EVERYDAY MEMORY STRATEGY USE IN OLDER ADULTS

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EVERYDAY MEMORY STRATEGY USE IN OLDER ADULTS

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LIST OF SYMBOLS AND ABBREVIATIONS

[bracketed text]	Symbolizes questions asked by the interviewer or insertions from the text for background
[…]	When segments of text have been abbreviated
…	When participants paused or trailed off

SUMMARY

Existing everyday memory questionnaires and interview studies lack the depth of knowledge necessary to understand the ways in which older adults use their memories during their everyday lives. These assessments do not elicit qualitative information about (1) how strategies or aids are used within the context of their daily lives and (2) how effective they are at helping older adults achieve their goals. These measures also implicitly assume that the use of memory strategies in daily life are a consequence of experienced memory decline and are used explicitly as a form of adopted compensation (Bäckman & Dixon, 1992; Dixon, de Frias & Bäckman, 2001).

These critical issues were assessed through a qualitative coding analysis performed on 26 individually tailored, semi-structured qualitative interviews with older adults about their everyday remembering. The interviews elicited information about how older adults implemented memory strategies, how efficacious these procedures were in helping them achieve their goals, and how they were conceptualized. Additionally, the interviews elicited detailed information about the context in which memory failures occurred and beliefs held by the participants about their memories. The qualitative analysis revealed several themes. First, everyday memory strategy use arises for a variety of reasons, not solely as a form of explicit memory compensation. Second, stated importance played a major role in older adults' approach to everyday remembering behaviors. Third, partially-structured habits and routines left individuals vulnerable to forgetting. Finally, a unique nexus exists among self-perceptions, older adults' perceived memory skills, and their beliefs about memory control. The implications of this research have the potential to improve older adults' everyday remembering by informing the design of an intervention to create a repertoire of self-regulatory strategies to help manage and improve everyday remembering.

CHAPTER 1. INTRODUCTION

According to Schaie and Zanjani (2006), cognitive decline can become noticeable on an individual level beginning on average as soon as the mid-fifties and as late as the mid-seventies. By the sixties, most intelligence-related aspects of cognition show declines; however, the extent of these declines differ between cognitive processes as well as across individuals. For example, the authors report that perceptual speed and numeric ability may begin to show longitudinal declines in the mid-fifties whereas inductive reasoning and spatial orientation begin to see declines by or before the late sixties. Schaie and Zanjani also argue that declines are observed for verbal ability and memory on average during the late seventies (2006). Further, Nyberg, Bäckman, Erngrund, Olofsson, and Nilsson (1996) report that episodic memory for tasks like name recognition and free recall show age-related declines, whereas semantic knowledge and procedural memory do not. Interestingly, Clark et al., (2012) found evidence suggesting that structural brain changes associated with cognitive declines can occur well before neurocognitive assessments reflect these changes. The implication is that structural brain changes can significantly precede assessment scores showing cognitive deficits often associated with aging.

Taken together, these claims necessitate the importance of investigating how older adults can help themselves before cognitive declines or serious memory failures occur. Promising research has shown that engagement in cognitively stimulating activities can aid in buffering against age-related declines on an individual level (e.g., Hultsch, Hertzog, Small & Dixon, 1999; *for a review see* Hertzog, Kramer, Wilson & Lindenberger, 2008). The issue therein lies in how older adults should be proactively working to try and mitigate or reduce the effects of cognitive decline through aging. We argue that by targeting ways to help older adults become more efficient

in the strategies and procedures they use to remember and accomplish their daily tasks and goals, it may be possible to reduce and better control the effects related to cognitive declines. The following analyses of qualitative interview data with older adults about everyday remembering and strategy use supports this notion by providing evidence about the ways in which healthy older adults' memory-supportive behaviors leave them susceptible to everyday memory failures.

1.1 Aspects of Everyday Remembering

1.1.1 Retrospective Memory

Retrospective memory is vital to everyday remembering. It involves how information is encoded and subsequently recalled at a later time and occurs either intentionally or incidentally (Burgess & Shallice, 1997). When remembering occurs for information that was previously encoded with the intent for recall to occur later, it is considered an intentional retrospective memory. Incidental retrospective memory is when information is recalled at a later time, but without the intent to remember it during encoding (Brandimonte, Einstein, & McDaniel, 1996). The ability to recall previously encoded information is embedded into our daily lives and instances of both intentional and incidental recall play a key role in successful everyday remembering.

Although retrospective memory is ingrained in our everyday lives, it is not immune to age-related deficits. Episodic memory, which is intricately woven in retrospective memory, also faces impairment with aging (e.g. Nyberg et al., 1996). For example, the most common memory complaint from older adults is not remembering names (Cohen & Faulkner, 1986). The relevance for remembering names becomes immediately apparent in the context of everyday social interactions; we often rely on our ability to remember information we intended to, as well as things we did not, and names are no exception. The distinction noted here between intentional and

incidental retrospective memory is important, as their use and application underlie several aspects of everyday cognition including prospective memory and self-regulation. I argue that we can achieve a clearer picture of everyday remembering by better understanding the role of intentional and incidental memory in older adults' daily lives.

1.1.2 Prospective Memory

Prospective memory is the ability to correctly recall and act on previously encoded information at a future time and is essential to leading a successful and independent everyday life. It is often required to complete daily tasks that require monitoring or delayed action (e.g. Brandimonte et al., 1996; Marsh, Hicks, & Landau, 1998; Kliegel & Martin, 2003). Although prospective memory is intricately tied to retrospective memory, an essential difference is that prospective memory requires that there is some action associated with later recall (Burgess & Shallice, 1997). The retrospective components of prospective memory include both the intention to act and remembering what to do when an intention to act is retrieved (Brandimonte et al., 1996).

Examples of common prospective memory failures include missing a dose of medication, losing your keys, forgetting an item on your grocery list, or forgetting to bring an item with you (e.g. Crovitz & Daniel, 1984). In a semester-long diary study, Terry (1988) had younger adults record daily instances of forgetting. Prospective memory errors were the most common type of memory failures and included forgetting to comply with requests, forgetting to bring items, and forgetting habitually performed actions. Note that these prospective memory failures likely included instances of incidental and intentional retrospective memory, although the level of detail necessary to make the distinction between them was not reported. Additionally, Sinnott (1986) found that younger adults were better able to remember incidental, non-essential prospective items

compared to the older adults, even though older and younger adults recalled about the same amount of prospective memory information in a longitudinal trial.

The widespread role of prospective memory in daily remembering and the frequency of prospective memory errors occur make it an area of great interest for research (Kliegel & Martin, 2003). Moreover, identifying means of decreasing memory failures and maintaining one's cognition is vitally important to older adults in maintaining one's independence and quality of life (Lawton et al., 1999; Hering, Rendell, Rose, Schnitzpahn & Kliegel, 2014). For these reasons, prospective memory is a prime target for cognitive interventions with the aim of increasing everyday functioning through intentional self-regulatory memory strategy use (McDaniel & Bugg, 2012; Hertzog & Dunlosky, 2012; Hering et al., 2014). The current body of literature on prospective memory answers basic questions about failures and compensatory strategies ranging from external aids to implementation intentions. However, this literature does not provide enough information to create an intervention program with widespread success for use in the general population to help older adults effectively manage their everyday remembering. In this investigation, I address gaps in the current literature and experimentation of everyday memory, including the contexts in which prospective memory errors occur and how daily, ecological strategy use occurs to achieve prospective remembering-related goals.

1.1.3 Self-Regulation

Engaging in self-regulatory behaviors, including taking steps to intentionally control different aspects of one's cognition, enables older adults to efficiently problem-solve by adapting to different contexts based on their needs and goals (for reviews on this topic, see Baumeister & Heatherton, 1996; Hofmann, Schmeichel, & Baddeley, 2012). Self-regulation involves multiple

aspects of cognition and memory including executive functioning, attention, retrospective and prospective memory. Self-regulatory behaviors including strategy use fall under the broader umbrella of metacognition, which entails self-monitoring based on one's environmental context and then adapting strategic behaviors to accomplish one's goal(s) (e.g. Hofmann et al., 2012; Hering et al., 2014). Self-regulatory behaviors relevant to managing everyday cognition include the use of strategies such as external or internal aids as intentional methods to help remember something. Everyday examples of these strategic self-regulatory behaviors include external aids to remember to take medications at a certain time or mnemonics, such as visual imagery, to remember part of a routine while running late.

1.1.4 Open Questions

Much of the literature on everyday memory strategy use implicitly assumes that the use of these strategies evolves from observed declines in older adults' cognition, resulting in the adapted use of these strategies as intentional memory compensation (e.g. Bäckman & Dixon, 1992; Dixon et al., 2001). However, I argue that there are a number of open questions about how older adults engage in self-regulation of everyday cognitive tasks. For example, is self-regulation for everyday cognition intentional and consciously enacted, or is it more automatic and routinized? Contrary to the underlying assumptions of the memory compensation literature, I propose many behaviors in older adults' daily lives may arise as an unintended consequence merely from living a routinized lifestyle, and not necessarily as an adopted form of compensation following observed changes in memory or cognition. In this case, memory strategies and memory-supportive behaviors are not seen by individuals as being explicitly memory-supportive. Instead, these self-regulatory behaviors and procedures may be internally conceptualized, or thought of, as simply part of a daily routine or habit.

Additionally, I am interested in whether individual differences exist in the quality of self-regulation and subsequent strategy use. It is possible that memory failures could be due to the use of contextually ineffective or low-quality strategies. Hertzog, McGuire, Horhota and Jopp (2010) found that older adults who reported using a memory strategy during list learning cited low-quality, marginally effective, and high-quality relational strategies with nearly equal probability. This finding implies that older adults do not necessarily enact the most efficacious self-regulatory behaviors relative to the memory task at hand, as their strategy use was split almost equally among both efficient and inefficient strategies. By employing effective self-regulatory strategies, it is possible to decrease memory failures especially when (1) no or (2) an ineffective strategy was previously used (Hertzog et al., 2010; Coane, 2013). In terms of predictability, Hülür, Hertzog, Pearman, & Gerstorf, (2015) found that individuals who were highly self-regulatory, were also likely to be more conscientious. Individual differences in this trait, specifically for individuals higher in conscientiousness may have inherently derivative advantages in terms of better self-regulation. These questions underscore open areas in the literature about the ways in which older adults use and conceptualize self-regulation and strategy use in their daily remembering.

1.1.5 Beliefs About Memory

To better understand everyday memory strategy use, I argue that a qualitative investigation about older adults' views and beliefs about memory is also necessary. Several questions remain, regarding what older adults believe about their own memories and memory in general. Additionally, why do older adults think that their behaviors are helping them achieve their everyday remembering? Many older adults have preconceived notions about memory as a construct or even their own abilities, emphasizing the importance of understanding how older adults conceptualize "memory" and within the context of their recent experiences. For example,

phrases like “use it or lose it” often come to mind when older adults think about their cognitive abilities as they continue to age (Hertzog et al., 2010; Troyer, 2010). This phrase implies two important things: (1) if you do not exercise your brain, it will result in a loss of cognitive abilities and (2) there is an implicit association that by exercising your brain, you can causally impact your cognition through aging. In other words, phrases like these lead older adults to believe that intentionally engaging in behaviors have direct causal effects on the status of their cognition.

Interestingly, current everyday memory research has found a disparity in the perceived causes of memory problems and the depth to which the population of older adults believes these causes are uncontrollable or unknown. For example, Vestergren and Nilsson, (2011) reported that in a population-based study of older adults ages 39 to 99, memory failures were generally attributed to external and/or uncontrollable factors. They found that the participants with memory complaints nominated “no cause” as the most popular cause of self-reported memory problems, followed closely by age and stress. Interestingly, participants did not attribute their memory problems to constructs such as absentmindedness, multitasking, or lack of concentration. This finding elucidates a possible disassociation wherein individuals do not believe there is a direct impact between their own behaviors, or lack of memory-supportive procedures, and their experienced everyday memory problems. However, it may be possible to change the way that older adults conceptualize the cause of their memory issues by connecting intentional memory supportive behaviors, like self-regulatory strategies, with their direct impact on memory successes and failures through cognitive restructuring interventions (Lachman, Weaver, Bandura, Elliot, & Lewkowicz, 1992).

Moreover, Hertzog et al. (2010) found that younger adults were more likely to report self-regulatory metacognitive strategies than older adults when they were asked to identify ways they

could exert control over memory. Both older and younger adults cited the use of such strategies as a method to control memory, but older adults did not spontaneously nominate these techniques as a means to achieve control over memory. Older adults were more likely to report that control over memory through aging was a consequence of personal choices such as mental and physical exercise. Importantly, these findings connect memory control and strategy use in older adults due to the influence of their beliefs about their ability to use a type of strategy on the likelihood of reporting strategy use. Older adults' beliefs appear to be linked to a discontinuity between their knowledge of effective strategies and employment of these techniques, potentially due to a combination of sociocultural influences, confidence, technique training or knowledge, and motivation. Cognitive restructuring may be the key to changing older adults' beliefs, and subsequent memory procedures influenced by their beliefs (e.g. West, Bagwell, & Dark-Freudeman, 2008). This highlights the importance of understanding older adults' beliefs about memory and how cognitive restructuring should be approached to bolster their self-efficacy for implementing memory strategy use as a means to control cognition (Hertzog et al., 2010; Horhota, Lineweaver, Ositelu, Summers, & Hertzog, 2012).

However, we must first gain a more holistic view of older adults' everyday remembering, including a deeper understanding about their implicit theories and beliefs. This should be done qualitatively, where older adults have the opportunity to expand on the rationale behind their beliefs and memory procedures, which is beyond the scope of what is currently offered in the literature. The current study provides a method by which to understand these questions through a qualitative approach of everyday remembering based on older adults' (1) memory complaints and concerns, (2) what strategies they do and do not use, (3) what they are (and are not) used for within the context of their own lives, (4) how often each of those strategies are used, (5) the effectiveness

of strategies and procedures used relative to their goals, (6) types of memory failures and (7) how they conceptualize their use of strategies and procedures.

1.2 Questionnaire Measures

Everyday cognition and self-regulation are difficult to measure, and as such, researchers typically rely on self-report questionnaire measures. Popular questionnaire measures include the Memory Functioning Questionnaire [MFQ] (Gilewski & Zelinski, 1988), the Metamemory In Adulthood [MIA] (Dixon & Hultsch, 1983), the Multifactorial Memory Questionnaire [MMQ] (Troyer & Rich, 2002), as well as the Memory Compensation Questionnaire [MCQ] (Dixon et al., 2001). See Table 1 for a comparison of questions across these measures. The MFQ focuses on assessing self-perception about the frequency of forgetting, the seriousness of forgetting, retrospective memory, and mnemonics usage in everyday remembering. The MIA takes a self-evaluative approach to memory function and knowledge about different memory processes and strategies. The MMQ has participants endorse contentment with their current memory ability, frequency of everyday memory failures, and strategy use. Finally, the MCQ measures frequency of compensatory behaviors by asking about external aids, internal aids, time spent remembering items, effort to remember something, commitment to high memory, and how their compensatory behaviors have changed over the last several years. Together, these questionnaire measures answer more basic questions to paint a broad, almost categorical approach to everyday remembering. They provide a way to quantify the frequency of forgetting and evaluations about memory changes and behaviors within and between persons or groups. Similarly, they provide quantitative contextual and frequency data about internal and external strategy use.

Table 1. Comparison of Sample Items from Everyday Memory Questionnaires

Assessment	Type of Question	Sample Questions
MFQ	Frequency of Issues	How often do these present a problem for you? (Names, faces, appointments, personal dates, where you put things)
		How well you remember things that occurred? (Last month, last year)
	Memory Self-Concept	When you actually forget in these situations, how serious of a problem do you consider the memory failure to be? (Names, faces, appointments, where you put things, personal dates)
		How is your memory compared to the way it was: 1 year ago? 5 years ago?
	Frequency of External Aid Use	How often do you use these techniques to remind yourself about things? (Keep an appointment book, write yourself reminder notes, make grocery lists, keep things you need to do in a prominent place)
	Frequency of Internal Aid Use	How often do you use these techniques to remind yourself about things? (Mental repetition, associations with other things)
MIA	Aid Use	Do you write appointments on a calendar to help you remember them?
		Do you ask other people to remind you of something?
		Do you post reminders of things you need to do in a prominent place, such as bulletin boards or note boards?
	Internal Aid Use	Do you mentally repeat something you are supposed to remember?
		Do you make mental images or pictures to help you remember?
	Memory Self-Concept/ Ability	I am good at remembering names.
		I'm less efficient at remembering things now than I used to be.
		I have little control over my memory ability.
MMQ	Frequency of Internal Aid Use	How often do you repeat something to yourself at increasingly longer and longer intervals so that you will remember it?
	Frequency of External Aid Use	How often do you put something in a prominent place to remind you to do something, like putting your umbrella by the front door so that you will remember to take it with you?
MCQ	External Aid Use	When you want to remember an important appointment do you ask somebody else (e.g., spouse or friend) to remind you?
		Do you post notes on a board or other prominent place to help you remember things for the future (e.g., meetings or dates)?
	Internal Aid Use	When you want to remember a story do you read it more than once?
	Frequency of Aid Use/ Memory Self-Concept	Do you use such aids for memory as notebooks or putting things in certain places more or less often today compared to 5±10 years ago?

1.2.1 Critique of Existing Questionnaire Measures

An important issue with these measures is that they do not specify enough information to truly learn about the ways daily remembering and forgetting naturalistically occurs. Respondents do not have the opportunity to elaborate on specific instances about memory failures, compensation, strategy use or contextual information. These questionnaires do not ascertain the rich qualitative details necessary to be able to holistically understand the ways in which memory strategies are used across contexts or how the respondents feel about using them. Moreover, these questionnaires do not measure the effectiveness of the strategies used relative to the respondents' goals. Further, the interpretation of these questionnaires often implicitly assumes that when older adults endorse using a strategy, they are doing so from a compensatory standpoint, which may not be the case. These measures make claims about everyday remembering in ways that simply do not represent everyday remembering from the perspective of the respondent.

By categorically approaching everyday remembering without personalization or clarification of the meaning for each questionnaire item, there is a systematic loss of information. Researchers' aims for administering a questionnaire are based on what the researcher wants to accomplish and how the key interprets respondents' scores. How the participants conceptualize and subsequently answer a questionnaire may be different than researchers' wherein the true interpretation of scores, and thus the validity of the results are at risk. These limitations highlight the necessity of a qualitative approach to provide more detailed information about the processes involved in daily remembering as well as to understand implicit theories and beliefs older adults hold.

1.3 Qualitative Interviewing Techniques

To that end, I designed and collected qualitative everyday memory interviews with older adults. The interview protocol was structured but provided personalized, individually-tailored follow up probes and questions for each participant. This type of approach, rather than a rigorously structured interview technique is based on motivational interviewing techniques (e.g. Cummings, Cooper & Cassie, 2009). Motivational interviewing is used by experts in fields from public health to social work, as a method to compensate and correct for health-behavior changes by increasing the subject's motivation to change as well as their confidence in their ability to change. This is done by creating an open line of communication between the interviewer and subject, focusing on the subject forming goals and planning to achieve them. Further, this line of research supports the efficacy of individually tailored, rather than broadly targeted, interviewing techniques (Kliegel & Bürki, 2012). Importantly, the interview protocol used in the current study integrated individually-tailored interview techniques based on motivational interviewing and created an open rapport between the participant and interviewer. This allowed for follow up questions and prompts that enabled the participants to share detailed information about how they accomplish cognitively-demanding goals in their daily lives.

To successfully achieve behavioral changes, motivational interviewing traditionally takes a person-centered approach where the structure of the interview protocol enhances the subject's feelings of competence in their ability to adhere to changes, that the decision to change was done autonomously, and that there is personal relevance driving their behavior change (West et al., 2008). These tenants of motivational interviewing will be essential in maintaining long-term behavioral changes to help older adults improve their everyday memory through strategy use and were incorporated into our interview technique to evaluate whether this approach allowed

participants to speak openly and honestly with the interviewer about their everyday remembering procedures and cognitively demanding goals.

1.4 Preliminary Qualitative Interviews

To this end, I began to investigate everyday remembering first through a preliminary analysis on previously collected and transcribed qualitative memory interview data from a study done by Prakash, Mostafa, Mitchell, and Rogers (2014). This allowed us to understand how to structure interviews based on the kinds of qualitative questions we wanted to answer. Further, these data gave us a glimpse at the depth of responses older adults gave based on the interview prompts. The interview was rigidly structured and did not allow for any follow up questions or unscripted prompts. The interview also did not give older adults the opportunity to share recent instances of memory failures or details about the strategies they used.

These interviews were collected from twenty-six older adults and pertained to seven categories of memory issues as they relate to the home. The interview protocol addressed everyday memory in older adults by specifically prompting for memory issues related to the following categories: financial management, nutrition, personal care, health, leisure activities, social activities, working or volunteering, and completing household tasks.

1.4.1 Findings

The scope of the interview data was limited to memory within the home, and the interview protocol did not allow for the kind of qualitative and individually tailored approach performed in my interview study. However, I learned a great deal about how to structure interviews to ascertain the type of information needed. I also gained exposure to what older adults everyday remembering

looks based on a qualitative interview. The older adults interviewed admitted to making errors on a number of everyday prospective memory items and used several internal and external memory aids. For example, many of the older adults in Prakash et al. (2014) talked about strategies for taking medication. However, many of these strategies were limited in their effectiveness. For example, one of the participants who used a pill organizer would forget to bring it with when they left the house and consequently missed doses of medication when meals were eaten outside of the home. Similarly, many older adults complained about their inability to remember names which was often unaccompanied by a memory strategy. Occasionally, participants provided spontaneous memory self-assessments where they gave details about strategies they used and their perceptions about their own performance. However, these details were severely limited and did not receive further attention from the interviewer.

Additionally, there were instances where participants reasoned about why internal and external aids did or did not work for them. Given the constraints of the interview script, my advisor and I did not originally expect to find data pertinent to this topic and did not define a systematic way to evaluate these instances a priori. So, while the number of instances was limited within the sample of older adults, these contributions were meaningful in that they provided evidence that when these older adults were prompted about strategy use they readily provided (spontaneous) rationale about the efficacy of methods they explicitly conceptualized as memory strategies and why they were or were not helpful for remembering. One of the most intriguing findings from our analyses on the interviews data from the Prakash et al. (2014) study were the instances where the older adults asked questions within the context of the interviews. These queries revealed older adults' desire to learn more about their own memories and about memory in general. Ultimately,

these instances suggested that older adults want an effective everyday memory intervention and that these individuals are motivated to learn and employ strategies relevant to their daily lives.

Further, these questions reinforce the premise that using an individualized approach specific to each person interviewed would reveal much greater qualitative information about their behaviors and mental conceptualization of their memories, abilities, and concerns compared to a structured, targeted interview. The prompts used by Prakash et al. (2014) did not include any questions regarding the processes, efficiency, or efficacy of the memory strategies provided by the older adults. In this way, the data precluded contextual, time-based, and detailed information about strategy use or the process of implementing a strategy, which we felt was necessary to understand in our investigation of everyday remembering in older adults.

1.5 Everyday Memory Interviews

1.5.1 Interview Protocol

The interview protocol for this investigation was created with a person-centered, individually-tailored style interview dialog at a fundamental level (see Appendix A for interview protocol). The goal of the interview was to elicit qualitatively-rich details about the participants' everyday remembering and the strategies that they use to achieve their everyday goals. The interview script was semi-structured and used tenants of motivational interviewing as well as clinical psychology interviewing techniques in order to elicit information about everyday remembering by prompting older adults about their detailed use of memory strategies, memory failures, and memory concerns. The interview protocol was designed to have participants walk the interviewer through (1) their normal daily routines and then (2) their recent past to elicit instances of both memory successes and failures.

The interview was also designed to specifically tailor follow up questions and memory process prompts around each response to elicit relevant information related to each participants' daily life and the ways in which they use memory strategies. The follow up prompts were intentionally person-centered and often used a method wherein the interviewer would rephrase participants' initial responses to clarify answers or to get the participants to elaborate, particularly for mentioned instances of forgetting or for the process of using a memory aid. By cuing participants in this way, they verbally recalled and shared extremely detailed information about their routines, habits and descriptions of the processes involved in each in a similar fashion to the cognitive interview (e.g. Fisher, Geiselman, Raymond, & Jurkevich, 1987).

The interview was divided into two sections. In Section A, a specific set of questions regarding their regular morning and afternoon routines during both the week and weekend were asked to all participants interviewed. The participants were then cued to recall the past five days or so in great detail, revealing information about the structure of their everyday lives, routines, habits, strategies used, and memory errors as they had actually, and naturalistically occurred. In Section B, participants recreated a recent meeting with friends or family members and went through a day reconstruction exercise with the interviewer wherein they were prompted to walk the interviewer through the prior day. Participants were also asked specifically about things they felt that they are particularly good and bad at remembering, the kinds of memory "tricks" or strategies they use, as well as about different external and internal aids including calendars and lists. Finally, they were prompted about potential memory questions or concerns they may have held.

1.5.2 Preliminary Analyses

An initial coding scheme was developed with our research team which included my advisor, Dr. Hertzog, our collaborator, Dr. Pearman, and me, for the purpose of a conference publication. This protocol was less elaborate than the one proposed for the current study. This analysis examined specific instances where participants shared qualitatively interesting or novel information pertaining to: memory complaints or concerns where older adults did not nominate a strategy or aid to help, instances where inefficient strategies were cited that exemplified how their memory-supportive behaviors were conceptualized as part of a habit or routine and where improving these behaviors could have beneficial implications for older adults, and instances where memory-supportive habits or routines were vulnerable to forgetting.

One of the major findings from our initial analysis of the data identified disparities between how we conceptualized everyday memory-supportive behaviors and how the older adults thought of their daily habits and routines. Although nuanced, older adults did not seem to explicitly conceptualize behaviors that we would classify as memory supportive, or strategic behaviors, as such. Instead, more often than not, these behaviors seemed to be viewed merely as part of these older adults' habits and daily routines. It also seemed to be the case that for older adults, external memory aids were more often seen by the participants as memory aids compared to internal strategies, which seemed to fall under a different classification. External memory aids, like calendars or lists were more often explicitly nominated by older adults as memory aids, compared to mental repetition or imagery, which older adults tended to view as things they "just did". Finally, we looked at the types of memory attributions older adults made and found that older adults provided instances which tended to discount the importance of self-regulation or strategy use or blamed something out of their control. This preliminary analysis, based on a subset of interviews, aided our understanding of how to classify and code the data.

1.6 Statement of Research Questions

The aim of the interviews was to qualitatively understand everyday remembering in older adults. In this investigation, I performed an in-depth qualitative coding analysis of the data. I wanted to know how older adults accomplish cognitively demanding goals and everyday tasks. Further, I wanted to investigate what people are actually doing in naturalistic settings to offset memory failures. I wanted to understand the pitfalls and successes of everyday remembering in older adults through their use, or lack, of memory strategies or memory-supportive behaviors. In this way, the outcome of this investigation will inform what should be targeted for intervention to improve everyday remembering in older adults.

Specifically, the proposed analysis of the interview data seeks to inform the following questions: What strategies are currently being used in everyday environments? Are there differences in the way that external and internal aids are used and conceptualized by older adults? Do current strategies work — why or why not? Are there specific situations or contexts where memory failures are more common and as such, should be targeted for intervention? How are current strategies implemented? When and what must occur in order for a strategy to be both employed and successful? Additionally, how do older adults think about and conceptualize their everyday remembering? How does their mental model, beliefs, and views about memory reflect their behaviors that influence remembering? Taken all together, this investigation of everyday memory strategies underscores a unique and open area in the literature to try to better understand everyday remembering, forgetting and strategy use in older adults. I note that these research questions are relatively open-ended, reflecting the qualitative nature of the data and the methodological approach taken to understanding these complex questions.

CHAPTER 2. METHOD

2.1 Subjects

Thirty subjects were recruited using the Adult Cognition Lab's participant database and ranged in age from 62-83 (M= 69.5, SD= 5.72). All interviews were audio recorded using either Audacity or Adobe Audition recording software. Four interviews were excluded due to poor sound quality, resulting in 26 interview transcripts (11 men, 15 women). Interviews took place either in the Adult Cognition Lab at the Georgia Institute of Technology (N= 19) or in the subject's home (N=7) and were performed by the same interviewer. Older adults were compensated $40 for their participation in the two-hour memory interview. All participants had at least a high school diploma or GED and were pre-screened for medications with known side effects that impair cognitive functioning. Participants had no history of head trauma or surgery, resided in a non-assisted home dwelling, and completed a basic demographics form. Participants rated themselves as healthy compared to a state of perfect health and compared to their peers, with the majority of responses being "very good" and none below "fair". Participants were also highly educated with the majority holding a bachelor's degree or higher (N=21).

2.2 Qualitative Coding Scheme

All interviews were transcribed verbatim in Microsoft Word and read multiple times before the data was analyzed using qualitative coding methods. The coding scheme was developed and guided using modern, constructivist grounded theory methods (Strauss & Corbin, 1990; Henwood & Pidgeon, 2003; Charmaz, 2005; Charmaz, 2006) after studying the literature, being immersed in the interview data, and reviewing the interview protocol. A preliminary coding analysis was

performed on a subset of five interview transcripts to assess how well an initial version of the coding scheme fit the data. Common themes were identified, defined, and then broken down into categories and subcategories. Interview segments were extracted from the transcripts and classified based on these categories. Potential categories were either accepted or deleted for the final version of the coding scheme based on the research questions, the interview protocol, emergent findings, and how they fit the data. The coding scheme was discussed and revisited by the coding team many times throughout the duration of the coding process to evaluate fit as findings arose that did or not fall within the existing framework themes, definitions, or classifications.

Specifically, the categories identified for the final coding scheme were as follows: memory complaints or concerns, memory failures, memory strategy use, types of memory support, and memory views, beliefs, and attributions *(see Table 2 for coding scheme)*. The memory complaints or concerns category encompassed a range of responses from the types of memory concerns or complaints older adults expressed to the reasons why they originally had these concerns. Subcategories were determined based partly on questions from the interview about external aids, like lists, to common answers among the participants, as well as what we expected to see in the respondents' answers based on the literature. Memory strategy use was also addressed in the proposed coding scheme.

Table 2. Finalized Coding Scheme

Category	Sub-Category	Definition/Explanation
Identify Memory Complaints/Concerns	Lists/notes Names Meds Calendar events Other: Specify Explicit aging/memory	Individual types of memory complaints or concerns related to each of the subcategories Code spontaneous vs. prompted concerns about aging and memory
Memory Failures related to part of a routine or out of habit	Lists/Notes Names Meds Calendar events Other: Specify	Identify memory failures related to part of a habit or routine.
Prospective Memory Failures	Lists/Notes Names Meds Calendar events Forgetting to bring an item Other: Specify	Identify memory failures related to prospective memory
Retrospective Semantic Memory Failures	Lists/Notes Names Meds Calendar events Other: Specify	Identify memory failures related to retrospective semantic memory
Retrospective Episodic Memory Failures	Lists/Notes Names Meds Calendar events Other: Specify	Identify memory failures related to retrospective episodic memory
Instances of inefficient/mismatched strategies to goal explicitly nominated by participant as such	Lists/Notes Names Cite mnemonic? Issue? Meds People as reminders Other: Specify	Instances of inefficient or mismatched strategies to the participants' goal, explicitly nominated by participant as such. For names: was a mnemonic cited? Why didn't it work?
Instances of inefficient/mismatched strategies to goal as judged by the coder	Lists/Notes Names Cite mnemonic? Issue? Meds People as reminders Other: Specify	Instances of inefficient or mismatched strategies relative to the goal For names: did the participant cite a mnemonic strategy? Why didn't it work?
Coded Instances of Strategies as Memory Support	No conceptualization of aid or strategy Strategies are part of a habit or routine Strategies as explicit memory support Aging-related compensation	Strategies are explicitly conceptualized as means to remember – not mutually exclusive within-persons

Table 2 (Continued)

Views, Beliefs, and Attributions about Remembering and Forgetting	Justifications discount self-regulation	Ex-post facto explanations discount the importance of self-regulatory behaviors
	Strategies conceptualized as habit/routine	
	Due to aging	Strategy use is connected to successful remembering
	Strategy use for success remembering	
	Memory is viewed as an uncontrollable entity	

There were an overwhelming number of instances where older adults shared the ways in which they accomplished their daily goals and items to remember that were deemed by the coders as either ineffective or inefficient relative to the reason they were using a given strategy or aid. Then, a second category examining the same types of strategy use was created, focusing on when the participant recognized that the method they were using to accomplish something was inefficient or ineffective. Additionally, accounts of experienced memory failures were fairly common throughout the interviews. These were given in response to interview prompts and were also shared anecdotally or spontaneously. Memory failures were captured in the coding scheme by examining them as a part of three common subtypes: when a routine or habit was disrupted in some way, as a prospective memory mishap, or as a retrospective memory mishap. Types of memory support was addressed by coding for ways in which older adults classified strategies: as intentional memory support, as intentional memory support due to concerns about aging, as part of a habit or routine, or when they were not recognized as memory-supportive at all. Finally, categories that broadly encompassed the beliefs and causes of remembering, or attributions held by the participants about remembering and forgetting were also created.

2.2.1 Coding Process

The coding scheme served as the basis for providing definitions, descriptions, and a classification system for what we called "codable segments" of interview data. The process of extracting these segments involved examining each transcribed interview, identifying sections that were relevant to the coding scheme, and assigning these segments to one or multiple parts of the coding scheme. The coding scheme was open to amendments throughout the coding process and allowed for the possibility of analyzing emergent themes or classifications from the data that better addressed the research questions proposed.

The interviews were analyzed by two independent coders according to the finalized version of the coding scheme, although the coding scheme remained flexible if the data necessitated amendments. All coding of the data was performed in Microsoft Excel. The initial agreement was reached by completing a single case together and criteria was set to 90% for agreement before the independent coding process began. Agreement was considered when both coders identified the same segment of interview as "codable" and assigned them to the same category. Disagreements were counted as differences in overall category classification as well as differences in whether a segment was considered "codable" or not. Out of a total of 50 segments coded, there were only four disagreements recorded; two were category disagreements and two were coded segments that were not identified by both coders. The coders reached an agreement of 92% (46/50) after completing the first case together.

After initial agreement was met, each coder completed a separate coding document that began after the codes from the first case. Subsequent cases and codes were entered sequentially in numerical order by subject identification number. Each coder was responsible for completing a

predetermined number of cases before the next coding team meeting so that the coders were examining the same data at the same time. This ensured that questions, disagreements, and potential changes or emergent themes were discussed while each coder was at the same stage in the data coding. The coding team was comprised of the two coders –myself and an undergraduate research technician, as well as Drs. Christopher Hertzog and Ann Pearman. Disagreements and questions were recorded in meeting memos and then resolved by consensus through discussion between coders and with the coding team. The coders also met regularly to discuss the coding scheme, review memos, and to discuss any potential issues that arose. Once the coding was completed by both coders, a combined document was created and used to further analyze the data.

2.2.2 Memos

Memos served as a systematic and methodical approach to record information throughout the coding process and subsequent analyses. Each coder kept memos throughout the process for each subject, after reviewing the entirety of their participant memos, and after reviewing the sum of codes for each category. Subject-level memos recorded interesting thoughts, raw data, questions, disagreements, comparisons, and information about possible recurring themes and ideas, similar to the memos outlined by Charmaz (2006). These memos were extremely flexible and were amended often as they captured the raw aspects of the data, coding scheme, and anything relevant to the exploration of the topic as a result of an individual participant's responses. The subject-level memos were reviewed and discussed regularly with the coding team. Category-level memos recorded information from exploring the data from a different perspective providing opportunities for patterns, observations, interesting cases, departures from expectations, insights and parallels to the literature. It is important to note that whereas individual-level data was recorded

in terms of codes and memos, the analyses focused on the broader impacts across categories and not within the individual-level data.

Additionally, memos were kept during each of the coding team meetings. These memos served as a way to record higher-level ideas, recurrent themes, questions, interesting cases, outliers, and person-level data or trends that may not be picked up by the coding scheme or individual memos. Memos guided the coding team discussions on disagreements, themes, possible trends, comparisons, and bigger picture concepts tied into the literature. Advanced memos helped record and organize the discussions from the coding team meetings as well as analyses from further explorations of the data including comparisons of abstractions from individual-level responses, trends across categories, similarities and deviations in properties of the data, and parallels or deviations from the body of literature on everyday remembering and strategy use.

CHAPTER 3. RESULTS

3.1 Qualitative Approach

3.1.1 The Interview Protocol

Our qualitative interview protocol was a major departure from the way that everyday remembering has historically been investigated by understanding the ecological implications for older adults' daily lives. The interview successfully prompted participants to share detailed information about how they accomplished their daily goals, strategy use, behaviors, and activities. Moreover, the semi-structured interview protocol provided a level of consistency in the types of information found in all of the interviews, allowing for comparisons across and within categories and types of information, as well as a limited scope of individual-level comparisons. The semi-structured nature of the interview also allowed for an ample amount of data to be collected to address the research questions as well as to uncover unintended dimensions of everyday remembering.

The participants shared an incredible amount of information about their lives including very personal details and were not shy in sharing their memory failures or admitting personal faults relevant to the interview questions. During the debriefing portion of the interview, many of the participants shared that they felt comfortable sharing with the interviewer and were happy to participate in studies that advanced the aging and memory research.

3.1.2 The Coding Scheme

Overall, the coding scheme fit the data well, allowing for a thorough investigation of everyday memory in both anticipated and unexpected ways. The coding scheme that was originally proposed for this investigation underwent a few changes as the coding process progressed. These changes were necessitated by the data and the nature of the investigation and agreed upon by the coding team. For instance, the memory failures category was altered to include instances of retrospective semantic and retrospective episodic failures, whereas instances of misremembering during the interview was dropped. The memory attributions category definition changed to be more inclusive of statements about memory beliefs and views as well as attributions.

Additionally, optional notes for each coded segment were added as an option within the coding document to notate when segments were cross-coded in multiple categories, related to previous segments, or had multi-faceted implications and necessitated an explanation. These notes helped to inform discussions among the coding team and contributed to the memos. Extra sub-category tags were added throughout the process to identify instances of possible self-regulatory behaviors, spaced retrieval, mnemonics, and the use of physical or locational memory cues. Finally, frequency counts were removed from the coding protocol. The nature of the data was such that references were made throughout the interviews to the same strategy, behavior, view, concept, or memory failure. Depending on the instance, these segments were added in with previous codes or counted as a separate but related instance. As such, explicit counts for separate instances in each category and subcategory were not viable and the research team felt that it was not a representative classification of the data.

3.1.3 Coder Agreement

Throughout the coding process, most of the interview segments were classified similarly by both coders. As anticipated, disagreements were either a result of: one coder identifying coded segments that the other coder did not, differences in category sub-classification, or differences in cross-category coding. Agreement was reached through consensus among the coders and/or coding team. The final coding document reflected agreement across the totality of coded interview segments and was used to complete advanced memos and further analyses.

3.2 Qualitative Coding Results

3.2.1 Memory Complaints and Concerns

Older adults expressed a number of common complaints and/or concerns throughout the duration of the interview, both when prompted and spontaneously. Their complaints ranged from common complaints discussed in the literature to larger concerns about the state of their memories and age-related memory impairments such as dementia or Alzheimer's disease. Interestingly, many of the complaints or concerns expressed by older adults were related to retrospective and prospective remembering, primarily names, phone numbers, and retrieval intention blocks. These complaints and expressed concerns were often unaccompanied by the use of a strategy to help. It was also the case that normatively ineffective or inefficient strategies were discussed and subsequently followed by statements about how they did not work for that individual. See Table 3 below for examples from across the memory complaints and concerns category.

Table 3. Memory Complaints and Concerns Category Examples

Sub-Category	Coded Segment
Names	I'm bad at remembering names. So, when you go back to the name thing... There are tricks to doing that, and I never tried them, and I should have. And, like the guy I met out there, I think he's the department chair, we talked a little bit and he showed me where to go, and I said, "well, thank you very much." And he said, "okay, I hope you enjoy yourself today, [participant's name]." […] Damn. I didn't remember his name, and I felt bad about that, because using people's names routinely is... It gives the other person some self-importance. They are feeling better that you actually took the time to think about that, or that's what you're taught in business school anyway. I felt bad not knowing his name. (#226, 757-768)
	I'm not good at remembering names. I try to remember names. I try to associate people with either another person with that name or an animal that reminds me of them. (#215, 872-874)
Calendar Events	If I don't have it down, birthdays and anniversaries and stuff like that, forget about it. I don't have a clue… You know, unless I have a reminder, it's just, there's just too much of it, it's almost like, why try to clutter your brain with that? You know, my brother's birthday is today. Thank goodness it popped up on here, because I would have forgotten […] [Using the digital calendar is helpful to remember?] Especially for those kinds of things, which you know, they're not in any way critical events, but they're nice-to-remember events. (#204, 652-663)
	[Are there things that you are not as good at remembering?] Yeah, definitely the medical appointments. They're hard for me to remember […] Just because they're done so far in advanced. It's generally six months, some of them are three months […] it's just hard to remember. (#203, 541-545)
Explicit Aging Concern	Names I think is the most significant. I'll have my senior moments and the name will really, when I name a person's name, that's most common every once in a while, maybe a place name, or a, you know […] I remember picturing how the individual looked, but the name I couldn't. So that happens, my gosh that actually happens a lot, I wouldn't say a lot more, I'd say significantly more than when I was young. I used to have a good memory for names, and I would say it's decent, but [...] I'm hoping it's just, either perhaps age, that or it's 'cause you know a lot of people. But I suspect it has something to do with age... I'm seventy-three, you start thinkin' about dementia. […] Of course, that's pretty scary to us old people […] I mean, it seems to happen to me more as I've gotten a lot older […] it may even be that like, in the old days, when I was younger, I would remember […] And that's, that's really pretty awful. Embarrassing. […] So really it seems to me it just happens now at my age, whereas it didn't when I was younger. (#211, 866-890, 896-910)
Aging	I don't forget. Well, the birthday, but most of the time, I don't forget things that are important. I usually have taken care of it way ahead of time, even a month ahead of time if I am preparing for something that is important. I remember. I usually don't have a problem with that. It's just when I am going to go do something or go find something, if I don't keep telling myself what I'm after or what I'm going to do, I'll forget it […] Sometimes, when I'm at a certain place, I will find something ahead of time and it's something huge or that you think somebody would really like, so you buy it. I have even bought stuff and hid it and couldn't find the gift. So, it's kind of funny. Just being at the right place at the right time, and seeing something and saying, "you better buy that ahead of time and remember where you put it so when you need it, you will find it." [what do you do to try and help? You said you all will hide it and then do something to help you remember where you hid it… Do you do anything?] No. Did I say that? I'm saying I think I'm going to remember. I think when I was younger, I did remember. And you're in this pattern of doing stuff like when you were younger, and you think you're gonna remember it and now you don't. (#215, 764-790)

Table 3 (Continued)

	[Have you had any other instances where you've forgotten something particularly important to you?] Not that was important. I've not missed any dinner engagement, lunch engagement, any other social get-togethers of any kind, not that I can think of […] I have occasionally, about once every twelve to eighteen months I'll forget to pay a bill. It drives me nuts when I do that. [Why do you think that happens?] Getting' old. (#205, 341-351)
Other	So actually, I took them, from where I misplaced them, and I brought them in and set them on my dining room table so when I go back out to work on the deck, they will be right there […] So, I can put it there and say, "Here's where it is." And I do find that sometimes I subconsciously do things and that just drives me nuts! I just, I have no clue! It's easier to distract me, I guess, as I've gotten older. (#213, 927-943)
	I can't even remember my husband's phone number. That's bad, because if my phone doesn't work, how am I going to call him? Right now, if you were to ask me, I think it's **********… might be 841. You go to the doctor, you have to write down all of your phone numbers and I have to look them up on my phone because you don't need to remember them anymore… (#210, 686-692)

As expected, older adults complained about remembering names (e.g. Cohen & Faulkner, 1986). The majority did not cite using an effective strategy to help. If a strategy was cited, almost none shared by the participants were regarded as effective in helping them remember names. Older adults often cited strategies they had tried previously to no avail including the use of associations with animals, initials, and famous people or objects. Further, several older adults' memory complaints or concerns were connected to failures of incidental encoding or retrieval. The excerpt below is a powerful example of several of these themes we found throughout the interview data.

The only other thing that I have tried tricks for without any success is names. All of my life I have been bad about remembering people's names. You know, someone I have met, and I will see them again and be struggling to remember their name […] I don't know. I feel like I make a conscious effort to plant the name in my brain. And yet I have never been able to do that very well. [What kinds of tricks do you use for that?] Things with people's initials, just repeating the person's name repeatedly in my head while I still got it firmly in my mind, it just doesn't… I don't know. At some level, it's sitting in a different layer of my brain. It's not that people's names aren't important it's just something that I never got the right solution for. (#207, 345-353, 370-371)

The older adults in our sample also discussed issues with word finding, remembering numbers, and retrieving their intentions when they walked into a room. These complaints typically not accompanied by stated methods to mitigate or help with their expressed trepidations, although there were a few exceptions. The majority of older adults who expressed complaints about retrieval blocks and had a solution most often retraced their steps, repeated their intention until it was completed, or simply waited for the block to pass.

Older adults were explicitly prompted at the end of the interview if they had questions or concerns about memory. There were a number of individuals who had concerns about the possibility of experiencing serious memory declines or getting Alzheimer's disease. Their responses ranged from asking the interviewer how to improve global memory, to questions about specific memory functions. There were a few individuals who ended this portion of the interview by attempting to solicit advice from the interviewer about ways to prevent memory decline or dementia. There were even a few individuals who attempted to coax the interviewer into giving an evaluation of their memory function, as illustrated in the following segment:

Now I feel like my memory is pretty good. And of course, I'm always interested in different things or programs or studies that you may have or may know about to help your memory or... I don't know if there's a way to test and see are you borderline Alzheimer's or borderline dementia? As we know sometimes science will say one thing and it doesn't ever happen. I'm always curious about that and especially because in the last 5-10 years it seems like Alzheimer's has just exploded and it's affecting people at different ages, not just 60-80 […] and you don't know, is it the medication they may or may not be taking? And I'm sure sometimes it's the environment we're in. You know, so you're always curious about that because I think if your memory goes your way of life is completely changed. So naturally you want to keep it going as long as you can... I'm always curious, is there anything I should be doing different? Or is there anything that I should do that may help keep it going longer? [And do you think that there are things that you could do to help prevent that or keep your memory sharp for longer?] Well of course I would be open to hear any you know, suggestions or opportunities that may take me on that path. You know, like I said I don't know if there's a way that you would test to see, "Ok, well your memory is... you're pretty good at what you're doing. Your memory is good for now." Who's to say that 6 months from now it may be totally different. I don't know. [Now do you think that there's something that would be the most beneficial in preventing Alzheimer's or other dementia onset?] I don't know if your overall health contributes to it because I know there's some seniors that they say they don't have like energy to do things. And I know some has to do with you know like they lose their appetite as they get older so of course you don't eat as much so yeah, you're kind of weak just from not eating [...] Just I don't know. So I mean like I said, I think for the most part I do pretty good. I don't know if there's... if you'll say, "well ok, on a scale of 1-10 you might be a 4. Or you might be an 8." And is there anything that I should be doing different to possibly help keep my memory going or am I kind of doing things that are already pretty good? (#225, 1297-1330)

The range of "solutions" or ways in which older adults addressed these concerns or complaints varied greatly. Examples of the solutions participants talked about included diets, physical exercise, mental exercise using crossword puzzles, taking memory courses, reading, or using Lumosity. Several individuals mentioned engaging in a combination of solutions as a way to try and stay healthy and/or prevent declines. The following segment captures several of these themes:

I'm always reading on the internet and trying to discern whether or not these claims on different products and different supplements, and foods even. I want to know how to prevent Alzheimer's and dementia. My mother had dementia. I want to know how to prevent mental decline, cognitive decline. [Do you think that there are things that could help you?] Yes […] Foods, I think certain foods can help with the brain, antioxidants and other foods. Fish oils, so I definitely think that there are things. [Are you doing those things?] Well, yeah. I try to eat properly and varied. I think it's important to vary foods. Like, I'm eating things I never would've eaten years ago […] I'm roasting parsnips. I'm a southerner, so I never had parsnips before […] I love parsnips now […] I find myself eating root vegetables, which are real good for you. Like turnips and parsnips, other things too, asparagus, sprouts, things I would never have roasted before. I'm roasting now. [And is that in an effort to help with this lifestyle?] Nutrition, yes. I'm hoping these things are good for the brain as well as other parts of the body. I'm interested if your research has come up with anything for the brain. [What do you think would be the most beneficial to improve your memory concerns?] Well, I've always read and heard that working crossword puzzles—and I've never been a crossword puzzle person, I mean, I've tried but I have never succeeded. Playing games—I like to play games, but—Sudoku, is that the name of it? I've tried to play that, but I haven't really mastered that either. But, I bought the books and I keep thinking, "I'm going to master this one day." To be honest, I haven't. [But, you still do those kinds of things?] I try to play with them every once in a while. (#222, 813-846)

Finally, several older adults did not expressly state memory concerns or complaints when prompted at the end of the interview. However, there was not a single individual who did not experience or describe at least one of the following: a recent memory failure, a memory complaint or concern, or identify something that they were bad at remembering.

3.2.3 Experienced Memory Failures

Several of the participants' responses about incidents of forgetting shifted as they were prompted to reconstruct their recent past. Many began the interview by conveying that they did not forget much after being broadly asked about possible recent memory failures toward the beginning of the interview. However, as their interviews progressed they provided a wide range of examples of forgetting incidents after being prompted about their recent past and regular activities, recent or important memory failures, and instances of forgetting. We specifically coded for

instances of when routines or habits failed to avoid memory errors, as well as instances of retrospective and prospective memory errors. There were a substantially higher number of prospective and routine or habit-based memory failures than retrospective memory failures, although there were coded instances of each. The most common retrospective memory failures were those related to remembering names or word finding and, as such, the results focus on prospective memory errors and failures related to part of a routine or habit. See Table 4 for examples of each type of coded memory failures.

Table 4. Memory Failure Category Examples

Sub-Category	Coded Segment
Routines or Habits	[How do you remember to take your morning medications?] Well, all it is is…routine. If I, if I have a change in the routine, I will sometimes forget. [Where do you keep those?] In a particular place in the [kitchen] cabinet. […] [Do you do anything to let you know you have already taken them for the day?] No, I have it all in memory. (#213, 52-63)
	I may go to the grocery store and forget that there was a certain thing I wanted because I haven't written it down. I will make a list if I'm going to the grocery store. My wife doesn't do any of the shopping. If I don't have it written down, I am likely to not remember it because it's out of my normal. (#223, 312-314)
Prospective Memory	I may go to the grocery store and forget that there was a certain thing I wanted because I haven't written it down. I will make a list if I'm going to the grocery store. My wife doesn't do any of the shopping. If I don't have it written down, I am likely to not remember it because it's out of my normal. (#223, 312-314)
	I did forget, now that I look back and see that I could have done something about it, today is my husband's birthday. We celebrated it on Saturday night at the camp out, but I didn't prepare. Today's his actual birthday, and I didn't prepare anything for his birthday. Which I didn't even think about, until his sister called this morning to say happy birthday to him. And that bothers me. I didn't even leave myself a reminder for myself to tell him happy birthday or get a card or plan something. I guess I kinda crossed it off my list when we did the Saturday night party […] But I wanted to have something on his birthday to let him know I remembered it. But of course, I forgot it […] Well, or get something prepared. Today's his birthday, so you know, find the card that I had gotten him and written a thoughtful message. Or thought about doing something special for supper, those kind of things. But at least I remember to say happy birthday when he wakes up, which I didn't, or lay out something special for breakfast this morning. (#230, 452-470)
Retrospective Semantic	I think I should know my husband's phone number. I do think I need to know. I think I should know my three brothers' phone numbers just in case of an emergency. But I don't, every time I was at the hospital, I had to get my phone out and call them if there was a need to call… So, I'm not very good at remembering those kinds of things. (#210, 717-723)
	I know them [words]… Sometimes I don't remember them… Still not the word, I subconsciously use a lot of synonyms until I can actually get the right word. Hopefully before I leave I'll remember the exact word I'm trying to remember. (#217, 142-145)
Retrospective Episodic	[Was there anything that you forgot to do yesterday?] If I did I don't remember! […] Because if I forgot it I don't remember that I forgot it… That sounds so stupid but it's true! (#224, 390-395)
	Well, when you say forget, I'm talking about I put something somewhere, where did I put it? There it is, okay. [Has that happened at all in the last five days?] It happens regularly, yes, but it's not a persistent thing […] Where, where the heck I put it, you know? [What do you do to find it?] Stop and think, "Where can I find it?" [And that works for you?] Yeah. [Is there a certain place or context that that happens?] No. It just a normal event, it's turned out to be a normal event. [Why do you think that you sometimes will forget where you set things?] Because it was not important when I put 'em down. (#205, 215-238)

Prospective memory failures were the most common type of memory failure among the participants. These included instances of forgetting the following: bringing an item with them when they left the house, events, dates or appointments, names, calendar entries or reminders, taking or refilling medications, incomplete or forgotten lists, returning phone calls, and remembering where they hid or placed things. There were also a fair number of instances related to failures in routines or habits. Participants expressed a number of ways for accomplishing their daily tasks and goals as habitual or routinized such as taking their medication and remembering regularly scheduled events. There was also a significant intersection between prospective memory failures and those related to routines or habits. These mishaps often occurred when a routine or habit deviated from their normal behavioral patterns or when something supplementary was required of them. Typically, these circumstances required an additional prospective remembering step. We found that participants did not plan ways to explicitly remind themselves, monitor what they needed to remember, or check to ensure that everything required of them was completed when finishing part, or all, of their routines or habits. Additionally, when habitual or routinized behaviors were altered in some way, individuals did not have ways of dealing with these unanticipated changes, ultimately resulting in memory failures. The following example highlights several of these findings:

> [Have you ever forgotten to take any of your medications that you normally take?] Yes […] that would be when the routine gets twisted someway… I will, depending on how I feel in the morning, I might either take a shower before I go to one of these little book studies it's pretty casual and sometimes if I played golf or worked in the yard the evening before and I don't really want to take a quick shower I'll just go to meeting. I'll comb my hair but it's just a bunch of guys. If I get out of that routine and I think, "Oh! I didn't take a shower yet!" or whatever, I might or might not think, "Did I take that pill?" or not. And I don't like to double up on some of those things. So yeah, it's rare. A couple of times a year. It's not like I forget on a regular basis, but it can get twisted up. I'm a routine kind of guy and if it gets twisted up then I might think, "Did I or did I not?" (#227, 167-180)

Additionally, several participants discussed forgetting the birthday of their spouse, a close family member, or a good friend. All of these instances were examples from their recent past and ranged from occurring in the previous year to mere days before the interview took place. These coded segments relate to several of the other categories, as the older adults often described these instances in great detail mentioning possible explanations or excuses as to why or how they forgot, sometimes justifying their memory failure. These instances were described as being highly impactful; however, in no cases did the participants subsequently described possible changes in their approach to remembering these types of events for the future. In the following segment, one participant described forgetting her husband's birthday.

> I had work on Sunday. I finished at 6:30, and we go to work on Sunday night and we have mass in the morning. So you know it was a 7:30 mass and I was working to get all my stuff put away. I had forgot to buy him a card. I forgot to buy him, usually I buy him a big cupcake. You know, cause we're watching our diet, and I forgot to do that […] So, I said to my husband, "I think I lost your birthday card I bought ahead of time, but I hid it. But I can't find it." […] I had work on Monday too. "So let's say we'll celebrate your birthday for dinner tonight." So I didn't buy a card and hide it. He says, "Maybe you'll find my card by Christmas." And I said, "Maybe Christmas or maybe I'll find it by your next birthday." He probably knows I screwed up. [In prior years, when would you go out and get the birthday card and the cupcake?] Well, the cupcake, usually I buy the day before or the day of because it was the day that I was working, it made it kind of hard to do that. Usually for his birthday, I'd buy his card months ahead of time and then I do hide it! And I just have to try and find it. But this time, I really didn't buy it. [later] I forgot to buy my husband his birthday card and his cookie. That was really important. I felt real bad about it. (#215, 77-100, 643-644)

There were also instances where participants mentioned that they had forgotten important events in the past and subsequently implemented a separate mechanism as a means to remember. Interestingly, those strategies or mechanisms were almost always kept separately (e.g. in an

address book or file folder) from the participant's regular calendar or calendar system. Moreover, none of the participants expressed general complaints or concerns related to remembering important events like birthdays or anniversaries, in the same way that they did for remembering names.

Next, several participants described memory failures related to medications that did not match reports of their typical means of medication adherence. These failures included instances of older adults forgetting to take their medications, forgetting to refill their pill organizers, forgetting to renew their prescriptions from the pharmacy, and forgetting to bring their medications with them when they left the house. Moreover, there were no expressed complaints or concerns related to taking medication as prescribed, creating an interesting paradox between their lack of complaints or concerns and their behavioral outcomes. The segment below exemplifies one participant's experience with a memory failure related to refilling their medication and weekly grocery shopping routine. This individual relies on others to take her grocery shopping, which is a routinely scheduled event.

I had never had anything like this happen to me, and it happened last week… Two weeks before […] I did not go grocery shopping. There was no one to go with me. So, it had been two weeks […] I realized that I was running low on certain medications. So, I called in the prescriptions. I did two of them over the automatic system because they were unfiled. I had given them a prescription that I had not used yet, so I also had to speak with a pharmacist […] So, I didn't go in the interim week, and when I went the next week […] they said, "You have three prescriptions." And I said, "No, two." And she said, "Oh, we have you down for a refill for this and a refill for that, and then this new prescription." I said, "Well, the new prescription is correct, but the other two are completely incorrect. It's this one that needed a refill." She said, "Oh, I'm sorry." I said, "How did that happen?" She said, "Sometimes we do this automatic refill." I said, "I already told you I didn't want that." […] Then, I got home, looked at my medications and realized she was right. I needed to refill those other prescriptions. I must've called those in. And, the one that I thought needed refilling didn't at all […] I was mortified. I called back and

apologized, and said, “Can you hold on to those. I'll need to come get them.” It was kind of scary […] That's the most extreme forgetfulness thing that I can think of that has happened to me in ages, and maybe ever. (#203, 200-225)

Additionally, forgetting grocery items was another major source of everyday memory failures among the participants. People often reported making grocery lists and described how they did so. Yet they also described instances of forgetting to put things on a grocery list, forgetting to bring the list, not using a list, or forgetting items that were not routinely purchased. These were instances where the strategies or methods the participants used failed during one or multiple stages of preparation, implementation, monitoring, or checking that they purchased all of their intended items. These instances demonstrated the negative impact that older adults’ current memory-supportive behaviors had on their everyday remembering endeavors. Additionally, these memory failures highlighted the disparities among the way that the older adults viewed their memory abilities in terms of their expressed concerns or memory in general, the behaviors they used to support remembering, and their experienced memory failures. An example is shown in Table 4 and additional examples are presented in the sections that follow.

3.2.4 Strategy Use

Whereas the primary focus of the investigation was in identifying the pitfalls in older adults’ behaviors and strategy use, there were also several instances when they cited effective strategies or memory-supportive behaviors. Specific memory strategy process questions and follow up prompts in the interview allowed for the collection of very detailed reports about how strategies or memory-supportive behaviors were used and how truly efficacious or efficient they were enacted in the older adults’ daily lives. According to their accounts, the spectrum of

behaviors, methods and strategies the older adults used allowed them to successfully complete the vast majority of their cognitively-demanding daily activities and goals. This was generally expected from a sample of healthy, highly-educated older adults. Importantly, though, the coding focused on the process of how older adults accomplished their day to day activities. The analyses highlighted the nuances in how many of their behaviors, methods and strategies that largely supported successful remembering still left these individuals vulnerable to forgetting. This important theme was present throughout the data and was strongly represented across all of the coding categories.

First, instances where the participants identified that their behaviors or strategies were ineffective or inefficient allowed for direct insight into the ways that the participants viewed their own behaviors (e.g. as potentially problematic). It also allowed for inferences based on how common it was for older adults to recognize that the methods they used to remember or accomplish something in their everyday lives was not ideal or well-planned relative to their goals. Additionally, this coding enabled a critical assessment of the participants' use of strategies in terms of effectiveness and efficiency. The number of instances identified by the coders as being ineffective or inefficient far surpassed that of the participants. However, the participants were given several opportunities to discuss the effectiveness or efficiency of their strategies or behaviors, often as individualized follow-up prompts in connection with their recent past and the methods they used to accomplish specific everyday remembering tasks or items. The older adults did not identify their own behaviors as being potentially ineffective or inefficient to the same degree that the coders and coding team did. This was one of many insights into how older adults' assessments of the behaviors, methods, and strategies they used to support their everyday endeavors were disconnected from and impacted their ability to remember successfully. This view,

wherein older adults often did not critically identify flaws in effectiveness or efficiency in their memory-supportive behaviors, perpetuates the notion that the ways they accomplish their daily remembering does not need to be altered. Examples of the coded segments from this category can be found in Table 5.

Table 5. Strategy Use Category Examples

Sub-Category	Coded Segment
Judged as inefficient or ineffective by the participant	If I want to remember, even if it has nothing to do with something that has got to be done. If I just want to remember somebody's name, I'll write it down [on the calendar]. If I want to remember a scripture verse, I'll write that down […] It could go anywhere on a blank spot. I have a habit. It makes no sense, no rhyme, or reason where something might be at the top. But, at the top, if the top has no room, then I will put it on a blank day. If there was nothing on that day, I'll just pencil in that scripture verse, for example. It really doesn't match the calendar, it's just a place to put it where I know it won't get lost […] Like a scripture verse, or a name, or something I hear on TV. (#222, 753-777)
	The only thing I can say I've forgotten is to stay in touch with people […] I think about them and then I don't have it recorded or I don't have it right in front of me, and I get involved in things, and so that's one thing (#212, 720-723)
	I just forgot to pick up a few things. I mean, maybe I forgot the battery lights, or I just wasn't thinking about that at Walmart […] Well, typically at Walmart it's the same things over and over [...] No, I don't think that there's anything I forgot. It's a bunch of stuff, and it's totally easy to forget, I don't really like to write things down. I won't physically make a list, I'll have an idea in my mind… so basically, I guess you recommend that I have it on a list when I go to the store. I should have wrote it down. (#220, 713-720, 1074-1079)
Judged as inefficient or ineffective by the coder	[How do you normally remember your other plans?] By talking about it, you know I talk about it anyway and then I put it on my calendar […] Usually my phone, and I use a printed calendar, paper. [Do you write things on both your paper calendar and your phone calendar?] No […] I try to duplicate them, my appointment and everything, but the phone is just so convenient to, so I just put everything there. (#206, 386-394)
	[How did you remember these words?] This one I used a memory device […] Let's see... BC... Bowl – the Collegiate Bowl Series is called B.C.S so it was – School, book... What was the C... I don't remember now… (#202, 536-543)
	The players were interesting to watch, I have trouble remembering who the heck is playing, who are all these new people? I don't know who they are, I don't recognize them yet […] Yeah. I'm trying to learn who they are. [How are you trying to learn who they are?] Their face, you know, click in… Yeah, yeah. I try to click, something that you'd remember about somebody, the first thing you remember is the shape of their face…accom, accommodation, yeah. (#205, 441-445)

Interestingly, one of the most common behaviors identified by the coders as being ineffective or inefficient was reliance on incidental encoding and retrieval. None of the participants classified this behavior as potentially problematic. Additionally, very few internal strategies were

identified by the participants as being problematic. Examples of the internal strategies shared throughout the interviews included reconstruction to find a lost item or retrieve an intention, bizarre associations, imagery, mass repetition to remember names, creating acronyms, going through the alphabet, etc. Many of these strategies were helpful in achieving successful remembering, but more so for retrieving intentions than for things like remembering names. However, there were several instances where the coders identified internal strategies that were ineffective or inefficient, including several of the internal strategies mentioned by the participants. Interestingly, there were also number of instances where the participant identified part of the behavior they were doing as being problematic and the coders identified a different aspect of the planning, implementation, or execution of the behavior as ineffective or inefficient. The example below illustrates several of these findings.

I don't forget much. The thing that I can't remember is people's names. I've never been able to remember people's names. [Why do you feel that way?] I don't know. And I've tried. I've gone to classes to teach you, "Oh, her name is Olive. She looks like an olive, she's tall and skinny." You know, "Think of olive oil." This connection thing or, "His name is Michael, Michael, the angel ... Michael the angel, remember, this guy is so nice you. His name is Michael." It doesn't matter. I have to probably work with you or have some reason to need to know your name. Go to a party, and they will be an entire room of people I've worked with over the last couple years, or my last job and now I don't have anything to do with them. I can't remember their name. And my husband hates that because we'd go to company parties and stuff and he'd go, "I know, don't ask anybody, to introduce me because you don't remember their names." So, we had a thing. He knew. I would just say, "It's great to see you! This is my husband." Usually Michael would say, "Hi. I'm Michael." So, you kind of get around it, but I have no idea why I cannot remember names. I remember faces, and people are surprised. They'd say, "How did you remember me?" I'd say, "I remember we were at that show and did this or did that" but I can't remember their names […] I don't forget the people usually. (#210, 538-556)

External strategies were much more commonly used. Subsequently, the use of external aids was also the subject of many instances of inefficiency or ineffectiveness. Many of the strategies and behaviors older adults enacted were not necessarily inherently poor methods. Rather their procedures were inefficient or ineffective in some way relative to the planning or implementation of a strategy, or the outcome of using it relative to the goal. External strategies specific to this category included examples of pill organizers, physical reminders, location cues, lists, notes, electronic reminders, calendar use, using people as reminders, and more. These strategies were also often intertwined with older adults' routines or habits, as showcased in the following example.

[You mentioned a couple of other medications. Were there specific times throughout the day when you are supposed to take those?] Yeah, there are some that are supposed to be taken in the mornings. I don't reliably eat three meals a day. I eat two meals a day, reliably […] So, I split them up into two times a day, and there are few that have to be in the morning. And, the ones that I take in the evening could be at any time during the day, just so that they're separated from the morning by at least four hours. [How do you remember to take each of those each day?] When I have a meal. [Where do you keep your pill organizer?] On my breakfast table, which is where I eat most of the time. If I'm having people over, I have to remember to set them on the dining room table because otherwise, I might forget until I've drunk all the wine in the glass and there is nothing to wash them down with. The worst time is to remember them to take with me when I go out to eat. [Is that a common occurrence?] Probably a couple times a month. [Do you have any strategies to remember to bring it with you?] I try not to take my big purse with me when I go out. It's just one more thing; having to keep up with my cane and carry everything. So, I take a little small purse and when I switch things over to that purse, I try to stick in the pills for that… I just try to remember when I'm getting ready to go, "oh you better take your pills" but like I said, I'm not real good at it. And, even when I'll have them in my purse sometimes, I'll forget when I'm in the restaurant because I'll be real engaged in the conversation. [Do you remember the last time that happened?] Last Tuesday when I got taken out to eat […] I got home and saw it sitting, waiting to be put in my purse. I hadn't gotten it in my purse, then I thought, "oh my gosh" so then I took it. (#203, 254-291)

When older adults' mental and behavioral approaches to everyday remembering lack intentionality or planning, they leave themselves vulnerable to memory failures. This was just one of many examples where older adults are at risk for forgetting. In this instance it was medication, but potential memory failures ranged from remembering medical appointments, social events, work or volunteer obligations, picking up items from the store, remembering the location of items, household chores, completing lists, personal care, remembering names, and the birthday of a loved one. Importantly, we gained a greater understanding of the ways that older adults assessed and approached their everyday remembering from seemingly trivial memory tokens to critical healthcare or events.

3.2.5 Strategies as Memory Support

Older adults' memory-supportive behaviors were classified according to type. These included when the methods they used were not conceptualized as being memory supportive or when no strategy was given, when strategies were seen as a means to an end that were always done as part of a habit or routine, and when they were explicitly conceptualized as a means to remember. The coding also included strategies that were conceptualized as explicit compensation for aging-related declines in memory. The coding allowed for further insight into the way that older adults classified the methods they used to support their memory.

Older adults tended to be very strongly opinionated in their views. They often described their way of doing something as being just how they did something, or as what they had always done rather than as something that supported memory. Several of these instances were coded across multiple categories and subcategories because the ways that people accomplished their daily tasks and goals were dynamic, typically falling into one or more classifications. Examples of

successful remembering as well as instances when memory failures occurred, involved multiple moving parts including partial-routines or habits (that may or may not have been viewed as memory supportive), to the use of explicit aids or strategies like calendars or lists, as well as reliance on spontaneous retrieval. Examples from each of the subcategories are displayed in Table 6.

Table 6. Strategies and Behaviors as Memory Support Category Examples

Sub-Category	Coded Segment
Routines and Habits	I put them [medications] in a place where I'm gonna run into them [...] the ones for the night, they're on my bed stand, and I keep a bottle of water there and, the ones in the morning are right where my toiletries are, where I shave and brush my teeth and all that so it's, you know, hard to forget really. (#204, 109-112)
	[You said that you do a devotional each morning?] Yes. [How do you remember to do that?] It's just ingrained. I don't have to remember that. (#207, 23-26)
	[What about when you go to proctor? Are there things that you need to take with you?] Participant: No… Just me! [...] Just my purse, and my purse has the same thing in it, I don't change purses, so I don't have to worry about forgetting anything, same things are in there all the time. (#209, 196-203)
Explicitly Conceptualized as Being Memory-Supportive	[Do you have any kind of memory tricks or routines or cheats that you use to help you remember things?] Well, I do repeat a person's name. When I meet someone new, I try to repeat it out loud as well as silently to myself over and over and over again to help me recall it, and that seems to help […] And the hours after that. I'll try to relive that moment of meeting them just silently to myself, try to remember their name again. It seems to work. That seems to help. (#222, 656-662)
	[Are there any other times that stand out to you where you've forgotten anything at all?] Not really… Yeah, not really. You know, I usually... I'm playing things over in my mind sometimes. And then between that and looking at my calendar I'm pretty... I'm pretty on top of you know, my daily routine so. (#225, 983-988)
	I think it was Thursday of last week because I had to go to court […] Usually if it's some place important for me to be, I would set it [the alarm]. If that determines whether I follow the law, I don't know, I just remember that I have to be in court the next day, I refer to that memory, but I also write it in a calendar like this, and I'll write the [...] it is a pocket calendar. And then on the back, I'll have notes about the things I need to do that day. (#211, 48-56)

Table 6 (Continued)

No Conceptualization of Aid or Strategy as memory support	[So you have items you kind of generally pick up?] Yeah, yeah. [Do those items make it on the list?] No. That's all stream of consciousness. (#217, 907-910)
	[Okay, now, do you have any other memory tricks?] I never thought of these as memory tricks until we were talking. (#226, 564-565)
	[Did you use anything to remind you that you needed to log in on Tuesday?] No. Usually, stuff like appointments, I remember really good. [So, you didn't make a note or anything?] No, not for that… But I should probably say I remember my appointments because I have that stuff on the mirror. But it was something I knew that had to be done, so it was embedded in my head to get out and do it. (#215, 387-404)
Strategy Use was Conceptualized as Explicit Compensation for Aging	[Do you set other reminders that pop up on the phone?] Yes […] Like birthdays… Well no, I usually get an email for a birthday […] I know that's the beauty of it. This is helping me become less senile. "Roof inspection today." [When is that set for?] 5:30. [And when is your reminder?] Probably an hour. Let's see... I didn't set a reminder. Because I knew I needed my roof fixed. And I also knew I'd be coming here so... (#202, 451-471)
	I used to be able to remember people's phone numbers, and I have trouble learning new phone numbers. My boss changed her cell phone, and it's been a couple of years, and I still cannot remember it. I have to look. I keep it in a notebook that I use for work, and scheduling. And, I have to look. (#203, 546-549)

There were many more instances of external strategies or behaviors that were explicitly memory-supportive, namely the use of calendars, notes or lists, and people as reminders. Participants also cited the use of internal strategies for memory support. Interestingly, the number of internal strategies that individuals conceptualized as being memory-supportive was relatively high compared to the total number of instances. That is to say that if older adults used internal strategies, for the most part, they were aware that the behavior was explicitly supporting memory. This was not true to the same extent with external strategies, as individuals used external aids or enacted behaviors but did not explicitly conceptualize these things as being memory-supportive. These things were often conceptualized as being part of their habits,

routines, or was just what they did. Internal strategies that were explicitly conceptualized as supporting memory included examples of imagery, associations, repetition, cueing systems using acronyms or the alphabet, as well as a select few examples of reconstruction.

> There's a schedule out there and so l pick which days I want to go to work… those are usually later, and so I don't have to adjust my schedule at work […] However, I have a calendar. So periodically I look at that calendar to see if there's anything that I have that's not part of my norm […] next week, I have some things that's not part of my normal schedule, but they're written down. And periodically if somebody asks me like I was scheduling this, it's like, "Okay, let me look at my calendar and let me see, what do I have?" and then that way, I can pick my dates. So I'm a, I'm a careful person, that's, that's where my memory, I won't even say my memory, that's, that's just what I do. I write things down because the things that I may have to remember is not normal. Like, I know I need to get some stamps, but I'm gonna write that down because that's not part of my normal routine. I'm not gonna remember I need to get some stamps until I pull out the little pack and you only have two stamps and you have about five things to mail. So I have a little notepad, and I carry that, well I don't carry it with me. I have a briefcase, so, it's right there on the seat while I'm driving, if I happen to remember stuff, "Oh gosh, I was supposed to do all this" […] my schedule may say, "Oh gosh, I need to call Georgia Tech to see if I could reschedule my appointment." That's not something I think about every day, so I would write down, "Georgia Tech appointment." But that's on that little piece of paper. And then periodically I will pull that paper and check off to see what I've done and what I haven't done. There are some things that's been on that list for months that I just have not done… But they weren't necessities, they were just things that I needed to do […] Things to keep in mind. It may be like, "Okay, you wanna schedule a doctor's appointment" […] so it's just on there, but it's not earth-shattering if it doesn't get done, which is why it sits on there. (#209, 232-257)

As previously noted, there were several instances where the participants did not conceptualize their behaviors as being memory supportive. These were fairly commonplace throughout the interviews and provided important insight into understanding how older adults' conceptualizations and behaviors interacted with their ability to successfully remember. These instances included unawareness of memory-supportive behaviors, wherein the participants did not recognize that what they were doing supported remembering, as well as when participants relied on incidental encoding and retrieval. Indeed, older adults often equated incidental

encoding and retrieval ability with their memory ability in general. Older adults talked about things to be remembered as being in their mind or that they relied on their brain to do that. These were actually instances of reliance on spontaneous or incidental retrieval – which was discussed as being how they remembered many pieces of information. Moreover, there were also instances when older adults did not use or conceptualize using a strategy to remember information, which can be observed in the example below.

> I'm not good at remembering things about people. First of all, I'm not good at remembering names of people […] This is Karen. What do I know about Karen? And all of a sudden, it's just blank. I don't know what I know about Karen. She lives in the neighborhood, we've known each other for ten years, and I'm stuck here! [Why do you feel that way?] Well, because I think that that's the most important thing in life, interaction with other people. Maybe not the most important thing. It's a very important thing, so I feel disappointed in my inability or my unwillingness to remember those kinds of things. It's more inability than it is unwillingness. [And, do you think that there's a reason that you feel like you are not as good at remembering names and details about people?] Yeah, I think that's genetic in me. I think I've always been that way. I have trivialized those things, like dismissing them." (#201, 522-540)

These themes permeated all of the categories and played an integral role in shaping the way that older adults thought about and managed their memory. Importantly, these instances elucidated that when older adults relied on incidental retrieval to remember things they also subsequently conflated their ability to incidentally encode and retrieve information with their self-concept of their memory ability. When their strategy was to rely on what they believed to be their inherent memory ability, they implicitly lacked mindful and intentional approaches to manage their everyday memory. Further, this view likely interacts with their motivation for

changing current behaviors. As long as their self-perception of their memory ability, what we call incidental encoding and retrieval ability, was positive there would be no motivation to change their behaviors.

> I had been meaning to send Judy an e-mail all day asking her about Alice because Alice has not responded to those two phone calls, and I keep forgetting to write Judy the e-mail and say, "What's up with Alice? She has not called me back." So, I need to send Judy an e-mail, and I keep forgetting to do that, but I will… It's on my mind. I haven't done it yet, but I will. It was on my mind yesterday. Yesterday came and went. Now today, I was gone and still haven't done it, but hopefully, I will do it. [When did you remember that you forgot to e-mail her?] Well, it just popped into my mind just now. Well, it popped into my mind again. It popped into my mind this morning. I got sidetracked somehow. I have a tenant that lives in my basement. He got some mail, and I had to send him an e-mail that I'll leave his mail at the top of the steps. I remember thinking, "I need to write Judy this e-mail" but I got sidetracked doing that, going to the mailbox and getting the mail […] Basically, I sent him the e-mail and forgot about her again. (#222, 625-643)

Often, when memory-supportive behaviors were reported throughout the interview, they were not stated as strategic behaviors, but rather as part of an embedded routine or habit to accomplish some end. Moreover, routines and habits were often the ways that older adults had been doing things for a number of years and were not typically discussed as being altered to accommodate changing circumstances in the individual's life, although there were a few examples that did. Often, the routines people relied on to support everyday remembering were not fully-formed and habits were often haphazard. The older adults shared numerous examples when their typical routines or habits for accomplishing their everyday tasks failed and things were forgotten as a consequence as can be observed in the example below.

Normally, I go on a Saturday late afternoon to get the paper and I go get what we need for the week. [How do you remember?] I do make a list of the things that I need […] It's a written list […] I keep it in the kitchen because I think about, "the mayonnaise ran out, so I need a new mayonnaise or ketchup or mustard." Usually, I don't make a list of all of the things I need. I make a list of the things that I don't normally buy. Like, wax paper, or mayonnaise or food storage bags. Those are not something I buy every week. I don't need a list to tell me to buy celery or milk, or eggs, or bread. I only make a list of stuff that I would otherwise forget. [And do you organize the list in any certain way?] No. I mean, I kind of do. That's really not true. If I put eggs and bread and I put I got to remember, as I go through the store, I have to pick up the Danish or whatever my husband said he wanted, or hotdogs. Hotdogs aren't something that I normally buy. That means I have to buy hot dog buns as I'm going down the bread aisle. And I would put it at the top of the list. So, when I'm picking up bread or whatever I made a note of based on how that store is laid out. So, eggs are dairy and they're at the end. And if he wanted some baked cookies, I make those with the eggs so because they are on that aisle. So, I do organize it but not totally. And, I do go through my coupons. I used to collect Kroger double coupons. Not so much anymore. So, I'm not a big—if I have coupons for something that I have saved, I look at the dates, I throw away the ones that are old, and take the ones that I might purchase something with. There is some order to it, I guess […] I clip them on Sunday mornings when I get the paper. And as I get a little further in Thursday night's paper […] When it's thrown in my lawn or something and it's got those little coupons on things in it, flyers, I kind of go through that and if there is something in there, and I shop at Kroger. So, if Publix has an ad, I will look at it, and if there's buy one, get one free, I make a list of all the things and go to Publix, specifically to go to Publix for. That's a separate list that says Publix at the top, and it's always buy one, get one. That's all of the items that I know I'm going to go buy and get at Publix. [You just keep a running list of that?] Only when I get that flyer on Thursday. I look at it then. It's only good until Wednesday and I know I got to do it between then and Wednesday […] I just keep them buy my wallet so when I'm headed out of the door, they are right there. [Do you find that you are pretty effective at getting the things that you need when you go to the grocery store?] Yes. I get really mad though if I get home and go 'oh. I didn't go get his olives!' (#210, 486-524)

Additionally, it was unclear that the normal routines or habits described by older adults were performed and formed explicitly with a memory goal in mind. It seemed to be the case that many routines or habits were long-standing ways to get something done and were unchanged from their earlier beginnings when the goal for enacting that behavior or ordered set of behaviors had an explicit and effective purpose. What older adults did make abundantly clear though, was that they enjoyed not having to think about how to do something. When something was ingrained or

automatic, it was easy, and became something they did not have to explicitly remember. This is observed in the segment below. Furthermore, the routines people did were more aptly portrayed as partially-structured routines or habits without a clear purpose or a sequence of steps. The older adults also did not discuss monitoring or checking whatever was required, as they progressed through their (partially-structured) routines and habits, particularly when they were altered in some way, lacking intentionality or mindfulness in their approach self-management and left them susceptible to failures. The excerpt below is a key example.

> Occasionally I buy something and put it away, and then can't find it again. I mean I've lost some pretty important things by putting away and then thinking I remember where they are and then I've lost them. [Do you find that you'll find them at a later time?] Very occasionally. Because I usually have a place for something that makes sense to me, and if it isn't there then there isn't another place that makes sense to me. For instance, I lost a bag of jewelry, that I hid when we were going to be gone for a long time, and so I thought I knew where it was when we got home, and it wasn't where I thought it was and we've never found it […] but I mean it could have been that it got disturbed or moved, but nobody came in the house and stole it, but I've never found it. Like I can't find that kneeling pad. [So its these unusual things?] Yeah, like with the jewelry I wanted to hide it in an unusual place where no one would think to look […] it's not a place that even I would look […] or I hid it randomly. I didn't plan it out. And then that would be a hiding place for everything else. It didn't occur to me. It was more, "oops, I need to get this jewelry hidden, I'll go up to the attic and find dark corner or something." But it wasn't in any dark corners. (#230, 836-855)

There were very few statements about explicit strategy use as compensation for noticed age-related memory declines. The lack of explicit compensatory strategy use statements provided further evidence that older adults' conceptualization of memory and the behaviors they engaged in to support their remembering were disconnected from intentional implementation of strategic

behaviors. However, when older adults did make these statements, they were about the use of external aids, like calendars and written notes as reminders. Interestingly, most of these statements were accompanied by statements about wanting to remember and using as many ways as possible to do so successfully. Further, these individuals tended to have more self-regulatory aspects in their approaches to manage everyday remembering than the individuals who did not make age-related compensatory statements. The example below was from one of the few individuals who made an explicit connection between age-related memory declines and compensatory strategy use. This individual also made statements that integrated aspects of self-regulation in the management of their everyday remembering which can be observed in their quotes found throughout the write up.

> I use the little calendar on the phone, but if it's something particularly important, I will make notes. This is such a departure from the way I lived my life for a long, long time, which was kind of like: I remember everything that I'm supposed to do, and I don't have to worry about it. As I got older, it became clear that I was forgetting things, so I use as many cheats as I can. A lot of those are written. There's a sticky note on the fridge. There's a sticky note on the front door as I leave to say, "don't forget to pick up the check" for example, or, "don't forget to go to the bank." It's usually just one word. Bank. Check. Milk. Coffee […] I make them about four or five times a week. I'll put something up some place or hang something on the desktop computer. Sometimes, I'll hang something on my tablet as well […] and also, both of us have electronic sticky notes on our desktop computer, which we share. So, anytime I'm seeing the desktop, the screen, I'm seeing my sticky notes in yellow and hers are in pink. Also, on those sticky notes is our 'to-do' and calendar things even though it doesn't send it from my phone calendar, but I'll put it on there that I have this event on this date at this time. So, we keep this running thing, both of us, of important dates and important tasks. (#201, 355-374)

Overall, a large majority of the methods and strategies used were not performed or planned mindfully relative to the participants' goals. Older adults often described their way of doing

something as being what they just did or as something they had always done. The methods and behaviors older adults used to accomplish their daily remembering were not planned or executed with the intention of effectively or efficiently achieving the goal at hand. The ways that older adults accomplished their daily activities and everyday remembering often left them susceptible to forgetting when distractions, interruptions, or changes occurred that were unplanned or unanticipated. The results help to elucidate this finding in providing evidence to support the disconnection between thoughtful and intention approaches to everyday remembering and many of the methods that older adults employed to do these tasks, without the explicit realization that what they were doing was memory-supportive, and in non-ideal ways.

3.2.6 Views, Beliefs, and Attributions About Remembering and Forgetting

There were several examples of explicit causal-attribution statements made by the participants (e.g. viewing outcomes as age-related). However, the majority of these kinds of statements were more implicit and were interpreted as beliefs or views rather than causal attributional statements. In this way, when participants did not explicitly make causal statements about their memory outcomes, we did not infer their implied meaning. Nevertheless, the findings about beliefs, views, and attributions are presented together. The majority of the explicit attributional statements made were about controlling memory, aging-related, and successful remembering. Interestingly, most of these statements were about an external locus of control, or lack of personal control over memory. The major exception to this finding was when older adults mentioned external strategies, like calendars, for remembering. The more implicit attributions, presented primarily as beliefs or views, involved causally attributing successful remembering to their habits, routines, or what the participants expressed as their memory ability. See Table 7 for examples from this category.

Table 7. Views, Beliefs, and Attributions About Remembering and Forgetting Category Examples

Sub-Category	Coded Segment
Discount	[Have you ever forgotten about that meeting?] I don't think so […] I'm pretty good with meetings. I've never really been... in 40 years of doing stuff I don't think I've missed very many meetings. I've missed less than a handful… They just sort of lock in. I do have a good memory for that kind of stuff. Now I keep an electronic calendar and I keep a, you know, a set of alarms for things but those generally speaking – now I have missed things but not very many […] I know what I do on Tuesday, I know what I do on Wednesday, I know what I do on Thursday, and that sort of thing. (#227, 225-236)
	[Have you had any other instances when you've forgotten something particularly important?] I'm sure. Not important, but I de-emphasize the importance of it. You know, if I didn't do it, it must not be important, I'll justify it. [So, nothing particularly bad happened as a result?] I would say no because I really don't feel that it was real critical. (#206, 361-365)
Control	Concerns? I will lose my memory. But the problem is I don't think I'm doing enough to retain my memory. Such as reading. I used to love to read, but I don't take the time to do that anymore. I love puzzles. But I don't do that often. My sister's begun losing her memory […] But I know as we age it will happen. But the thing is, I really do need to try and do other things that will help me retain it. (#229, 929-934)
	I don't know. How can you explain a memory lapse? I have had a memory lapse in the last 5 days […] I'm from Mississippi and music is a big part of my life and all of the sudden I could not remember what Muddy Waters' real name was. I know that as well as I know that I'm sitting here at Georgia Tech. I vowed not to look it up and it came to me within 24 hours but... I think stuff like that happens as you age… I try not to get too upset about it, but it really did piss me off. (#202, 92-100)
Habit	[What other types of memory tricks, you said you use a calendar?] The main thing is I do have trouble remembering to take things that I need to take. [As in when you're leaving the house?] Right. So, I have developed the habit of putting them right by the door […] Yeah, I was going to take a book to someone that I was going to see. And, I knew I never remember that book. It was too big to put in my purse, so I just put it by the door. To the point where our trip over it. That was just a few days ago […] But yes, I do remember I have the book... some things I put in my purse, my purse is fairly large, I forget things are in there. For example, I've got a birthday card in there now. When I get to the car, I will sit it on the seat or I'll forget to mail it. If I just leave it in the pocket book, I'll forget to mail it. (#207, 296-305, 307-310)
	[Where do you keep these medications?] In a drawer. In our, in my dressing area. I've got a sink, I've got a drawer on one side, a drawer on the other side, then all this stuff in there. All the medications, all the shaving stuff, all the deodorant stuff, it's all in one place. […] Brush my teeth, open the drawer, start going through. [Now do you do anything to remember if you've actually taken the medication that morning?] Not if I'm at home [...] but when I'm brushing my teeth, I get out all the stuff that I'm going to take and I put it on the counter and it's a little bit of a memory thing, it's more of a habit than anything else but I'll take all the medications, deodorant, shaving stuff, put it all up on the counter, eye drops if I think I'm going to need those, which I sometimes do during seasonal times, and I do that when I'm brushing my teeth. It gives me something to do and as I take them, I throw them back in the drawer. I'll take the baby aspirin, another thing I'll take it I'll put the container back in, take the thyroid, do the same thing. Use the deodorant, put it back in the drawer […] I guess that's a memory thing. (#227, 108-128)

Table 7 (Continued)

Aging	But like I said… you know that fitness is helpful and brain exercise is helpful, but what I understand about Alzheimer's, you know, if you got the gene, you're in trouble until they figure something out. (#204, 750-752)
	Once I knew I wasn't going to go back to bed, I had got a coffee, opened up the computer, you know, checked e-mail, and looked at what I was supposed to do or what I had planned to do that day, and then read the news for a while. [When you check what you plan to do for the day, where do you check that?] Generally, on my little calendar. Or, maybe, I may have even written myself a note and posted it some place, on the fridge or… I use as many memory joggers as I possibly can. Because I think it keeps me a little sharper. I have a little bit of an ego problem as I don't like to look like a doddering old man. I like to have everything in order, which is not the way I lived most of my life. Is there a reason for the change now? Well, yea because I found myself forgetting things, not remembering that I was supposed to come here, go there. That started to happen maybe ten or twelve years ago. And so, I just adapted and adopted these little tricks to keep myself on target. " (#201, 72-80)
	Well, I'm concerned 'cause I noticed that so many people of, in my age group have very poor memories, I mean some of it is pretty bad and I don't want to get there, and I don't know what it takes not to get there. Do you have a magic formula? Tell me! [Do you think that there are things that can help you?] I don't know that diet would make a difference, I don't know that, I think my diet's good, I think that by constantly keeping my body fit and my mind going, it's helpful to not lose my mind or my body, but I don't know if that is not forever, I thought I might be crazy, I thought, "It's forever!" It isn't! One day, one of 'em will go bon voyage! And that's how, I know that's how it works, I just wanna delay it! (#205, 670-678)
Success	I use my calendar on my cell phone for almost everything I do. So, I set reminders usually because I hate to be late to anything […] I hate it when other people are late, so I set reminders usually to remind myself maybe as much as a week in advanced for something and another reminder like 24 hours in advanced for something. My life is not that busy, but anything that I do have to do, I put it in my little calendar and it reminds me… Because I do forget. (#201, 39-48)
	I have on my computer or my hard drive, I list the birthdays, anniversaries, significant dates for people. Sometimes it's the death of a spouse, sometimes I can remember some of my kin, but I usually list [them] and I try to check at the first of the month and day, "Is this a person that I need to contact or..." […] It's usually the first of the month […] as you get older, there a lot of people that you know and so I write these down […] usually I'll either write on the date line right at the top of the calendar and the once I follow up, I write down that I've done it, or sometimes I'll, something that's tentatively, anniversary this day, but I may, I may forget to call, and so I call the next day. That's usually what I do. [How many times did you, or when did you check the calendar?] Oh, I probably do it once or twice a day, because even, sometimes or even once in a while I will go to look at it. It's a habit […] You know that I've forgotten this, and so um, like I say, I have a, I have a big memory, but it's certainly not perfect. I, you know, I forget. (#211, 124-153)
	Participant: I use the alphabet […] If we're sitting, trying to recall the name of someone, for example. 'You know the guy who played in…?' 'Yeah. What was his name.' And, I just, I actually hum 'A-A-A, B-B-B', and somewhere between A and Z, it happens. I can't explain it. Charles de Gaulle! Never failed. [Do you use that for remembering things other than names?] No. (#221, 736-751)

3.2.6.1 Strategy Use Connected Successful Remembering

The participants explicitly made causal attributions that connected the use of several aids, both internal and external, to successful remembering. External aids were the most widely cited strategies connected with successful remembering. In particular, some older adults explicitly attributed the use of physically written external aids (e.g. written calendars, notes, lists, etc.) as a reason for successful remembering. Electronic calendars, reminder systems, and notes were also linked to successful remembering, in those persons who used these devices.

Moreover, we observed an interesting discrepancy between respondents' beliefs and the coders evaluations. When older adults attributed their successful remembering to the strategies or aids they used, their described procedures often indicated to the coders that they were at substantial risk for forgetting. That is, the memory-supportive behaviors that older adults explicitly attributed to successful remembering often indicated to the coders that their methods were inefficient or ineffective. For example, there were older adults who managed two or three calendars across multiple platforms. Additionally, these calendars were kept in different locations, and contained different information, requiring complex monitoring of schedules and plans. These calendar systems were attributed to successful remembering, but it seemed that they created unnecessary risk for failures to fill out or consult their calendars as needed. The example below displays one such instance:

So this tells us what days, so if somebody says, "April is out", okay April is out, we can't do anything. And we may look at December and say, "December's out." So, this is our social calendar, and then I have my own to-do calendar which might have on there my stamps, whatever else it is that I have to go on there. Now, even though I keep saying, "stamps" I'm not gonna

remember stamps, that's what my calendar's for… And I usually get them at the cash register. So unless that's written down on my little piece of paper, which is sometimes I have to fold it, sometimes it's inside my book... and sometimes I'll take that piece of paper out because I need to remember something while I'm at work. And so I find out what I need to do, I write it down, and then I may type it up later because my, my handwriting obviously is not the best in the world. And that's how I remember... But I have, I don't tie anything around my finger, I don't have any stickies anywhere… if it's not in this calendar, it's not happening. […] if I say, "Okay, let's go shopping tomorrow." I'm like, "Okay, cool." You're like, "You're not gonna write it down?" I'm like, "No, I'll remember it." But I'm counting on myself to remember that… But if I have to fit shopping in among two or three other things, then I'm gonna write it down in there… So if it's, if I have a lot of madness to do on one day, I may have to write it down… Because there are some things that I need to remember. (#209, 834-857)

Interestingly, participants characterized internal aids as a method for remembering certain types of information successfully (e.g. names) but later followed up with statements about how they struggled to remember the same information. Furthermore, how these strategies were used was not viewed as the cause of their forgetting. Rather, individuals tended to make statements about their innate inability to remember that type of information and did not attribute forgetting to faulty strategy use. There were also instances where people talked about using or trying strategies (e.g. the example earlier where the participant talked about taking memory classes to associate Olive with an olive) that did not work for them.

Many of the older adults spoke about their everyday occurrences in terms of their habits and routines. Their routines and habits were simply how they did things but were not typically conceptualized as causally impacting memory. Rather, successful everyday remembering was viewed more as a by-product of their habits or routines. Similarly, failures of habits or routines were not conceptualized as the cause of forgetting. Participants mentioned when habits or routines were disrupted or disturbed, but typically failed routines or habits were not explicitly viewed as

the cause of their memory failures. Coincidentally, habits and routines intersected with several of the other categories as they played an integral role in the participants' conceptualizations of how they went about their daily lives. This is observed in the example below.

> For one thing, being retired now I have more time, so I have time to do silly things like that, but the other thing is I just like I've gotten into the habit… before I go to bed each night I generally already have my medicines laid out for the next morning. I, you know I have these little pill boxes, but I lay them out for the next morning. I have my tea cup and my juice cup out on the counter, the tea bag and the SweetN' Low is already in the tea, all I have to do is turn on the water, pour it in, put my juice, and I'm ready to go […] it makes it, you know, I don't know, I think those are partly habits I've developed all throughout my life […] the more things you routinize, the less things you have on your mind. It's all done, you don't have to think about, you know, the mundane stuff. (#204, 50-61)

3.2.6.2 Discounting the Importance of Self-Regulation

The participants often provided ex-post facto justifications for their behaviors that discounted the importance of using self-regulatory approaches for remembering. These were instances when participants said that important things would be remembered, and if unimportant things were forgotten it did not matter. Then, there were justifications of the opposite nature, wherein participants explicitly justified the use of memory strategies as a means to support remembering important things. When this occurred, it was often the case that multiple strategies were used to remember important things such as the use of calendars, sticky notes, and people as reminders. Things they deemed as important ranged from remembering the birthdays of important people in their lives to medical appointments and social engagements. Older adults often stated that the importance of the information to be remembered was causally related to their global ability

to remember the information. However, older adults often erroneously linked their ability to spontaneously retrieve information as their global memory ability. Importantly, this implies that the importance of the information to be remembered allowed them to simply and successfully rely on "their memory". In this way, the participants discount the importance of using memory strategies, aids or other memory-supportive behaviors. The segment below is just one of many examples found throughout the interviews.

> I recently moved from [place] to here. So, a lot of my friends are there. I haven't seen my friends as much as I would like because I'm going through a second divorce now […] a few months ago we went out to dinner […] [How far in advance did you make the plan?] Probably a week. [How did you remember the day and time?] I just kept it in my head […] [Do you normally not put social engagements in your phone?] No, because I'm going to remember that and if somebody is coming from away, that's an important thing. You don't want to forget. I have never forgotten in my life that, "Oh gosh, I'm supposed to meet someone who's coming over to meet." I can't remember a time in my life when I've forgotten a... That would just be rude […] It's so important. If somebody makes plans to do something, you don't want to let somebody down. That's treating them like ... I would feel bad about that. (#226, 327-360)

3.2.6.3 Beliefs and Attributions About Memory as a Controllable Entity

Throughout the interviews participants were not shy in expressing their views, beliefs and attributions about their memories. Generally, when these sentiments were discussed, the participants expressed that much of what happened to their memory was not within in their control (i.e. getting dementia). Moreover, we found that older adults tended to attribute memory issues to uncontrollable or unknown causes. Uncontrollable causes included aging, global memory ability, gender, and genetics. There were also a number of individuals who said there was essentially

nothing they could do to prevent themselves from experiencing memory decline or getting Alzheimer's disease, often attributing the cause to uncontrollable factors, like genetics, or simply to aging. There were also several instances where participants expressed that they did not know the cause of their memory issues. There were a small number of older adults who expressly asked the interviewer if there were things they could do to preserve their memory ability, as they did not know themselves. Moreover, a couple of individuals expressed the desire for a magic memory pill to prevent Alzheimer's disease. The example below highlights this theme of uncontrollability of memory ability and outcomes and lack of ownership in the individual's ability to control their everyday memory outcomes.

> [I have a problem with] remembering things that are something that I want to do and I'll go there and I can't remember why I went there and what was I supposed to do […] It's pretty frustrating that you're so good in one area and something that's kind of –trivial stuff—stuff that's really not important, you're not remembering. It's not something that's big. It's these little everyday things that you get frustrated because you think that maybe something is more wrong with you, like a lapse of memory. Early Alzheimer's, I mean, there are all kinds of stuff after you get to a certain age. You know, is this happening to me? (#215, 874-886)

3.2.6.4 Explicit Age-Related Attributions

Age-related attributions about remembering and forgetting were the strongest and most explicit. Several of the older adults made statements about age being the cause of memory issues or developing memory impairments. Age-related attributions made by the participant ranged from developing Alzheimer's Disease to losing your memory to the idea that your brain has a limited

capacity and once you get to a certain age it becomes full and can no longer remember new information. The segment below exemplifies one of these views expressed by a participant.

[Now are there things that you think you could do to kind of help alleviate the concerns that you have or that you think you could do to not be as good as you were at remembering?] As far as music? I don't think so. I'd be interested if somebody could tell me something. I'd be willing to do it. I just think that it seems to me that it's probably age related that over time... and I just sort of think the brain just fills up. I think you just get more and more stuff in there and you pull it out. I think it's true with names. You still learn people and people and people and Yasmine sat in the third desk on the right when I was in 6th grade. I can't remember that so they got pushed out, but I think they're probably still in there. They're cluttering up room for the new neighbor that just moved in. (laughs) So if you could tell me how to get me some storage and reapply that would be good. Now, I don't know what I could do... and I don't consider it a dramatic drop off. I mean it's still, I think, very very good […] I just have noticed. I will get in the middle of a song that I have sung 100 times without words and all of the sudden it will just... I'll get to a blank. A little blank disc in there. Just a little blip on the disc and the disc doesn't quite lock in. So rather than embarrass myself in front of an audience when I'm singing something that's familiar I go ahead and print the words and put them in front of me and have them available so that if I get to that spot where it's blank I sort of know where on the page to look and I'll – usually it's just one word generates another hundred words behind it. You know, I just need a starting point to get back to that. So that would be my biggest question or concern. That would be a concern. And I fully expect that over time that will get diminished more. I don't have any reason to think it's going to not diminish more. I mean, we age, and things happen and we just gotta get used to that. But who knows, maybe it'll stop. It's not lousy, it's still really really good but it's not as good as it used to be. (#227, 1386-1411)

Aging was deemed as the root cause of memory issues across the data, namely related to memory declines or forgetting. Participants did not typically attribute changes in memory or the causes of forgetting to their own behaviors, actions or strategies, but rather to external and uncontrollable causes, like aging. For example, the following segment showcases aspects of ineffective calendar use as the participant intended to, but did not, complete calendar entries or reminders for two

friends' birthdays and subsequently mixed them up. One can imagine several ways that this memory failure could have been avoided and different attributions that could be made about how or why the memory mishap occurred.

There was a point in my life when I took pride in my memory. Now, sadly, I don't remember like I used to. I know people say, "Well it happens to everybody." Two of my best friends have birthdays in July. I have known those two men for 30 years. Every year, I get the birthdays mixed up. I call KC when it should be JJ. I called JJ when it should be KC. Every year, I tell myself, "You have this phone." I usually just add a reminder and be done with it! This year, one of them called me and said, "I can't remember JJ's birthday. Do you know when it is?" I said, "Absolutely." Nothing in here [his phone]. All of the stuff that I was telling myself to do, I never do. So, I missed it again. The one whose birthday was on the 18th, I called him on the 9th [...] I blame it on my mind, and it's weighing on my heart. I mean well […] you know, the road to hell is paved with good intentions. But I don't remember things like I used to. [Why do you feel that way?] I'm buying into this aging thing […] I'm buying into the aging thing that I'm not remembering things like I used to. I'm also buying into to… I don't think I use my brain the way I used to. (#221, 150-169)

CHAPTER 4. DISCUSSION

The purpose of this investigation was to examine everyday memory strategy use in older adults. In taking a qualitative approach to detailed interview protocols about older adults' daily lives and everyday cognitive demands, we were able to assess how they accomplished their cognitively-demanding tasks and goals. In doing so, several important findings became apparent that are not available from responses to current everyday memory questionnaires that dominate the literature on everyday memory. These findings have important implications and potential applications for improving older adults' approach to everyday remembering.

First, there was an apparent mismatch between older adults' memory complaints or concerns and their experienced memory failures. This finding parallels results from Hertzog, Park, Morrell, and Martin (2000) who found that subjective memory complaints did not match older adults' quantitative assessments of their memory. Additionally, Pearman and Storandt (2004; 2005) found that older adults who were higher in consciousness (e.g. self-discipline) reported less subjective memory complaints and that their complaints were influenced by their self-perceptions. We found that not only were the older adults' complaints mismatched with their recent memory failures, but that their conceptualizations and views of remembering and forgetting were somewhat dissociated from their use of memory-supportive behaviors. Moreover, many of their complaints were unaccompanied by strategies or solutions to help them remember. The lack of stated strategies or solutions in these instances reveals that older adults are a good target for interventions focusing on strategy use to improve everyday remembering. The implication is that older adults generally do not view or approach their everyday remembering using methods rooted in self-

regulatory management, leaving them vulnerable to forgetting when they do not employ effective memory-supportive behaviors.

We found that older adults tended to blame aging or inherent, uncontrollable factors for their memory complaints or failures. This was particularly true for things like remembering names. This outcome echoed findings from Vestergren and Nilsson (2011) where the majority of individuals in their study did not attribute their memory errors to controllable factors. Older adults expressed memory complaints, memory failures, and lack of self-regulation in their approach to everyday remembering indicated that they were at risk for forgetting. The need to better understand barriers to, and avoidance of, potentially effective aids was reinforced when older adults stated concerns, memory weaknesses, or issues with past or current strategies. These statements also echoed the importance of individuals' self-perceptions and memory self-efficacy related to using and implementing strategies. These findings also relate to the larger body of literature demonstrating the complex relationship between older adults' beliefs and attributions about memory control, their complaints, and memory performance (e.g. Lachman, Steinberg, & Trotter, 1987; *for a review see* Hertzog, Lineweaver, & McGuire, 1999).

Additionally, older adults often spoke about their daily endeavors in terms of their routines and habits. Automatic behaviors in daily life allow individuals to quickly achieve their goals with minimal conscious effort, although effective performance of these behaviors often involves intentional monitoring or deliberation (Wood, Quinn, & Kashy, 2002; Wood & Rünger, 2016). Given the right context and set of procedures, automatic behaviors in everyday life can be extremely effective for remembering with little cognitive investment. Nevertheless, we found that the participants actually employed partially-structured routines and habits without mindful intentions or self-regulatory approaches to managing their daily memory-demanding tasks. Older

adults' descriptions of their routines and habits coupled with their recent memory failures highlighted that they enacted haphazard habits and routines that were not fully-formed. That is, according to the definition of routinized behaviors, older adults often did not report engaging in one or several of the steps necessary in establishing a true routine, lacking either a conscious intention in achieving a given outcome and/or specificity in the order of events involved in performance (Clark, 2000). In terms of habits, we found that older adults engaged in context-specific behaviors that were relatively ineffective or inefficient in the pursuit of their goals, likely as a result of these behaviors being automatized without intentional thought to their performance relative to the goal.

Our qualitative evaluation of their reports indicated that peoples' reliance on habits and routines in their daily lives left them vulnerable to slip-ups and memory mishaps. Potential issues with these procedures were detected more often by the coders than the participants, further exposing the lack of thoughtful management for enacted everyday behaviors. Moreover, there were only a few examples where older adults mentioned self-regulatory habits of mind to help implement their routines and habits. These instances of automatic behaviors were only self-regulatory in the sense that they were intentional or mindful in planning their implementation. Discussions about monitoring or checking the steps involved (or completing them in a particular order) in a routine or habit to guard against forgetting were essentially non-existent. Approaches that emphasize mindful and intentional approaches to manage, monitor, and check automatic behaviors in everyday life (e.g. habits of mind) may help to improve older adults' memory outcomes particularly when their habits or routines are disrupted or disturbed (e.g. Stine-Morrow, 2009).

The apparent disconnection between older adults' behaviors and their conceptualizations of how memory was supported by their behaviors may arise because their approaches to everyday remembering lacked thoughtful and intentional approaches to remembering. For example, older adults did not explicitly, nor exclusively, enact the use of memory strategies as compensation for age-related changes in their cognition. To assume that older adults enacted specific behaviors for the purpose of compensating for noticed declines, as is implicitly assumed in everyday memory questionnaires, would ignore the present data. These older adults did not make explicit and intentional connections between the use of their everyday behaviors, strategies, and routines as being the means through which they supported remembering. Further, they often did not recognize that the "ways they did something" were ineffective or inefficient relative to their reason for using a behavior to accomplish (e.g. remember) something in the first place.

When memory-supportive behaviors were compensatory in nature and enacted based on noticed declines, these behaviors appeared to be more self-regulatory in nature. As such, it is possible that teaching older adults to conceptualize their approach to successful remembering using explicit self-regulatory mechanisms (e.g. implementation intentions) for self-management could improve the effectiveness and efficiency of the behaviors they use to support remembering. It may be the case that typical older adults do not explicitly classify accomplishing their daily tasks and goals as requiring memory support, potentially accounting for some of the variance in the degree to which they conceptualized their behaviors as being memory-supportive.

There was also an intriguing nexus among the older adults' self-presentation and self-perception biases, their use of spontaneous encoding and retrieval, and their beliefs about memory control. Essentially, we found that the older adults perceived how well they were able to spontaneously encode and retrieve information from memory as the basis for characterizing their

global memory ability. Not only that, but their presentations of their self-perceptions during the interview were relatively well-preserved even though they also described memory failures or used ineffective or inefficient strategies. These self-perceptions may in fact be accurate most of the time. However, this finding raised interesting questions about nuances and exceptions to these rules when these individuals experienced memory failures and what this relationship implies as these individuals' ability to rely on successful incidental encoding and retrieval decreases (e.g. Craik, 2002).

Further, this view may interact with older adults' motivation for changing their current behaviors. As long as their self-perceptions of their own memory ability, or what we refer to as incidental encoding and retrieval ability, remains positively skewed, there would be little motivation to change or learn new internal mnemonic strategies and behaviors. For example, older adults' memory failures and approaches to medication management have the potential to be greatly improved through the use of implementation intentions, as previously shown by Liu and Park (2004) for medication adherence. These findings suggest that older adults are a good target for memory interventions emphasizing both strategic behavioral approaches as well as cognitive restructuring around their beliefs and views about remembering and forgetting (Lachman, 2006). This approach may also generally be applied to several of the risky behaviors and procedures older adults use for everyday memory management, as implementation intentions show sustained benefits for prospective remembering in naturalistic settings as well (Liu & Park, 2004; Hering et al., 2014).

Finally, older adults' approach to everyday remembering generally fell into one of two paths of action based on perceived importance. The first way older adults' stated importance interplayed with daily memory efficacy was as an after-the-fact justification for not having to use

aids or strategies to remember something. The importance of the to-be-remembered information served as the justification and perceived cause of their ability to recall the information with individuals relying on incidental or spontaneous retrieval. The view that important things would be remembered, and information perceived as being unimportant did not matter if it was remembered or forgotten, left these individuals vulnerable to forgetting. The second way perceived importance influenced everyday memory occurred when the significance of the information or event to be remembered was explicitly connected to strategy use for the purpose of remembering. These strategies were most often external aids, such as calendars, sticky notes, reminder alerts, or spouses. Interestingly, when older adults did employ strategies specifically for remembering information they stated as important, they often used multiple or inconsistent methods. For example, individuals used their calendars, had reminders set one week before and 24 hours before the event, had a sticky note reminder, and asked their spouse to remind them for a single event.

More specifically, the type of information that fell into one of these avenues for remembering was most often related to social connectedness and centered around family, friends, or social engagements. Based on the literature people's self-concept and self-identity are built on the foundation of their connectedness with others (Christiansen, 1999). As individuals continue into to older adulthood, psychosocial connections have important influences on well-being and quality of life (e.g. Rowe & Kahn, 1987; Pilisuk, Montgomery, Parks, & Acredolo, 1993; Carmel, 2001). There were numerous instances in the interviews where the participants talked about their relationships with others as being the most important thing in life. The older adults' classifications of remembering these kinds of events, people, or information were in fact of vital personal importance. However, perceived importance should not dictate lesser approaches to remembering, which often left these individuals susceptible to forgetting by not employing effective and efficient

methods for remembering. Emphasizing ways that strategic approaches can improve effective everyday remembering for information and events older adults deem as important may be a good target for cognitive and behavioral intervention in the future.

A few intervention studies have been successful in training subjects in memory strategy use but have yet to produce outcome measures consistent with long-term or translational adherence of these strategies to everyday life (e.g. Troyer, 2010; Weigand, Troyer, Gojmerac & Murphy, 2013; Dawson, et al., 2014; Aronov, Rabin, Fogel, Chi, Kann, Abdelhak & Zimmerman, 2015; Bier et al., 2015). Intervention training has focused on process-specific strategies with little-to-no training on transfer for successful everyday applications (Hertzog et al., 2008; Sandberg, Rönnlund, Nyberg & Stigsdotter Neely, 2014). For example, participants in the ACTIVE trials have shown immediate and short-term gains from specific speed of processing training, reasoning training, and episodic verbal training, but limited transfer for everyday use (Ball, et al., 2002). Moreover, in a multi-domain intervention cognition was generally improved or maintained throughout a two-year period (Ngandu, Lehtisalo, Solomon, Kivipelto, 2015). However, there were no measures of ecological strategy use or transfer of strategies, limiting the generalizability of this intervention model. Strategy training is efficacious for learned tasks, but constraints based on strategy training approaches may be to in part to blame for the lack of transfer (Hertzog & Dunlosky, 2012; McDaniel & Bugg, 2012).

To this end, our investigation of everyday memory strategies, effectiveness, and the processes involved in each suggests that the next step in helping older adults improve their memory in everyday life would be to design and implement such an intervention. Individuals' approaches that supported remembering were extremely complex, necessitating tailored methods for successful intervention, implementation, and integration of mental and behavioral changes. These

findings form the basis for intervention design techniques that emphasize the efficacy of an individually-tailored approach targeting everyday memory in older adults. Additionally, cognitive restructuring around memory controllability and memory self-efficacy is necessary for successful intervention. Cognitive restructuring improves memory outcomes as a result of modifying how individuals perceive their memory, the ways that behaviors are conceptualized, and how memory-supportive procedures are enacted to fit within an individual's mental model for successful everyday remembering (e.g. Lachman et al., 1992; Berry, 1999; West & Yassuda, 2004). An intervention coupling cognitive restructuring for beliefs, attributions, perceptions and confidence about memory with training of self-regulatory memory strategies, and transfer of those strategies to naturalistic contexts may help older adults reduce their memory failures by bolstering strategic habits of mind.

4.1 Limitations and Future Directions

The present investigation was guided by the interview protocol and subsequent data that was collected. In the future, another interview protocol could be designed to more specifically target the processes involved in planning, implementing, managing, and using strategies or other memory-supportive behaviors. The length of the semi-structured protocol made it challenging for the interviewer to focus verbose participants and keep them on track to answer all of the interview questions with sufficient detail about processes for implementation given the time constraint of the interview. The interview collected a lot of information and future research may seek to focus on a more limited scope of information. Future studies may seek to qualitatively examine specific strategies, behaviors, or mental models involved in everyday remembering (e.g. internal strategies, medication adherence, remembering social events, grocery shopping, etc.) to try to better

understand how to target approaches for older adults to learn and enact behavioral changes in their approaches to everyday memory.

The present investigation involved an abundance of interview data. As such, there is still much that can be learned from the data. Perhaps if the data were explored through a different point of view, another qualitative investigation may have different findings. Even so, there are likely unexplored themes related to older adults daily functioning and remembering that could inform another investigation with a different focus. Additionally, the coding did not include explicit individual-differences analyses. The data could potentially undergo analyses wherein each interview would be coded like a case-study that focused on nuances in the number and type of strategies, memory failures, views held within, and subsequently between, each individual, rather than on holistic patterns. In this way, the focus would be on how the relationship among complaints, memory failures, efficacy of strategies or other memory-supportive behaviors, and their views or attributions about memory in individual participants. This analytical approach was not the intent for the data collection or analyses but is a plausible alternative option.

It is important to note that the subjects for this interview were generally high functioning, well-educated, and well-off older adults from the greater Atlanta area. This has implications for the representativeness of these findings as being potentially limited to a certain demographic that may not be generalized to the older adult population. Further research should be conducted to test whether the posited analyses and conclusions may also apply to a more representative sample of older adults, including those who have been diagnosed with memory impairments such as Mild Cognitive Impairment or who are predisposed to dementia (e.g. Alzheimer's Disease).

Finally, future studies should seek to assess individuals' strategies to better understand how to structure behavioral and cognitive interventions around concrete examples of older adults' calendar systems, reminders, notes, lists, and experienced memory failures. Moreover, this investigation could make a stronger argument for an intervention if it included additional quantitative assessments about the participants including comparisons to popular everyday memory questionnaires. Quantitative data alongside the qualitative interview data would also provide an even stronger foundation for several of the claims made and future investigations should consider a mixed-methods approach.

4.2 Summary

Our investigation helped identify what older adults do to remember in their daily lives in ways that cannot be extracted from everyday memory questionnaires. In summary, relatively healthy, highly-educated older adults expressed memory complaints, concerns, and experienced memory failures. Their complaints and concerns were mismatched relative to their recently experienced memory failures, which ranged in type, severity, and how they were conceptualized by the older adults although they were primarily prospective memory failures. Additionally, older adults did not necessarily use memory strategies and other behaviors that supported remembering as an explicit form of compensation. We found that individuals relied on 1) their ability to incidentally encode and retrieve information and 2) fallible habits and partially-structured routines – without making explicit connections between how to support remembering through the use of effective and efficient means.

We know that older adults also experience declines in different areas of cognition as a part of the normal aging process and that there are ways that can help older adults function better as

they begin to face these declines. By understanding how older adults can be shaped to improve their use of potentially effective techniques for enhancing everyday remembering, intervention becomes a possibility for improvement and preservation of successful everyday remembering. Where older adults lacked effective, efficient, and self-regulatory methods for remembering in their daily lives provides evidence that interventions centered around learning effective memory-supportive behaviors and changing beliefs about memory have the potential to improve everyday remembering. This investigation provides the first step in identifying ways to help older adults proactively set themselves up to remember better within the context of their everyday lives as they continue to age and experience normal and potentially abnormal declines.

APPENDIX A. OLDER ADULT INTERVIEW PROTOCOL & SCRIPT

Hello! Are you (participant's name)? I'm (your name). I'll be working with you today to ask you some questions. Before we get started, we have some consent forms.

(Give consent, demographics forms & pen.)

Do you have any questions?

IF YES: answer questions or provide email, etc. where they can direct their questions. Any other questions?

IF NO: Great, then let's get started.

(Collect forms & Turn on recording device) say SID, starting time and date.

Introduction:

Today we're going to discuss your everyday life. We're very interested in learning about your memory for things, from things you find you remember well to things that you sometimes forget. You should know that having some problems with memory happens to everyone. It is part of being human, and it is common across people of all age groups. We want your help in understanding how you try to remember things you need to remember. We also want to know about your typical memory problems, what they are like, and what you might do to adjust for forgetting something when it happens.

It's important to know that your accurate and honest responses will help us to gain a better understanding of your everyday life and the ways in which you use your memory. We need to know about your remembering as it actually happens, whether it works, or it doesn't. In fact, understanding what happens if and when it doesn't work is really important to us. Know that you have the right to not respond to any of the interview questions, without penalty or justification.
Do you have any questions before we get started?

Interview:

Section A: Now I'm going to ask you some questions about your daily routine. Can you tell me a little bit about your usual morning routine? Try to think about the past 5 days or so. Walk me through what a normal morning looks like for you starting from the time you wake up. What time has that been during the past week? (Pay attention for consistency, differences in schedules-especially weekend vs. weekday)

(go back to first action or action without much detail): Can you describe that in a little more detail? What kinds of things do you need to remember to be able to make _____ work? What kinds of preparations need to be made?

Were there any mornings in the past 5 days or so that didn't follow your normal routine? Take a minute to try and take yourself back through the last 5 mornings.

(If yes) how was it different?

Does your normal routine differ on the weekdays as opposed to the weekends? Walk me through what a weekend morning looks like for you.

(back to first action) Can you tell me what kinds of adjustments you make to accommodate the change in your schedule on the (weekend or weekday)? What do you do differently?

(If subject needs a cue or doesn't understand): For example, did you have to lay the umbrella by the door, set an alarm clock differently, use sticky notes, write a list, set a reminder on your computer or phone, or ask someone to remind you?)

During the past 5 days did anything go wrong? For example, did you run late, forget an item, etc.?

Why do you think that is? What were the consequences?

Now I'm going to ask you to think about a typical afternoon for you during the week. Try to think about the past 5 or so days. What kinds of activities did you engage in? These can be things from recreational activities to running errands to social gatherings. Take a moment or two to think.

Describe a little bit more about your afternoon yesterday, for example starting from around lunch time?

(Follow up on one of the activities mentioned, likely lunch plans) Is this a regularly scheduled activity? How do you remember to be timely? Is there anything you're required to do or bring?

What kinds of things do you use to remember that you have (insert activity)? Or that you need to bring_____?

IF REGULARLY SCHEDULED: Have you ever forgotten about (participant elicited activity)? What happened when you did forget?

Was there anything you forgot to do yesterday? What were the repercussions?

Have you had any other instances where you've forgotten something particularly important? What happened as a result?

Section B:

Now, we're going to switch gears a little bit. I want you to think of your close friends and family. How often do you see them? What do you do when you do get together? Take a minute to really reflect and think about it.

When was the last time you saw a friend or family member that you do not live with? Can you describe what you did?

Where did you meet?

How did you remember the day and time of the meeting?

Did you plan out this meeting in advance? How far ahead?

When you planned the meeting, how did you remember that it would be coming up?

Do you use this strategy to remember other types of things?

Have you ever missed or forgotten plans? Can you describe what happened to me?

What did you do to resolve the issue?

Now, we're going to switch gears a little bit again. I want you to think about last night. Try and remember how your afternoon ended. What time did you have dinner? Where did you eat? What did you have? (IF already mentioned last night, inquire about previous night)

IF ATE DINNER OUT: (inquire about how plans were made, remembered and carried out. Was anything forgotten?)

Do you usually (insert dinner action)?

How do/did you remember your plans?

Did you forget anything? Was there anything that was supposed to be done but wasn't in preparation?

What was done instead?

IF ATE DINNER IN: How did you prepare your meal? When did you go grocery shopping?

How did you remember what to get at the grocery store?

Did you forget anything while you were there?

(Inquire about use of aid for grocery shopping) How do you prepare your meal? What ingredients did you use? How did you acquire them?

Do you feel that _____ is effective in helping you remember to get all of your grocery items?

Did you do any activities after dinner? What were they?

Were they planned ahead of time? How did you remember to do them?

Did you forget anything that you were supposed to do? When did you realize that you had forgotten something?

What did you do instead of the thing you had forgotten?

(If answers are no): Ask about the previous week. If no instances, ask if there are any moments that came to mind and if they have any examples.)

General Questions about Strategies and Memory

Are there any other times that stand out to you that you can think of where you have forgotten something? Can you describe the situation for me?

What about other types of "memory tricks"? Do you have tricks, routines, or "cheats" that you use to help you remember things throughout the day? (Can cue again w/examples above: did you have to lay the umbrella by the door before you leave the house, set an alarm clock differently, use sticky notes, write a list, set a reminder on your computer or phone, or ask someone to remind you?)

How do you remember things that are particularly important to you? Can you provide me with an example?

Do you make lists?

IF YES: What kinds of lists do you make? How and when do you make them?

Do you keep a calendar?

IF YES: Tell me about your calendar... How do you use it? What do you use it for? When do you check it?

Are there things that you are not as good at remembering? What are they?

Why do you feel that way? (good or bad!)

Are there things you are particularly good at remembering? What are they?

Why do you feel that way?

We've had people ask questions about their memory concerns, who want to know what they could do to change it. Do you also feel that way? Do you have any memory questions or concerns?

IF YES: Do you think there are things that could help you? What do you think would be the most beneficial to improve your memory concern(s)?

END OF FORMAL INTERVIEW:

Thank you for your time. We appreciate your honesty in sharing details about your life with us. The goal of this interview study is to help us learn more about older adult's memory in everyday life and ways that they use internal and external memory strategies.

(Hand participant payment form): Thank you for your time!

Interview Guide & Prompts:
Follow-up Prompts:
Can you tell me a little bit more about? How do you execute (task, action)?
How do you remember to do (intended action?) (I.e. How do you know when to wake up in the morning?) (How do you set your alarm?) (How do you remember to go to the grocery store?)

If off-topic:
Let's bring it back to (insert comment)
Thank you for providing so much detail about (off-topic), I'd like to focus on (new subject) now though

If participant looks or feels uncomfortable: Remember, you do not have to answer any of the interview questions if you don't want to.

At end of piloting interviews:
-Can you tell me a little bit about what you thought of the questions?
-Do you have any feedback about the wording of the questions?
-Do you think that there are any questions you felt should have been asked but were not?
-Do you have any comments about the interview process?
(Follow-up questions based on interview may vary, depending on circumstance and interview dialog flow)

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