse/ in front pocket.
  - Shopping lists on the fridge door.
  - A reminder to take breakfast medication by the coffee pot.

- If you need to take an item somewhere, put it in front of the door!
  - Example: Place a package that needs to be shipped in front of the door!
    You will encounter the package when you leave, reminding you to ship it!

- Put the reminders in the same place every time.
  - This way, you know where to look!

- Review to-do lists or daily planners often.
  - This helps keep the info fresh in your memory!

- Use flashy colors or pictures to grab your attention.
  - For calendars, daily planners, and to-do lists, you can color coordinate tasks you need to complete.
  - Drawing pictures of what you need to do is another way of enhancing your memory!

- Try not to multitask- do one thing at a time!
  - We can only do so much at once!

- Plan a schedule of your daily tasks. Consider the obstacles towards completing your goals!
  - Try to complete tasks in an order that is efficient and assures you will be able to get to it.

- Say whatever you are writing down aloud.
  - This ties into our next memory strategy...
Mental Goal Completion

- A “When-Then” statement that can be used to help you remember!
  - “When I go to the store, then I will pick up milk.”
  - “When I finish lunch, then I will go by the library.”
  - “When it is 2:00, then I will go exercise.”

How it Works

1. Decide what you need to do.
   - Example: You need to drop a letter off in the mailbox before you head to lunch.
2. Say what you need to do out loud in the “when-then” format 3 times.
   - “When I go to lunch, then I will drop off the letter in the mailbox.” x 3
3. Mentally visualize yourself completing the task for 30 seconds.
   - Imagine yourself dropping off the letter in the mailbox as people are standing outside for lunch- What will you hear, see, smell, etc.?

- Mental goal completion has been found to help people remember to complete a wide variety of goals
  - Including remembering to exercise, quit smoking, and take medications

- Helps create a strong “mental picture” of the situation
- Incorporates multiple forms of memory, including visual and verbal memory.
- Helps you pay attention when it is important!
  - When you come in contact with the “When”, you will be more likely to remember the “Then!”
  - Example: When you are about to go to lunch, you will be more likely to remember to go pick up the letter and bring it to the mailbox!
Week 3

Remembering Smarter, Not Harder
**Depth of Processing**

When hearing, seeing, or learning something you want to remember, you can make the memory stronger by mentally processing the information in a more meaningful way.

**Uses of Deep Processing**

- Family Stories
- Books, TV, Movies
- News Stories
- Facts, such as medical information
- Future Goals

**Deep Processing Examples**

- Why am I learning this information?
- How is the information meaningful to myself?
- How is the information meaningful to others?
- How is this information connected to other things I have learned?
  - How is this information different from what I once knew?
  - **How does this information make me feel?**
  - What are the contextual details about the information?

- Makes the memory longer lasting, more detailed, and easier to recall.
- Creates stronger mental connections between previously learned knowledge and memories with new knowledge and memories.
- When you learn something that is in reference to yourself, you are more likely to remember it!
Remembering Names

1. Commit & Concentrate
   - Make a conscious decision to remember names.
   - Devote your attention to hearing and remembering their name.
   - Don’t be afraid to ask their name again if you did not hear it the first time.
   - Take notice of their physical characteristics and facial features.

2. Repeat
   - Repeat their name when you hear it: “Hello Jim”
   - Mentally repeat the name to yourself 3 times while looking at their face.
   - Comment on their name, if possible: “Oh, my brother’s name is Jim”
   - Use their name during the conversation, and when leaving.
   - Make a “name journal”
     ▪ Write down names, along with physical characteristics and where/when you met them
   - Go over at the end of the day: “Who did I meet today?”

3. Associate
   - **Physical**: Associating the name with a physical characteristic.
     ▪ Mr. Booker wears glasses, for reading books.
     ▪ Debbie is large, because she eats too many Little Debbie’s.
   - **Sounds**: Make a rhyme using the person’s name
     ▪ Dave needs a shave.
     ▪ Latrice is Patty’s niece.
   - **Impressions**: Linking the name to your impression of the person
     ▪ Angela is sweet, like an angel.
     ▪ Martin Peck is a pain in the neck.
   - **Jobs**: Associating the name with a job
     ▪ John Baker the baker
     ▪ Mr. Booker the librarian
   - **Famous People**: Names or physical characteristics that are associated with famous people
     ▪ John who wears a cowboy hat: John Wayne
     ▪ Grace with is skinny and has blonde hair: Grace Kelly
Where Did I Put That?

- Put items in places that make sense.
  - For example, place your glasses where you typically read the newspaper.

- Make a habit: Put it in the same place every time!
  - However, that isn’t always possible...

- Say aloud where you are putting the item.
  - Multiple forms of memory.

- Notice what room you are in, or what is around you.
  - Think of environmental details: Is it cold? Dark? Noisy?
  - Is someone with you?

- Think: “Why am I putting the item here?”
  - **Come up with a story:** “What was I doing when I put the item here?
    What caused me to place the item down? What will I use the item for?”
  - “Was I frustrated I had to put the item down?”

- Use external reminders, like post-it notes.
Drawing for Memory

- Drawing is a mentally stimulating activity, and can relieve stress: both of which are healthy for your brain!

- Drawing can also be used to help you remember!
  - Use with external reminders.
    - A mailbox picture to help you remember to mail a letter.
    - A cross picture to help you remember to go to church.
  - Include in notes when learning something new.
    - If trying to remember John is a plumber, draw a picture of a toilet plunger.
    - If trying to remember a news story about cats, draw a picture of a cat.
    - Use colors to remind you that Jane has blue eyes and loves to wear clothes that are yellow.
    - Draw doodles about what you learned/what you did today.

- Makes the memory more meaningful, thus more likely to be remembered!
- Incorporates multiple forms of memory, including the visual memory of the image, the motor memory of drawing the picture, and the semantic memory that is used when we engage in meaning-making.
- Found to be helpful for memory, even for those not good at drawing.
Week 4

Retrieval Practice
Retrieval Practice

Testing Effect: Repeatedly calling information to mind enhances learning and memory.

- Can be as simple as repeating the information in your head/re-reading a passage over and over, but there are more effective ways.

- Test yourself: After a delay, try to remember what you learned.
  - Go over what you could not remember.

- Don’t try to memorize the information- try to understand it.
  Comprehension is the key to understanding!
  - Ask questions!
  - For what you cannot remember, ask yourself: Why can’t I remember this?
    - Is this information different from what I once knew?
    - Is this information not what I expected?
  - Tell/Explain to someone else.
    - Acts as a form of testing that requires a deep understanding of the info.

- Use multiple forms of memory
  - Repeat verbally, Mental visualization, Draw pictures, Write it down
  - Use Mental Goal Completion!

- Don’t be afraid to make mistakes!
  - Go over what you missed, think: Why is this answer correct, while the other answer is wrong?
**Spaced Retrieval**

Testing recall several times over a period of time, with longer delays in-between each testing session - Retrieval practice over a period of time!

- **Spacing Effect**: Information is learned more effectively when spread over time
- **Cramming is no good!** It may help your memory for a short period of time, but you won’t remember it in the long run!

1. Use the Retrieval Practice strategy until you can successfully remember most of the information

2. When you can remember most info, then wait a brief period (5-10 minutes) and test yourself again. For what you cannot remember, go over it again, and test yourself until you can remember it.

3. When you can remember most info, then wait a longer period (20-30 minutes) and test yourself again. For what you cannot remember, go over it again, and test yourself until you can remember it.

4. Repeat these steps with increasingly longer intervals of time.
   - 1 hour, 2 hours, 4 hours, 6 hours, every day, and so on...
   - Testing yourself over multiple days is best - helps retain long-term memory

5. For more difficult things to remember, break up the information into smaller bits.
Uses of Retrieval Practice

- Numbers
  - Chunking: Separate large numbers into multiple smaller groups
    - Instead of remembering “3553416”, remember “355”, “34”, “16”

- Names
  - Repeat their name when you hear it: “Hello Jim”
  - Use their name during the conversation, and when leaving.
  - Go over at the end of the day: “Who did I meet today?”
    - Make a “name journal” with names, along with physical characteristics and where/when you met them

- Lists
  - Organize alike information into groups.
    - Put all “cleaning to-dos” together, all “shopping to-dos” together

- Stories
  - Try to tell the story back to yourself!
  - Think about why each part of the story is important.

- Anything you want to learn!
Remembering Steps for Operating Electronics
Technology can be difficult, but you can make it easier on yourself!

- Translate the directions into your own words.
  - Rewrite the instructions in a way that is easy for you to understand.

- Use external reminders.
  - Attach labels to buttons or dials that identify their purpose.
  - Keep the instructions close to the technology.

- Block off the buttons that aren’t important.

- Comment on the steps.
  - Why is this step important? Make each step meaningful!
  - Are there unimportant steps? Cut them out!

- Practice
  - At first, practice at least once every day on going through the steps.
    - If there are a lot of steps, try to learn one task at a time! Don’t overload yourself.
  - Practice once a week to maintain knowledge.
  - Try to explain the instructions to someone else.
    - Acts as a form of testing!
APPENDIX E

OUTLINES
Week 1 Notes

- Intervention Goals/ Lessons
  - Ultimate Goal: To teach helpful strategies you can use to help improve your memory
  1. Tips for improving memory performance and cognition (today)
  2. Goal-planning strategies using external reminders (using your environment to help your memory) and a memory strategy called mental goal completion
  3. Depth of Processing strategies (Thinking smarter, not harder)
  4. Retrieval Practice and Spaced Retrieval (Testing yourself to improve your memory)
  5. An overview of what we have learned, an opportunity to ask questions

Throughout the program, I will be teaching you strategies and tricks you can use to improve your memory for everyday life. However, today I will be focusing on some lifestyle changes you can make for keeping your brain healthy, which is important for keeping your memory at peak performance.

- What do you think is the best thing to do for your memory?
- Do any of you do anything to try and help you remember?

1. Exercise your body.
- Exercise doesn’t have to be difficult! It can include walking and even completing household chores!
  - Have any examples of ways you guys try to stay in shape?
- It is recommended you get 30 minutes of exercise a day, for 5 days a week
  - It can be done in 10 minute intervals

- Reduces the risk of cardiovascular disease (heart attacks)
- Improves your balance by strengthening your leg muscles.
- Gives you more energy, allowing you to stay focused.
- Relieves stress and can improve your mood.
  - Brain releases endorphins

- A healthy heart is a healthy brain:
  - Increases blood and oxygen flow in the brain
  - All of our cells in our body require oxygen to survive, especially brain cells.
- More blood flow means more oxygen, which improves brain functioning and keeps your brain healthy.
- Blood also provides micronutrients vital for the survival of brain matter
- Reduces the risk of heart attacks, which are linked to issues with memory
- Improves memory and learning abilities.
  - Physical activity can engage multiple parts of the brain associated with cognitive functioning and mobility, improving upon these skills and delaying neurodegenerative processes
    - Studies have found aerobic exercise increased the size of a brain structure important to memory and learning
    - Studies have also found it improves your brain’s ability to adapt to changes, called neuroplasticity

- It’s never too late to start exercising- benefits have been found from children to adults over 80 years old!

2. Exercise your mind.
- The brain is like a muscle- exercise it to keep it healthy!
  - Like any muscle “use it or lose it”
- Mentally-stimulating activities help protect the brain by making it more resilient and more able to adapt to changes.
  - The more you use your brain, the more your brain creates synapses, which allow brain cells to communicate with each other.
    - Telephone example- synapses are the wires
      - You are on right side of brain, your friend is on left side.
      - You want to call your friend to tell them something, so you dial their number on the phone.
      - When you try to call them, the call travels across telephone wire to get to its destination- your friend’s phone.
      - The synapses are the telephone wire- if one of the cables snap, the connection would be lost.
      - However, if more wires are made, if one wire snaps, the others can take its place.
      - More synapses = stronger and more reliable communication!

- Examples:
  - Reading, bible study
- Brain games, like word puzzles, Sudoku, Chess/checkers, ones at SV
  - Think of any board games that would be mentally stimulating?
- Photography and creating art
- Taking care of a plant
- Learning something new is one of the best ways to strengthen your brain- like you are doing in this program!

3. Sleep
- Sleep isn’t pointless!: The ancient Greek philosopher, Heraclitus, once said, “Even a soul submerged in sleep is hard at work and helps make something of the world”
- Benefits for Cognition:
  - Memory and Learning
  - Processing Speed
  - Decision making
  - Attention & Alertness
- Newly learned information is benefited by being undisturbed by interference from waking activities/thoughts while asleep.
- Your brain may also be in a sort of “recovery mode”
- Also beneficial for mood, Stress, and energy
  - Examples in daily life
- It is recommended you get about 7-9 hours a night.
- Naps are important too! 30 min-1 hour daily naps can improve memory performance

- Do any of you have any nightly rituals you use to help you fall asleep?
- Tips for a Good Night’s Sleep
  - Get more natural sunlight during the day.
    - Gives you Vitamin D- makes you feel better, supports strong bones, immune system, cardiovascular health
  - Exercise regularly.
  - Don’t drink coffee or soda after 4 PM.
  - Don’t go to bed hungry or stuffed.
  - Go to bed and wake up at the same time every day.
- At night, stop watching TV and turn off bright lights at least an hour before bed.
- Relax before you go to bed- read a book, listen to music, pray, deep breathing.

4. Socialize
- A socially active lifestyle can help prevent cognitive decline and improve memory functioning.
  - Social activity is mental activity.
  - Opens up opportunities for collaborative problem solving and more mentally-stimulating activities.
  - Learning from one another.
  - Helping remind each other.
- Participating in social activities may lower the risk for some health problems, as well as improve mood and reduce stress.
Examples:
  - Church services/bible study (2-in-1)
  - Exercising (2-in-1)
  - Playing games (2-in-1)
  - Spending time together listening to music/sitting outside (2-in-1)
  - Volunteering
    - Gives you that “good” feeling after you help someone else out
    - May also provide opportunities for mentally and physically stimulating activities

5. Memory Drugs
- “Cognitive-enhancing” drugs may work for a short period of time, but overall are ineffective.
- Additionally, they can come with side effects, including headaches, nausea, confusion, and insomnia.
- There is no conclusive evidence whether supplements can improve memory functioning.
  - Includes ginseng, “jellyfish” pill, anything else

- Unfortunately, there is no pill that will give you perfect memory, but getting the necessary vitamins from a balanced diet can help maintain brain health, which of course is important for memory

Vitamin B
- Keeps your brain healthy, as well as your skin!
- A study found that individuals with more VB in their diet had stronger memory functioning.

- Helps the body break down and release energy from food.
  - Makes you feel fuller!

- Eggs, fruit, whole grain breads, liver, rice, fish, milk, poultry, beans, and veggies in general

**Omega-3 Fatty Acids**
- Fish Oil Pills
  - Helps keep brain cells and tissue healthy
  - Helps prevent cognitive decline
  - Use has been linked to better memory performance & mood
  - Fish, walnuts, plant oils (vegetable oils, olive oil, sunflower oil)

**Vitamin E**
- Helps maintain healthy cells and tissues
  - Strengthens the immune system- helping protect against illness and infection
  - Nuts, seeds, plant oils, wheat, whole grains

**Iron**
- Important in making red blood cells, which carry oxygen throughout the body- including the brain!
- Increased blood flow in the brain improves brain functioning and keeps your brain healthy.
- Liver, beans, nuts, fruit, whole grain foods, meat, eggs, potatoes, leafy greens

- Be careful about taking additional supplements/vitamins
  - All of these vitamins can be acquired through a balanced diet!
  - As we age, our body takes longer to break down and absorb these vitamins.
  - If you are thinking about taking a new vitamin, always ask the nurse or your doctor before beginning! They know what is best for you to take.
Week 2 Notes

1.
- Anyone remember any of the tips I gave you last weekend?
  - Sleep, Exercise, Mental Activity, Social Activity, Balanced Diet
- Goal Planning: We do it every day!
  - Some are large and must be completed over a long period of time
  - Some are small, everyday tasks, like remembering to do laundry
  - The ability to remember to complete future intentions is important for everyday living.

- Because of the many other tasks you may need to complete during the day, it can be difficult to remember all of the things you need to do!
  - Despite our busy lives demanding it, multi-tasking is hard to do. We aren’t meant to take in so much all at once: you only have so much “brain power.”

- However, memory strategies can be used to help overcome our limitations, and help us remember to complete future tasks.

- The main way they can help us is to pay attention for the opportunity to complete the future task at the appropriate time.
  - All future tasks require you to pay attention for the opportunity to complete it.
    - If you aren’t paying attention for the opportunity to complete a task, you will forget what you were supposed to be doing!
  - Sometimes you have to be actively paying attention for the opportunity, but sometimes it automatically comes to your attention that you need to complete a task
    - By using memory strategies, you can improve the probability of being attentive—thus being more likely to remember what you need to do!

- Discussion: Do any of you have any goals, big or small?

2.
- One of the most obvious, but possibly most effective, ways of helping yourself remember future goals are external reminders, like post-it notes, which are something in your surroundings you use to help you remember future tasks

- I’ve listed some types of memory strategies:
- **Post-It Notes**: Pretty much helpful for anything! Helpful for remembering tasks that come out of the blue, or that you need to complete soon. Appointments or lists of errands can work well too.
  - Some people even use them as words of encouragement!
- **Alarms**: Time-based tasks, appointments, anything important you need done soon
  - You can set alarms on your phone, and can even have different alarm tones for different tasks
- **Calendars**: Appointments, Important dates, long-term goals
- **To Do Lists**: Daily chores, lists of errands, grocery lists
- **Daily Planners**: A mix of To-do lists and calendars, really good for long-term goals & appointments

- While some types of external reminders might be better for some situations, you have to choose what works best for you!

- **Activity 1**

- **Discussion**: What ones are you most likely to use?

  - Using external reminders allows you to preserve the memory by offloading the memory onto something more permanent!
    - Trying to multi-task between current activities while also remembering to complete future tasks can be cognitively demanding!
    - But, creating a reminder can help you remember to complete future tasks with minimal cognitive effort!

  - Also, using external reminders acts as a form of “rehearsal”, meaning you will be more likely to automatically remember to do a task when you come in contact with the opportunity to complete it!
    - Through writing and viewing external reminders numerous times, it strengthens the memory to complete the future task!

3.

All tasks are made up of two parts:

- **Action** (what the task is)
  - To get a haircut
- **Context** (information about the scenario the task will be completed in)
  - At 1:00/ On Monday/ On the 1st floor/ When my hair gets too long
• **Using context is like using hints!** By including context information in external reminders, it helps you automatically remember the future task when you come in contact with that context.
  • The more “hints” you give your memory, the more likely you are to remember!

• **What Information to Include:**
  • **Event**
    - Go to the barber/hair dresser
  • **Activity**
    - To get a haircut; To get my hair colored
  • **Time/Date**
    - At 11:00; On Monday; Before lunch
  • **Location**
    - On the 1st floor; Near the fireplace
  • **People**
    - With your friend; by the barber Linda Crowley
  • **Why**
    - Because my hair is too long; Because I want my hair colored
  • **Sensory Information (What will you see, hear, smell, taste)**
    - What TV programs are playing; Who will you see; Is food cooking?
  • **Emotions/Feelings**
    - How will you feel? Relaxed, anxious, happy, sad? Are you hungry or full?

• Activity 2
• Discussion: Did you find this helpful, was it worth it, or too much work?

4.
• I’ve got more tips for making your external reminders stronger:
  1. **Put the reminder in a place that is relevant/ you know you will see it!**
    - Post-it notes on the front door.
    - To do lists or daily planners on top of purse/ in front pocket.
    - Shopping lists on the fridge door.
- A reminder to take medication by the medication.

2. If you need to take an item somewhere, put it in front of the door!
   - Example: If shipping a package, put the package in front of the door! You will have to
     look at it then, reminding you to take the package with you!

3. Put the reminders in the same place every time.
   - This way, you know where to look!

4. Review to-do lists or daily planners often.
   - This helps keep the info fresh in your memory!

5. Use flashy colors or pictures to grab your attention.
   - For calendars, daily planners, and to-do lists, you can color coordinate tasks you need
     to complete.
   - Drawing pictures of what you need to do is another way of enhancing your memory!

6. Try not to multitask; do one thing at a time!
   - We can only do so much at once!

7. Plan a schedule of your daily tasks. Consider the obstacles towards completing your
   goals!
   - Try to complete tasks in an order that is efficient and assures you will be able to get to it.

8. Say whatever you are writing down aloud.
   - This ties into our next memory strategy...

-Mental Goal Completion is a memory strategy that has been found to be successful in past
studies, in which the strategy was used to help people remember to complete a wide variety of
goals, including remembering to exercise, quit smoking, and take medications

- A “When-Then” statement that can be used to help you remember!
  - “When I go to the store, then I will pick up milk.”
“When I finish lunch, then I will go by the library.”
“When it is 2:00, then I will go exercise.”

-How it Works:

1. **Decide what you need to do.**
   - Example: You need to drop a letter off in the mailbox before you head to lunch.

2. **Say what you need to do out loud in the “when-then” format 3 times.**
   - “When I go to lunch, then I will drop off the letter in the mailbox.” x 3

3. **Mentally visualize yourself completing the task for 30 seconds.**
   - Imagine yourself dropping off the letter in the mailbox as people are standing outside for lunch. What will you hear, see, smell, etc.?

- Activity 3

- Helps create a strong “mental picture” of the situation
- Incorporates multiple forms of memory, including visual and verbal memory.
- Helps you pay attention when it is important!
  - When you come in contact with the “When”, you will be more likely to remember the “Then!”
  - Example: When you are about to go to lunch, you will be more likely to remember to go pick up the letter and bring it to the mailbox!
Week 3 Notes

- What did we learn last week?
  - Using external reminders
  - Using context
  - Mental goal completion

Penny Activity
- We all have seen thousands of pennies in your lifetime; however, can you answer this question: What word is on the penny, next to Abe Lincoln’s head? What side is it on? What way is Lincoln facing?
  - Liberty
  - Left
  - Right

- Why was this difficult? We have seen pennies all throughout our lives, but most of us have not taken the time to thoroughly inspect the coin.
  - Our analysis of the penny has likely been shallow, in other words, we likely only pay attention to the color, the man on the coin, and the building on the back; but ignore the fine details.
  - However, if you were a US coin historian, you would probably study why “Liberty” was put on the coin, as well as why the penny was designed the way it was.

- This is considered deep processing, which is the effortful and meaningful analysis of information that you want to learn or remember.

1.
- This is the memory strategy I am focusing on today: Which is that when hearing, seeing, or learning something you want to remember, you can make the memory stronger by mentally processing the information in a more meaningful way.
  - Information can be anything from stories, names, ingredients for a recipe, math—anything that you can remember!

- Here is an example of deep processing!

Activity 1
(Tell everyone to take out sheet of paper, with Yes/No answers)
-I will read another list of words, and when I say each word, circle Yes or No whether the word starts with the letter S.

Sailboat  Snake
Honey     Window
Chair     Salad
Sink

-I will repeat those words, and check off which ones you got right.

-Did anyone have any difficulty with this task?

-Let’s try this again, but we will do something a little different.
(Tell to flip over sheet)

-I will read another list of words, and when I say each word, circle Yes or No whether the word fits in the sentence, “The ____ was found in the kitchen.”

Dog       Park
Fork      Spatula
Thunder   River
Telephone

-I will repeat those words, and check off which ones you got right.

(Say words)

-Who found that a bit easier to do?

-This is because you made the words more meaningful- instead of just thinking if the word started with a letter, you had to think to yourself, “Does this word make sense in this sentence?” While it may have seemed easy, you had to think logically and decipher the meaning of each word, which made the memory of the words stronger!

-This strategy, deep processing, can be used when learning something you want to remember, perhaps a news story you want to share with friends, or medical info your doctor gives you, or when you have a thought in your mind you don’t want to forget, like a family story you want to tell your grandkids or a particular motivating quote you read in the bible
It can also help you remember future intentions!

-What do I mean by “meaningful analysis?” I mean mentally processing what you are trying to remember in a more elaborate and detailed way, or that is relevant to yourself or those around you.

-This would be instead of just trying to remember it, or just trying to remember basic things, like the color of an object or the name of a person who said a quote.

-For example, if trying to remember a date an event occurred on, if you also think about and try to remember why that date is important to you, you will be more likely to remember it!

-I have laid out some examples of ways you can more “deeply” process things you are trying to remember.

1. “Why am I learning this information? Or “How have I come into contact with this information?”

-Instead of trying to remember: “Bingo is canceled today”

-Remember: “I was walking by the chapel, and I saw on the board that bingo is canceled today.”

2. How is this information meaningful to myself?

-Instead of trying to remember: “My doctor told me I need to take blood pressure medication”

-Remember: “My doctor told me I need to take blood pressure medication because he warned me I could get a blood clot.”

3. How is the information meaningful to others?

-Instead of trying to remember: A family story passed down through generations

-Remember: A family story passed down through generations, as it is important to pass on family history, and will allow my grandchildren to understand where we came from, and the hardships we had to go through.

4. How is this information connected to other things I have learned?

-Instead of trying to remember: In chapter 4, Susie backstabbed Josh.

-Remember: In chapter 4, Susie backstabbed Josh, which makes sense, because she was threatening him/acting weird around him in the chapter before.
5. How is this information different from what I once knew?
   - Instead of trying to remember: Exercising is good for your brain.
   - Remember: I knew exercising was beneficial to heart health, but I recently learned exercising is also good for your mental health (as it increases blood flow to the brain)

6. How does this information make me feel?
   - Instead of trying to remember: I need to call my insurance company to complain.
   - Remember: I am going to get angry and frustrated, because I need to call my insurance company to complain.
   - This is a very important one: Emotional memory is one of our strongest forms of memory. If you can associate something you are trying to remember with an emotion, if you can get yourself back into that emotion, you are more likely to remember.

7. What are the contextual details about the information/ what contextual details about the environment I learned the information in?
   - State dependent learning

   - By encoding information in a “deeper”, more meaningful way, the memory of that information will be more detailed, longer lasting, and easier to recall
   - This is because this strategy helps create stronger mental connections between previously learned knowledge and memories with new knowledge and memories.
   - Additionally, when you learn information that is reference to yourself, you are more likely to remember it!

2.
   - The deep processing strategy has been found to be very useful for helping people remember names!

   - Humans are notoriously bad at remembering names- we actually are better at remembering things about people

   - Instead of just trying to remember the name of someone you just met, you can help your memory by associating their name with something that is relevant to them, like their appearance, personality, or lifestyle
111

-So I have a couple of steps laid out to help you remember names the next time you meet someone:

1. **Commit & Concentrate**
   - Make a conscious decision to remember names.
   - Devote your attention to hearing and remembering their name.
   - Don’t be afraid to ask their name again if you did not hear it the first time.
   - Take notice of their physical characteristics and facial features.

2. **Repeat**
   - Repeat their name when you hear it: “Hello Jim”
   - Mentally repeat the name to yourself 3 times while looking at their face.
   - Comment on their name, if possible: “Oh, my brother’s name is Jim”
   - Use their name during the conversation, and when leaving.
   - Make a “name journal”
     - Write down names, along with physical characteristics and where/when you met them
   - Go over at the end of the day: “Who did I meet today?”

3. **Associate**
   - **Physical**: Associating the name with a physical characteristic.
     - Mr. Booker wears glasses, for reading books.
     - Debbie is large, because she eats too many Little Debbie’s.
   - **Sounds**: Make a rhyme using the person’s name
     - Dave needs a shave.
     - Latrice is Patty’s niece.
   - **Impressions**: Linking the name to your impression of the person
     - Angela is sweet, like an angel.
     - Martin Peck is a pain in the neck.
   - **Jobs**: Associating the name with a job
     - John Baker the baker
     - Mr. Booker the librarian
-Famous People: Names or physical characteristics that are associated with famous people
- John who wears a cowboy hat: John Wayne
- Grace with is skinny and has blonde hair: Grace Kelly

Activity 2
- List of names and descriptions, what would be a meaningful way to associating their name with something that is relevant them, which may help you remember their name
  1. A man named Paul who is 6 foot 4: Tall Paul
  2. A man named Phil McDonald owns animals: Old McDonald
  3. Margie has smooth, blonde hair: Margarine-Hair Margie/ Butter-Hair Betty
  4. Jack is a construction worker, and is strong: Jack hammer
  5. A woman named Hazel has brown eyes: Hazel eyes
  6. A friendly man named Carson who you can tell likes to talk a lot: Johnny Carson
  7. A man named Larry who has bushy eyebrows: Hairy Larry

3. The deep processing strategy can also be used to help you remember where you put things! However, this is more to help you with remembering where you put things, but not trying to find things you have already lost!

- Put items in places that make sense.
  - For example, place your glasses where you typically read the newspaper.
  - Put the remote next to your chair.
  - However, that isn’t always possible…

- Make a habit: Put it in the same place every time!
  - Again, that isn’t always possible…

- Say aloud where you are putting the item.
  - Multiple forms of memory: verbal, auditory, and visual

- Notice what room you are in, or what is around you.
- Think of contextual, environmental details: Is it cold? Dark? Noisy?
- Is someone with you?

- Think: “Why am I putting the item here?”: Deep processing
  - Come up with a story: “What was I doing when I put the item here? What caused me to place the item down? What will I use the item for?”
  - “Was I frustrated I had to put the item down?”

- Use external reminders, like post-it notes.

4.
- A method of “deep” processing that you may not think of is drawing what you learn, or want to remember
  - Drawing for fun or relaxation can help your memory, as it is a mentally stimulating activity, and can relieve stress: both of which are healthy for your brain!

- However, drawing also is a way to make information you want to remember more meaningful
  - Use with external reminders.
    - A mailbox picture to help you remember to mail a letter.
    - A cross picture to help you remember to go to church.

- Include in notes when learning something new. (name journal)
  - If trying to remember John is a plumber, draw a picture of a toilet plunger.
  - If trying to remember a news story about cats, draw a picture of a cat.
  - Use colors to remind you that Jane has blue eyes and loves to wear clothes that are yellow.
  - Draw doodles about what you learned/ what you did today.

- Incorporates multiple forms of memory, including the visual memory of the image, the motor memory of drawing the picture, and the semantic memory that is used when we engage in meaning-making.

- Found to be helpful for memory, even for those not good at drawing.
Week 4 Notes

- What did we learn last week?
  - Deep Processing: when hearing, seeing, or learning something you want to remember, you can make the memory stronger by mentally processing the information in a more meaningful way.
  - Remembering names
  - Remembering where you put things
  - Drawing

Activity 1
I will say a list of words, and you must try to remember them. After I have finished saying the words, write down as many as you can remember. X 4

Toothbrush    Picnic
Buffalo        Napkin
Goldfish       Ocean
Tomato

1.
- Retrieval Practice: Repeatedly calling information to mind enhances learning and memory.
  - Caused by the testing effect, in which repeated retrieval of material can strengthen one’s memory of that retrieved information, &
  - Priming, in which previous exposure to information influences the future recognition of that information

- This is why I try to review what we went over last week at the beginning of each session, and why I do pre and post tests!

- Can be as simple as repeating the information in your head/re-reading a passage over and over, but there are more effective ways.
  - In fact, while repeating info/rereading is ok, it is a passive exercise, and is ineffective for long-term remembering
  - Instead, if you actively try to remember information (aka use your memory) by testing yourself, the memory is more likely to become long term- stronger
- Test yourself: After a delay, try to remember what you learned.
  - This can be on paper, verbally, or in your head. Writing it out is the best way, though.
  - Go over what you could not remember.

- Don’t try to memorize the information- try to understand it. Comprehension is the key to understanding!
  - Ask questions!
  - For what you cannot remember, ask yourself: Why can’t I remember this?
    - This taps into last week: You want a deeper understanding aka deeper processing
    - Is this information different from what I once knew?
    - Is this information not what I expected?
  - Tell/Explain to someone else.
    - Acts as a form of testing that requires a deep understanding of the info.

- Use multiple forms of memory
  - Repeat verbally, Mental visualization, Draw pictures, Write it down
  - Use Mental Goal Completion!

- Don’t be afraid to make mistakes!
  - Making mistakes is a great way to learn- it defies your expectations, which makes you think
  - Go over what you missed, think: Why is this answer correct, while this answer is wrong?

**Activity 2**

I will show you 5 faces, and tell you their name. After I have finished telling you their names, I will show the faces to you again. For each face, write down as many names as you can remember.

1. Samantha Davis
2. Judy Jones
3. Phil Wilson
4. Mary Johnson
5. Robert Miller
2. Spaced Retrieval: Retrieval practice over a period of time! Testing recall several times over a period of time, with longer delays in-between each testing session

- Spacing Effect: Information is learned more effectively when spread over time
- Cramming is no good! It may help your memory for a short period of time, but you won’t remember it in the long run!

1. Use the Retrieval Practice strategy until you can successfully remember most of the information

2. When you can remember most info, then wait a brief period (5-10 minutes) and test yourself again. For what you cannot remember, go over it again, and test yourself until you can remember it.

3. When you can remember most info, then wait a longer period (20-30 minutes) and test yourself again. For what you cannot remember, go over it again, and test yourself until you can remember it.

4. Repeat these steps with increasingly longer intervals of time.
   - 1 hour, 2 hours, 4 hours, 6 hours, every day, and so on…
   - Testing yourself over multiple days is best- helps retain long-term memory

5. For more difficult things to remember, break up the information into smaller bits

**Activity 2 pt. 2**
I will show you 5 faces, and tell you their name. After I have finished telling you their names, I will show the faces to you again. For each face, write down as many names as you can remember.

1. Samantha Davis
2. Judy Jones
3. Phil Wilson
4. Mary Johnson
5. Robert Miller

3.
-Here are some various uses of retrieval practice.

-Numbers
  - Zip codes, bank codes, social security number, phone numbers
  - Chunking: Separate large numbers into multiple smaller groups
    - Instead of remembering “3553416”, remember “355”, “34”, “16”

-Names
  - A lot of the stuff we were talking about last week
  - Repeat their name when you hear it: “Hello Jim”
  - Use their name during the conversation, and when leaving.
  - Go over at the end of the day: “Who did I meet today?”
    - Make a “name journal” with names, along with physical characteristics and where/when you met them
  - Test yourself if you have pictures!

-Lists
  - Organize alike information into groups.
    - Put all “cleaning to-dos” together, all “shopping to-dos” together

-Stories
  - Bible stories, book stories, news stories, family stories
  - Try to tell the story back to yourself!
  - Think about why each part of the story is important.

-Anything else you want to learn or remember!
  - Facts, medical history, important dates, lessons in this class!

Activity 2 pt. 3
I will show you 5 faces, and tell you their name. After I have finished telling you their names, I will show the faces to you again. For each face, write down as many names as you can remember.

1. Samantha Davis
2. Judy Jones
3. Phil Wilson
4. Mary Johnson
5. Robert Miller

4.
-Another use of retrieval practice is remembering steps for operating electronics
- Technology can be difficult, but you can make it easier on yourself!

-Translate the directions into your own words.
  -Rewrite the instructions in a way that is easy for you to understand.

-Use external reminders.
  -Attach labels to buttons or dials that identify their purpose.
  -Keep the instructions close to the technology.

-Block off the buttons that aren’t important.

-Comment on the steps.
  -Why is this step important? Make each step meaningful!
  -Are there unimportant steps? Cut them out!

-Practice
  -At first, practice at least once every day on going through the steps.
    -If there are a lot of steps, try to learn one task at a time! Don’t overload yourself.
  -Practice once a week to maintain knowledge.
  -Try to explain the instructions to someone else.
    -Acts as a form of testing!
Week 5 Notes

1. Exercise your body
   - It is recommended you get 30 minutes of exercise a day, for 5 days a week
     - Can be as simple as walking or cleaning
   - Reduces the risk of cardiovascular disease
   - Gives you more energy, relieves stress, and improves mood
   - Increases oxygen flow to the brain, which improves brain functioning and keeps your brain healthy.
     - Studies have found aerobic exercise increased the size of a brain structure important to memory and learning

2. Exercise your mind.
   - The brain is like a muscle- exercise it to keep it healthy!
     - Like any muscle “use it or lose it”
   - Mentally-stimulating activities help protect the brain by making it more resilient and more able to adapt to changes.
     - Examples are reading, brain games, and learning

3. Sleep
   - It is recommended you get about 7-9 hours a night.
   - Benefits for Cognition:
     - Memory and Learning
     - Processing Speed
     - Decision making
     - Attention & Alertness
   - Naps are important too! 30 min-1 hour daily naps can improve memory performance

4. Socialize
   - A socially active lifestyle can help prevent cognitive decline and improve memory functioning.
     - Social activity is mental activity.
     - Opens up opportunities for collaborative problem solving and more mentally-stimulating activities.
- Participating in social activities may lower the risk for some health problems, as well as improve mood and reduce stress

Examples:
- Church services/bible study
- Exercising
- Playing games
- Volunteering

5. Unfortunately, there is no “memory pill” that can be used to magically repair memory.
- However, getting the necessary vitamins from a balanced diet can help maintain brain health, which of course is important for memory
- Vitamin B, Omega-3 Fatty Acids, Vitamin E, and Iron are all important!

Week 2
- In week 2, we discussed external reminders, which are an effective way of helping remember future goals
- External reminders are something in your surroundings you use to help you remember future tasks

- Examples of external reminders include post-it notes, alarms, calendars, to do lists, and daily planners

- Using external reminders allows you to preserve the memory by offloading the memory onto something more permanent, which allows you to maintain the task in mind with minimal cognitive effort

  • External reminders can be made more useful by using context. Using context is like using hints! By including context information in external reminders, it helps you automatically remember the future task when you come in contact with that context.
  ▪ The more “hints” you give your memory, the more likely you are to remember!

- Contextual information includes:
  ▪ Time/Date
    o At 11:00; On Monday; Before lunch
  ▪ Location
- On the 1st floor; Near the fireplace

- **People**
  - With your friend; by the barber Linda Crowley

- **Why**
  - Because my hair is too long; Because I want my hair colored

- **Sensory Information (What will you see, hear, smell, taste)**
  - What TV programs are playing; Who will you see; Is food cooking?

- **Emotions/Feelings**
  - How will you feel? Relaxed, anxious, happy, sad? Are you hungry or full?

-Mental Goal Completion is another memory strategy that takes the form of a “When-Then” statement that can be used to help you remember!

- “When it is 2:00, then I will go exercise.”

-How it Works:
  1. Decide what you need to do.
     - Example: You need to drop a letter off in the mailbox before you head to lunch.
  2. Say what you need to do out loud in the “when-then” format 3 times.
     - “When I go to lunch, then I will drop off the letter in the mailbox.” x 3
  3. Mentally visualize yourself completing the task for 30 seconds.
     - Imagine yourself dropping off the letter in the mailbox as people are standing outside for lunch- What will you hear, see, smell, etc.?

- Helps create a strong “mental picture” of the situation
- Incorporates multiple forms of memory, including visual and verbal memory.

**Week 3**

-In week 3, we discussed deep processing, which is the effortful and meaningful analysis of information that you want to learn or remember.

-So, when hearing, seeing, or learning something you want to remember, you can make the memory stronger by mentally processing the information in a more meaningful way, meaning in a more detailed way or in a way that is more relevant to yourself

- For example, if trying to remember a date an event occurred on, if you also think about and try to remember why that date is important to you, you will be more likely to remember it!
- By encoding information in a “deeper”, more meaningful way, the memory of that information will be more detailed, longer lasting, and easier to recall

-Here are some examples of ways you can more “deeply” process things you are trying to remember

1. “Why am I learning this information? Or “How have I come into contact with this information?”
   - Instead of trying to remember: “Bingo is canceled today”
   - Remember: “I was walking by the chapel, and I saw on the board that bingo is canceled today.”

2. How is this information meaningful to myself or others?
   - Instead of trying to remember: “My doctor told me I need to take blood pressure medication”
   - Remember: “My doctor told me I need to take blood pressure medication because he warned me I could get a blood clot.”

3. How is this information similar or different from what I once knew?
   - Instead of trying to remember: In chapter 4, Susie backstabbed Josh.
   - Remember: In chapter 4, Susie backstabbed Josh, which makes sense, because she was threatening him/acting weird around him in the chapter before.

4. How does this information make me feel?
   - Instead of trying to remember: I need to call my insurance company to complain.
   - Remember: I am going to get angry and frustrated, because I need to call my insurance company to complain.

-Deep processing strategy can be used to help you remember names:
  - The main way is by associating their name with something that is relevant them, like their appearance, personality, or lifestyle
  - **Physical**: Associating the name with a physical characteristic.
    - Mr. Booker wears glasses, for reading books.
  - **Sounds**: Make a rhyme using the person’s name
    - Dave needs a shave.
  - **Impressions**: Linking the name to your impression of the person
    - Angela is sweet, like an angel.
  - **Jobs**: Associating the name with a job
- John Baker the baker

- **Famous People**: Names or physical characteristics that are associated with famous people
  - Grace with is skinny and has blonde hair: Grace Kelly

- The deep processing strategy can also be used to help you remember where you put things!
  - Think: “Why am I putting the item here?”
  - Come up with a story: “What was I doing when I put the item here? What caused me to place the item down? What will I use the item for?”
  - “Was I frustrated I had to put the item down?”

### Week 4

- In Week 4, we discussed retrieval practice: Repeatedly calling information to mind enhances learning and memory.
  - Can be as simple as repeating the information in your head/re-reading a passage over and over, but there are more effective ways.
  - Instead, if you actively try to remember information (aka use your memory) by testing yourself, the memory is more likely to become long term stronger

- Test yourself: After a delay, try to remember what you learned.
  - This can be on paper, verbally, or in your head. Writing it out is the best way, though.
  - Go over what you could not remember.

- Don’t try to memorize the information- try to understand it. Comprehension is the key to understanding!
  - Ask questions!
  - For what you cannot remember, ask yourself: Why can’t I remember this?
  - Tell/Explain to someone else.
  - Acts as a form of testing that requires a deep understanding of the info.

- Use multiple forms of memory
  - Repeat verbally, Mental visualization, Draw pictures, Write it down

- Here are some various uses of retrieval practice.
  - Numbers
    - Zip codes, bank codes, social security number, phone numbers
- Chunking: Separate large numbers into multiple smaller groups
  - Instead of remembering "3553416", remember "355", "34", "16"

- Names
  - Repeat their name when you hear it: "Hello Jim"
  - Use their name during the conversation, and when leaving.
  - Go over at the end of the day: "Who did I meet today?"

- Lists
  - Organize alike information into groups.
  - Put all "cleaning-to-dos" together, all "shopping-to-dos" together
  - Anything else you want to learn or remember!
  - Facts, stories, medical history, important dates, lessons in this class!

-Retrieval practice is better is done over time! This is called spaced retrieval, which is testing recall several times over a period of time, with longer delays in-between each testing session.
- Caused by the spacing Effect: Information is learned more effectively when spread over time.

1. Use the Retrieval Practice strategy until you can successfully remember most of the information.

2. When you can remember most info, then wait a brief period (5-10 minutes) and test yourself again. For what you cannot remember, go over it again, and test yourself until you can remember it.

3. When you can remember most info, then wait a longer period (20-30 minutes) and test yourself again. For what you cannot remember, go over it again, and test yourself until you can remember it.

4. Repeat these steps with increasingly longer intervals of time.
   - 1 hour, 2 hours, 4 hours, 6 hours, every day, and so on...
   - Testing yourself over multiple days is best- helps retain long-term memory

5. For more difficult things to remember, break up the information into smaller bits

- Another use of retrieval practice is remembering steps for operating electronics
  - Translate the directions into your own words.
  - Rewrite the instructions in a way that is easy for you to understand.
  - Comment on the steps.
  - Why is this step important? Make each step meaningful!
APPENDIX F

ACTIVITIES
**Week 2 Activities**

**Activity 1**

For each of the following scenarios, choose the type of external reminder that would be most helpful to use to help you remember the task.

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Calendar</th>
<th>Daily Planner</th>
<th>Post-It Note</th>
<th>To-Do List</th>
</tr>
</thead>
</table>

1. You need to do laundry, change bed sheets, send a letter to your grandchild, and go to a book club meeting, all tomorrow.

2. You want to go to a bible study group that meets up every Monday at 10:00.

3. In 30 minutes, Reggie will be hosting Brain Games at the fireplace, and you want to be sure you remember to go.

4. You decide you want to set a goal for yourself, that you will start exercising for 30 minutes every weekday.

5. You need to remember to pick up toothpaste when you go to Walmart.

6. When about to go to bed, you realize you forgot to drop off a book at the library, so you decide you will do it tomorrow.

**Activity 2**

As groups, think of a couple of tasks that you will need to complete, either today or in the near future. For each of these tasks, mark down what you think would be relevant context information that you could use to help you remember to complete the task. Also, what external reminder would you use, if any?

*Remember: Context can include the Activity, Time, Date, Location, Sights, Smells, Noises, People you will be with, Emotions, Feelings, and Purpose.*

**Activity 3**

Let’s practice mental goal completion together. What are some things you all need to do today or tomorrow?
Week 3 Activity
FRONT

For each word I say, circle Yes or No if the word starts with the letter S.

1. Yes  No

2. Yes  No

3. Yes  No

4. Yes  No

5. Yes  No

6. Yes  No

7. Yes  No
For each word I say, circle Yes or No if the word fits logically in the sentence: “The _____ was found in the kitchen.”

1. Yes   No

2. Yes   No

3. Yes   No

4. Yes   No

5. Yes   No

6. Yes   No

7. Yes   No
Activities Week 4

Activity 1
I will say a list of words, and you must try to remember them. After I have finished saying the words, write down as many as you can remember.

1.

2.

3.

4.

5.

6.

7.
Activity 2
I will show you 5 faces, and tell you their name. After I have finished
telling you their names, I will show the faces to you again. For each face,
write down as many names as you can remember.

1. 

2. 

3. 

4. 

5. 
APPENDIX G

HOMEWORK ASSIGNMENTS
**Week 1 Homework**

Keep track of your brain-healthy activities!
At the end of the day, mark down the information for every box!

<table>
<thead>
<tr>
<th>Day</th>
<th>Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td></td>
</tr>
<tr>
<td>Day</td>
<td>Activity</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Wednesday</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day</th>
<th>Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday</td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td></td>
</tr>
</tbody>
</table>
**Week 2 Homework**
For this week, mark down what goal-planning strategies you used!
This includes the external reminders and mental goal completion strategies.
Also be sure to mark down if you successfully remembered and completed the task you used the goal-planning strategy for!

<table>
<thead>
<tr>
<th>Wednesday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thursday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
**Week 3 Homework**

Over the next week, write down the names of people you have met, or have had trouble remembering their names in the past. Additionally, write down an association “hint” you can use to help remember their name. Remember, this “hint” is an association of the name with a physical characteristic, job, famous person, rhyme, or your impression of them. Look in the “Remembering Names” page in your Memory Workbook for examples!

<table>
<thead>
<tr>
<th>Name</th>
<th>Association</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Week 4 Homework

For this week’s homework, I will provide you with a list of words on this page I want you to try to remember. For these words, test your memory everyday using the strategies we learned today. Put a check mark by every day you test yourself on the words. At the beginning of our next meeting, I will see who can remember the words!

1. Horse  
2. Airplane  
3. Computer  
4. Chimney  
5. Creek  
6. Triangle

<table>
<thead>
<tr>
<th>Tuesday</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wednesday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monday</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
VITA

Thomas Vorwerk was born in Concord, NC, to the parents of Michael and Karen Vorwerk. He attended St. Ann Catholic School and continued to Saint Benedict at Auburndale for high school, both in Memphis, Tennessee. After graduation, he attended the University of Tennessee at Chattanooga with a major in Psychology, and soon became interested in the fields of research and gerontology. During this time, he completed several research projects involving prospective memory abilities with both younger and older adults. He also volunteered and worked at an individual and assisting living home for elders, which cemented his focus and passion in gerontology. He graduated magna cum laude with a Bachelor of Science in Psychology, and continued at the University of Tennessee at Chattanooga to pursue his Masters of Science in Psychology in August, 2019. He plans to continue his education in the field of gerontology by pursuing a Ph.D. in an aging-related field.