DANIEL VON DER HEYDE FERNANDES

The Functions and Dysfunctions of Reminders

The Functions and Dysfunctions of Memory Aids

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De functies en disfuncties van geheugensteuntjes

Thesis

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To Julia

Chapter 1.

Introduction

My thesis started with trying to understand *why only about 50% of consumers use shopping lists when we know from research in psychology that memory is so easily fallible?* After studying the literature and interviewing some shoppers in the supermarket, we discovered that the main reason why few shoppers use shopping lists is that most of them (if not all) think they are likely to remember what they need to buy without a list. The question then became: *are shoppers overconfident in their memory?* And the answer is: *most often*.

People are always predicting and assessing their learning and memory performance (e.g., "I am terrible at remembering things that I need to do", "I can't live without my agenda", "I studied enough to pass this exam"). We access and predict our knowledge so frequently that we don't even notice. These activities have been termed metacognitions, which means our ability to know about our knowing and has a central role in our performance and accomplishment of our goals. In the terminology of Nelson and Narens (1990), memory metacognition is assumed to supervise memory processes – encoding, rehearsing, retrieving and so on, and to regulate them towards one's own goals.

The fact that we assess our cognitions so often does not mean that we are good at it. One situation in which consumers have to predict their memory (or use their memory metacognition, to use the jargonish term) is between after they decide they need to go grocery shopping and before they leave to the store. By that time, consumers assess whether a shopping list is needed. The first paper described on chapter 2 shows that consumers often mistakenly think they are likely to remember what they need to buy. They don't realize that after a few minutes memory may be lower and that they are likely to need a shopping list to remember what they need to buy.

The third chapter of my dissertation examines reminders in general and *what are their effects on task completion*. The literature on prospective memory and implementation intentions strongly advocates the use of reminders. Many papers show that without reminders such as simple memory cues or more elaborate cues linking the future context with the desired behavior (i.e., implementation intentions), people fail to complete their plans. However, the majority of the empirical work has been conducted in the context of single tasks. Participants are asked to perform a task and the presence (vs. absence) of reminders is manipulated. In real life, we juggle multiple tasks. Little (1989) finds that students report on average 15 ongoing projects. In our studies, participants also easily report ten planned tasks including academic tasks (e.g., finish my essay), interpersonal ones (e.g., visit my parents), as well as, heath (e.g., lose weight) and recreational tasks (e.g., go out with friends). Surprisingly, the few papers that asked participants to deal with multiple tasks found no effects of reminders. We predict and show that there is an interaction such that for people high in propensity to plan, reminders drive attention and action to the reminded task, but for people low in propensity to plan, reminders drive attention and action to other more urgent non-reminded tasks.

Together, those two chapters try to answer why consumers often don't use shopping lists and what is the (motivational) effect of reminders on multiple task completion. We believe reminders are great. They are often functional. I cannot think of my life without my agenda. And I cannot shop without a shopping list. But reminders can be dysfunctional. That is, consumers may fail to use a much-needed reminder and reminders can drive consumers to procrastinate on a task. We discuss those issues in the next chapters. The research presented in chapter 2 is being conducted together with professors Stefano Puntoni, Stijn van Osselaer and Elizabeth Cowley. The research presented in chapter 3 is being conducted with professor John G. Lynch, Jr.

Chapter 2.

The Dissociation between Consumers' Memory Metacognition and Memory Performance

Remembering to perform tasks in the future is a necessary part of every consumer's daily life. Often consumers have to remember to pick up dry cleaning, pay bills, renew subscriptions to magazines, stop at the grocery store on the way home to buy bread, and redeem coupons within a certain date. These chores must be remembered amongst all of the other everyday distractions. Planning to execute an intention involves assessing how likely one is to remember to perform the task in the future. When consumers think that forgetting is likely to happen, they may use reminders to ensure the task is performed at the appropriate time. They may also strategically rehearse or monitor the task until it is time to perform the action. For example, when consumers think that they are likely to forget to buy the things they need to buy at the grocery store, they may use a shopping list to remember to buy the products.

Consumers are often overconfident about what they know (Alba and Hutchinson, 2000; Wood and Lynch, 2002). This may have many negative consequences. For example, when consumers are overconfident about what they know, they process information less extensively and learn less. As a consequence, overconfidence when learning new product information causes consumers to rely on incorrect self-generated inferences (Wood and Lynch, 2002). In addition, overconfidence in memory leads to the formation of suboptimal consideration sets in the pre-choice stage as people stop looking for more alternatives once they are confident they have considered all the options (Alba and Hutchinson, 2000). When consumers do not realize that their memory is fallible, they are less likely to take protective and corrective actions.

In the context of planning to perform a task in the future, we propose and find that consumers are overconfident about their memory and that this overconfidence causes them to be less prepared to remember to undertake a plan. Consumers often think that they will remember the grocery items they need to buy in the supermarket and, therefore, do not use a shopping list. We show that this belief about future memory performance (i.e., memory metacognition) is flawed for two main reasons. First, consumers mistakenly use the ease of constructing a mental list of required items and naïve theories about how memory works when making predictions about their memory. Second, they fail to consider factors that have an effect on memory (e.g., the nature of the items and the context of learning on memory).

We first examine the antecedents of the dissociation between memory metacognition and performance as drivers of shopper's overconfidence in their future in-store memory performance (studies 1-3). Next, we explore whether judgments concerning future memory performance (memory metacognition) determines the act of writing a shopping list (study 4).

2.1. Theoretical Background

2.1.1. Shopping lists

Shopping lists are an effective external memory aid that prevents forgetting to buy (Block and Morwitz, 1999). In addition, shopping lists influence consumers' buying behavior. Consumers with a shopping list are less likely to make in-store decisions compared to consumers without a list (Inman, Winer, and Ferraro, 2009). They also spend less money (Thomas and Garland, 2004), gather more information about products inside the store, compare prices and brands and look for in-store promotions more often than those without lists (Putrevu and Ratchford, 1997). Shoppers with a list are also more likely to refrain from purchases that are

appealing at the moment, because of a state of hunger, but that their list did not include (Gilbert, Gill, and Wilson, 2002). Shopping lists improve self-regulation as they make grocery shopping easier and reduce the number of conflicting goals (Gilbert, Gill, and Wilson, 2002; Vohs, Baumeister, and Tice, 2008).

Despite the benefits of shopping lists, not many consumers prepare them before shopping for groceries. Descriptive studies from several countries show that about half of consumers make a shopping list before going to a supermarket (Thomas and Garland, 2004). We interviewed shoppers in two supermarkets in Colorado and obtained 50 complete questionnaires. Two respondents did not answer all the questions and were not included in the analysis. Results remain statistically significant and almost identical when they are included. We found that only 40% had written a shopping list. There were some remarkable differences between list and non-list users. Shoppers without a list more strongly agreed with the statement "I generally can remember a list of items to buy without having to write them down" than shoppers with a list (on a scale from 1 = strongly disagree to 7 = strongly agree; $M = 5.13$ vs. 4.35; $F(1, 48) = 4.11$, $p < .05$). Moreover, shopping list users thought they would forget many items if they were to shop without a list ($M = 6.77$ items). Non-users predicted forgetting fewer items ($M = 1.42$; $F(1, 48) = 11.85$, $p < .01$). This difference occurred despite the fact that users and non-users did not differ significantly in the total number of items they intended to buy.

These exploratory findings suggest that shoppers without lists believe they have a better memory for the products they need to buy than shoppers with lists. In the next session, we review the relevant literature to argue that this belief is likely to be flawed and how it may be actually harmful for memory performance.

2.1.2 Memory Metacognition

Memory metacognition refers to "people's knowledge of, monitoring of, and control of their own learning and memory processes" (Dunlosky and Bjork, 2008, p. 11). Research in marketing has explored the relationship between consumers' predictions of future learning and their actual learning of a new product (Billeter, Kalra, and Loewenstein, 2011; Chan, Sengupta, and Mukhopadhyay, 2013; Gershoff and Johar, 2006; West, 1996; Wood and Lynch, 2002). However, to the best of our knowledge, no consumer research has investigated consumers' predictions about their future memory performance (but see Alba and Hutchinson, 2000, for a review of the psychological literature).

Psychological research on the consequences of predictions about memory has focused on learning effort (see Metcalfe, 2009 for a review). Memory metacognition influences learners' behavior by informing whether more study is needed (Nelson and Dunlosky, 1991). This means that pessimistic predictions about future memory can lead to behavior that is intended to ensure accurate memory performance. In contrast, optimistic predictions about future memory can lead consumers to believe that employing strategies to correctly remember in the future is unnecessary.

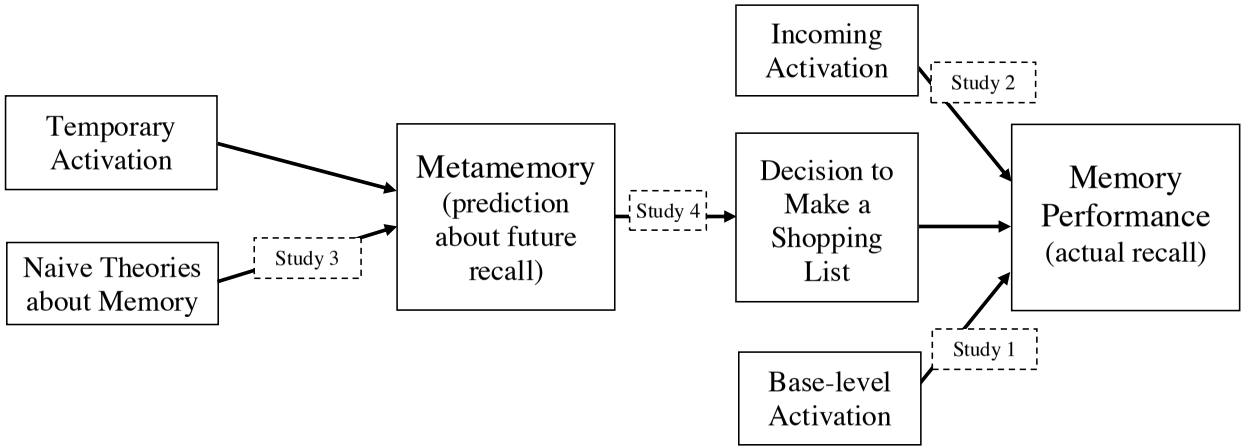
Although literature on memory metacognition has not explored this possibility, another way to ensure accurate memory performance in the future is to rely on memory aids, for example by setting a reminder. Thus, a hitherto unexplored, behavioral consequence of predictions about future memory is the use of a shopping list as an external memory device. We propose that the decision to prepare a shopping list is partially determined by predictions about future memory. Consumers who predict they will remember fewer items will be more inclined to write a shopping list. Consumers who predict they will remember most of the items will be less inclined

to write a shopping list and, if their predictions are wrong, they will potentially forget to buy some of the products they need. Therefore, it is important to understand what drives overconfidence about memory for grocery products.

2.1.3 Memory Metacognition and Memory Performance

Understanding when consumers are more versus less likely to forget to execute a consumption action they had intended to perform (i.e., situations when consumers do not use shopping lists *and* fail to remember to buy an item because they do not have a memory aid) requires studying the discrepancy between predictions about future memory and actual memory performance. To understand this discrepancy, it is important to consider the factors that differentially influence memory metacognition and performance. We propose that the discrepancy between predictions about future memory and actual performance can be thought of as a function of two factors (see our theoretical framework in figure 1).

Figure 1: Conceptual Framework



2.1.3.1 Ease of construction of a mental list of required items. First, a prediction about future memory performance for a set of consumption actions should depend on the ease with which the tasks in the set come to mind at the time the prediction is made (Koriat, Bjork, Sheffer, and Bar, 2004; Kornell, Rhodes, Castel, and Tauber, 2011; Schwartz, 1994). That is, one important input for the prediction about future recall is the ease with which the mental list containing the set of shopping tasks is constructed. Generating items for the mental list of consumption tasks depends on three sources of activation of tasks' representations in memory: (a) Activation depends on relatively stable base-level activation of the shopping actions' representations in memory (Anderson et al., 2004; Higgins, 1996). For example, more familiar tasks are chronically activated in memory, making them easier to access (Hall, 1954). (b) Activation of a shopping task in memory can be boosted by incoming activation from related concepts (Anderson et al., 2004). For example, shopping tasks become easier to retrieve if they are associated with and through a common theme (e.g., all related to an upcoming event such as a dinner party; Bower, 1970; Mirman and Graziano, 2012; Ross and Murphy, 1999). (c) Activation of a shopping task in memory is influenced heavily by temporary factors whose influence decays quickly over time (Higgins, 1996). Previous research on memory metacognition shows that people are especially likely to be overconfident about their memory when making memory predictions right after being exposed to the items to be remembered (Rhodes and Tuber, 2011). This is consistent with the notion that recent exposure to a task (e.g., being confronted with an empty container, a member of the household telling one to buy a product, or generating a to-be-bought product from memory) leads to a temporary boost in the action's memory activation that does not necessarily result in increased retrieval after a delay (Graf and Mandler, 1984; Srull and Wyer, 1979).

The strength of activation during the prediction of memory performance and during actual memory performance varies between activation types. Whereas incoming activation and relatively stable base-level activation should play an especially large role determining recall after a delay (e.g., in the store or on the way home from work), the prediction about future recall should to a large extent be driven by the temporary activation of the shopping tasks (Hertzog, Dunlosky, Robinson, and Kidder, 2003; Nelson and Dunlosky, 1991; Rhodes and Tauber, 2011; Schwartz, 1994). The temporary activation due to recent exposure to a shopping action or consumer need (e.g., during the realization that a shopping task is needed) should lead to a discrepancy in the form of overestimation (predicted memory higher than actual memory performance after a short delay). This overestimation should be reduced when actual memory performance is boosted by relatively stable base-level activation (e.g., when the shopping tasks are very familiar) or by incoming activation from related concepts (e.g., from a common theme such as *items for a dinner party*). Thus, the temporary activation that occurs when an item is identified as needed may result in predictions of memory that optimistically overestimate in-store memory performance. That is, overestimation of in-store memory performance will arise because unfamiliar or unrelated items are not well remembered, but predictions of memory contaminated by temporary activation do not take this into account. Unanticipated by the forecaster, lower levels of future activation will reduce memory performance such that predictions of memory will be over-optimistic.

2.1.3.2 Lay theories about forgetting. Second, a prediction about future memory performance for a set of shopping tasks should be influenced by consumers' beliefs about the effects of memory-related factors over time. That is, consumers' naïve theories about the determinants of recall and forgetting should be a second important input for the prediction about

future recall. These beliefs should cause discrepancies between predicted and actual memory performance whenever the beliefs are wrong or miscalibrated. In some situations, consumers may believe that factors will affect memory performance more than they really do. In this paper, we focus on lay theories about the consequence for future memory performance of the characteristics of the retention interval, defined as the time between learning (e.g., being told to buy an item on the way back from work) and memory recall (e.g., the journey from work to home). We focus on features of the retention interval because it is an area which has not been considered in previous work on memory metacognition and because lay theories about the impact of the retention interval on future memory performance are likely to affect a wide range of consumer situations, independently of the nature of the task to be remembered and of the environment in which the task will be executed. In particular, we propose that consumers tend to believe that demanding mental activity between prediction and later memory performance will hamper memory performance. Previous research has shown that people believe that exerting cognitive effort on a task reduces cognitive ability to perform another ongoing task (Reichle, Carpenter, and Just, 2000) and/or a subsequent task (Botvinick, 2007). Although this is true in many situations, consumers may generalize this belief to contexts in which cognitive effort has little impact on performance. Demanding cognitive activity may have little influence on actual memory performance to the extent that the content of the mental activity during the delay is unrelated to the to-be-remembered items (Nairne, 2002) and the processes that underlie the mental activity during the delay are different from the processes that underlie storage (Logan, 2004; Schmeichel, Baumeister, and Vohs, 2003). Therefore, we hypothesize that anticipating cognitively demanding (but unrelated) activity during the retention interval will not affect memory, but will reduce predicted memory performance.

2.2. Empirical Studies

The main goal of this paper is to propose and test a framework to explain the common experience of forgetting to perform consumption tasks and, in particular, to explain when and why metacognitive judgments for the performance of shopping tasks are inaccurate (see figure 1). Based on this framework, we conducted four experiments to study memory for products in a store. We add to existing consumer research by highlighting the importance of memory metacognition in consumer behavior. That is, we show that consumers often overestimate their future in-store memory and that estimates of future ability to remember what items to buy predict the use or non-use of a shopping list. We also examine moderators of the overestimation, documenting factors that reduce or increase the overestimation.

We also add to existing psychological literature on memory metacognition by examining the causes of metacognitive failures. First, previous research shows that predictions of future memory performance rely heavily on the ease with which the to-be-remembered items are generated at the time of metamemory judgment, which depends heavily on the temporary activation of the items (Rhodes and Tauber, 2011). We find that these judgments ignore two factors that boost in-store memory performance, thereby reducing the extent of overestimation. Specifically, we hypothesize that the dissociation between memory predictions and performance is mitigated when memory for items is supported by chronic accessibility of the items such as when shopping items actions are familiar (study 1) or by incoming activation such as when the context of learning provides a thematic cue that ties the items altogether (study 2).

Second, our framework proposes that the dissociation between memory predictions and performance is influenced by consumers' lay theories about factors at play between the time of

metamemory judgment and actual retrieval. Specifically, study 3 shows that, when predicting future memory, consumers apply the incorrect belief that cognitively demanding but conceptually unrelated mental activity between metamemory judgment and actual in-store retrieval will disrupt that retrieval. Third, we documented the behavioral significance of metamemory judgments, by showing that metamemory judgments predict the creation of an external memory aid (i.e., shopping lists; study 4).

Study 1: Product Familiarity

Our model asserts that highly familiar products should have higher chronic activation in memory, making it easy to remember them even after a delay. For example, if milk is a very familiar purchase, then it is less likely to be forgotten. Thus, product familiarity should have a strong positive effect on actual memory performance. If consumers base their metamemory judgment on momentary activation of items at the time they make their metamemory judgment, their judgments should neglect the effect of product familiarity. The result should be a stronger effect of familiarity on actual memory performance (e.g., in the store) than on metamemory. Thus, metamemory soon after encoding should be high due to temporary activation regardless of product familiarity. In contrast, actual memory should only be high when boosted by familiarity as temporary activation has worn off.

Method

One hundred and twenty-two undergraduate students at a Western-European university participated in return for extra course credit (participants in subsequent studies were drawn from the same population). They were randomly assigned to conditions in a 2 (Familiarity: High vs.

Low; between-participants) x 2 (Memory: Metacognition vs. Performance; within-participant) design.

Participants were informed that they would be exposed to a number of product names on a computer screen and instructed that their goal was to pay attention to the products so that they would be able to remember what items to buy 10 minutes later in an online shopping task. The products were displayed one at a time in the upper and lower part of the screen, while an animated movie (Pixar's "Presto, The Magician") played in the middle of the screen. We included the animated movie as a secondary task to increase external validity because consumers often think of items they need to buy, or are asked to buy items, while doing other tasks. Figure 2 illustrates the presentation of a product on the screen. The screen capture of the film was replaced by a blank rectangle in figure 2 due to copyright restrictions.

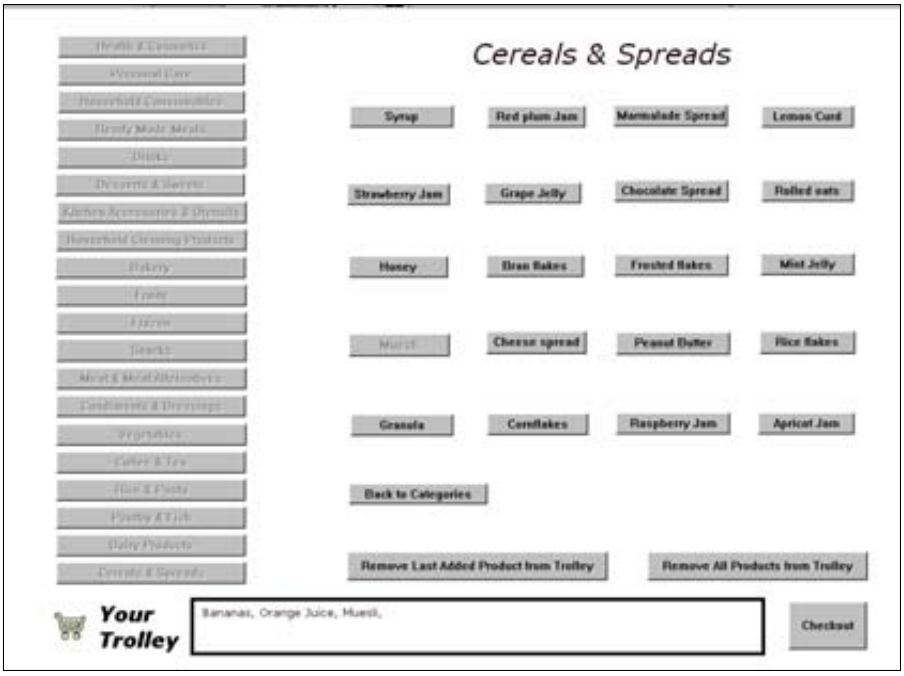
Figure 2: Screen Capture of the Study during Which the Products Were Presented.

Participants were presented with 20 products, one each from 20 product categories, while watching a short film. Ten of the products were randomly selected to be shown with the word "buy" before each one of them. The other ten products were shown with the words "don't buy." In the context of grocery shopping, consumers often need to remember to buy some products and to avoid buying some others that they already have at home. The items that participants should avoid buying were therefore included to increase the external validity of the study. The products were displayed in random order. For half of participants, the 20 products were familiar items consumers commonly buy in the supermarket (e.g., beer, bread, oranges, toilet rolls, and tomatoes). For the other half, the 20 products were relatively unfamiliar items that can be found but are not frequently bought (e.g., eggplant, crème fraiche, frozen paella, fudge, and haddock). The products were displayed one at a time in the upper or lower part of the screen while an animated movie played in the middle as in study 1.

Immediately after the item presentation phase, participants were asked to predict how many products they would remember to buy 10 minutes later. In the 10 minute interval, participants watched five Pixar cartoons of two minutes each. Next, they entered an online grocery store in which they were asked to buy the products whose names had been shown with the word "buy" on the side of the screen 10 minutes earlier during the first film. They were required to find the products and put them in the shopping trolley by clicking their name. The online store listed the 20 categories: Fruit, Vegetables, Condiments and Dressings, Ready Made Meals, Bakery, Dairy Products, Frozen, Drinks, Coffee and Tea, Household Consumables, Rice and Pasta, Cereals and Spreads, Desserts and Sweets, Household Cleaning Products, Kitchen Accessories and Utensils, Meat and Meat Alternatives, Poultry and Fish, Snacks, Health and Cosmetics and Personal Care. Each category featured 20 products (see figure 3). Participants

could navigate the store by clicking a category, clicking products in or out of the trolley, and pressing "back" to select another category.

Figure 3: Screen Capture of the Simulated Grocery Shopping Task



As mentioned above, two lists of 20 products each were used. The products in the familiar and unfamiliar conditions were selected by asking two university staff members to indicate the most and least familiar products of each product category. To further validate the familiarity manipulation, a word search was performed on Google's search engine for each of the product names. The number of search results is a measure of prevalence of the word in a given language (Google, 2011). The number of hits for familiar items was higher than for unfamiliar

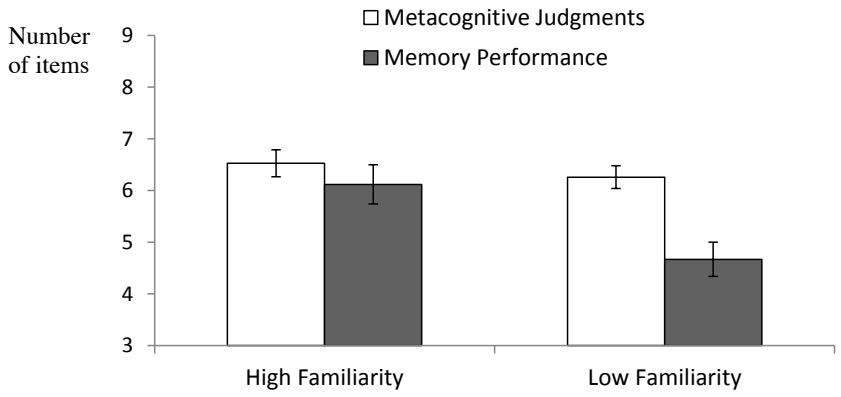
items ($F(1, 38) = 4.66$, $p < .05$). Note that, due to the need to ensure comparable distribution of items across categories in both familiarity conditions, some of the familiar products are not among the most familiar overall in a typical grocery store. However, they are the items that produced the highest number of hits on Google in each of the categories in our online store.

Results and Discussion

In this and the subsequent studies, the dependent variable for actual memory performance was the total number of items correctly bought in the simulated shopping task. The data were subjected to a repeated-measures ANOVA with metacognitive judgments and actual memory performance as repeated-measures and familiarity as a between-subjects factor. The interaction between memory (metacognition vs. actual performance) and familiarity (high vs. low) is significant ($F(1, 120) = 6.39$, $p = .01$, partial $\omega^2 = 0.042$; see figure 4). There was a significant increase in memory performance going from the low familiarity condition ($M = 4.67$, $SD = 2.82$) to the high familiarity condition ($M = 6.11$, $SD = 2.71$; $F(1, 120) = 8.07$, $p < .01$), whereas metacognitive judgments exhibited no significant difference between the low ($M = 6.25$, $SD = 1.71$) and the high familiarity condition ($M = 6.53$, $SD = 2.08$; $F(1, 120) = 0.67$, $p > .41$). Finally, there was a main effect of memory (metacognition vs. performance: $F(1, 120) = 19.07$, $p < .01$). Metacognitive judgments were on average higher ($M = 6.38$, $SD = 1.87$) than actual memory performance ($M = 5.28$, $SD = 2.85$). However, metacognitive judgments were only significantly higher than memory performance in the low familiarity condition ($F(1, 120) = 27.88$, $p < .01$) and not in the high familiarity condition ($F(1, 120) = 1.47$, $p > .22$). These results confirm that participants were overconfident about their memory performance in the low familiarity condition but not significantly so in the high familiarity condition.

Figure 4: Study 1 Results

Metacognitive Judgments and Memory Performance as a Function of Product Familiarity



In the shopping task, participants sometimes also bought items they had not been asked to buy. Although such mistakes were relatively rare, the number of products incorrectly bought was greater in the low (M = 2.54) than in the high familiarity condition (M = 1.40, $F(1, 120) = 9.07$, $p < .01$). This also confirms that memory performance was more accurate in the high familiarity condition than in the low familiarity condition. Among the products incorrectly bought, a minority were items that participants had been instructed to avoid buying. There was no differences between the low (M = 0.67) and high familiarity conditions (M = 0.63; $F(1, 120) = 0.04$, $p > .84$). The number of products incorrectly selected for purchase was also low in the remaining studies.

Due to the low numbers of incorrectly bought items, results using signal detection metrics (e.g., d') do not deviate substantially from those using the number of correctly bought items in this and following studies. Given that (a) our substantive interest is in the number of products

correctly remembered from the to-be-purchased list and (b) the lack of additional insight provided by more complex signal detection metrics, in subsequent studies we report only the number of items correctly bought.

Study 2: Thematic Cue

Study 2 examines another factor that may reduce the dissociation between memory metacognition and performance. Our model predicts that incoming activation will influence memory performance, but not memory metacognition. Specifically, items that differ in the level of incoming activation from related concepts are more likely to stay accessible in memory after a delay (see figure 1), therefore positively affecting memory performance in the store. However, memory metacognition is driven mostly by the temporary activation at encoding, ignoring other factors, such as incoming activation from related concepts. Incoming activation should therefore have little influence on memory metacognition. At the same time, the association of the shopping items to a common theme should facilitate remembering to buy a set of shopping items after a delay (Bower, 1970; Ross and Murphy, 1999) and should reduce the discrepancy between metamemory judgments and memory performance in our online store.

Method

Sixty-nine participants were randomly assigned to conditions in a 2 (Common theme: Thematic cue vs. Control; between-participants) x 2 (Memory: Metacognition vs. Performance; within participant) design. The procedure was similar to the one of study 1 but this time all participants were asked to remember the same list of items. In the thematic cue condition, before

the movie started, participants were informed that the products they had to buy were all breakfast items. In the control condition, participants were not given this information.

One list consisting of 20 products was used, 10 with "buy" and 10 with "no buy" instructions. The 10 target "buy" items were chocolate sprinkles, cornflakes, croissant, dark bread, English tea, Gouda cheese, ham, orange juice, peanut butter, and yoghurt. These products were selected based on a pre-test in which university staff members described local breakfast habits. The most frequently mentioned items were used as stimuli for the study. When the products were equally representative of local breakfast habits, we selected the one from the category that had the lowest number of products such that no more than two products came from the same category. For example, milk and croissant were equally representative of local breakfast habits. We selected croissant because yoghurt and Gouda Cheese were already selected for the Dairy Products category. The decoy "no buy" items were randomly selected from the remaining product categories (no more than one per category, e.g., air freshener, candy, ice-cream, lemon, sunscreen, and tomatoes). The products were displayed in random order.

After presentation of the products, all participants were asked to predict how many items they would remember to buy 10 minutes later in a simulated shopping task. After the filler task, they were again instructed about what they needed to do in the simulated shopping task and then entered the online store.

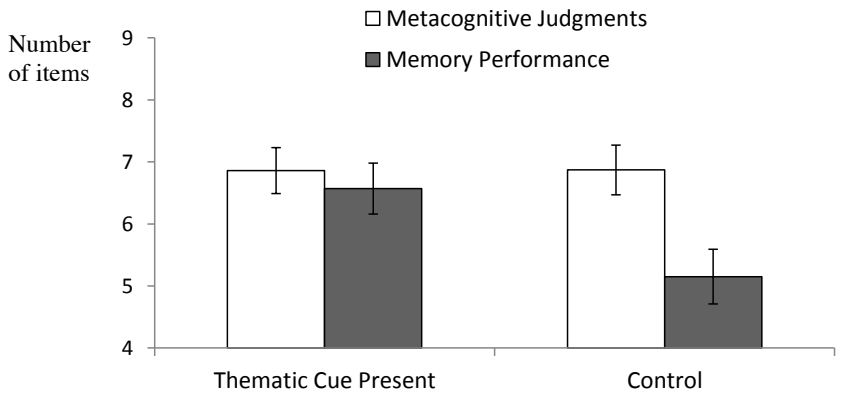
Results and Discussion

A repeated-measures ANOVA with metacognitive judgments and memory performance as repeated measures and thematic cue condition as a between-participants factor yielded the predicted interaction effect ($F(1, 67) = 6.05$, $p = .01$, partial $\omega^2 = 0.068$; see figure 5). Actual

memory performance was higher in the thematic cue condition (M = 6.57, SD = 2.11) than in the control condition (M = 5.16, SD = 2.95, $F(1, 67) = 5.31$, $p < .05$). However, the metacognitive judgments did not differ between the thematic cue (M = 6.86, SD = 2.12) and control condition (M = 6.87, SD = 2.42, $F(1, 67) = 0.01$, $p > .98$). Moreover, the results again show a significant main effect for memory (metacognitive judgment vs. memory performance, $F(1, 67) = 12.16$, $p < .01$). On average, predictions of memory (M = 6.87, SD = 2.25) were higher than memory performance (M = 5.91, SD = 2.61). However, as predicted, metacognitive judgments were significantly higher than memory performance only in the control condition ($F(1, 67) = 16.49$, $p < .01$; thematic cue condition: $F(1, 67) = 0.57$, $p > .45$).

Figure 5: Study 2 Results

Metacognitive Judgments and Memory Performance as a Function of Thematic Cue



Study 2 confirmed that a thematic cue increases memory performance. The benefit of a common theme, however, was not anticipated by participants. These findings are consistent with

our proposal that the dissociation between memory metacognition and performance is due, at least in part, to consumers' reliance for their memory predictions on the current accessibility of the needed items and not on factors such as item familiarity (study 1) and a salient common theme (study 2) that determine the longer-term accessibility of shopping items.

Study 3: Expected Cognitive Effort

In addition to underestimating the effects of familiarity and thematic cue on memory performance, metamemory judgments may be flawed by incorrect naïve theories that overestimate the impact of intervening processes on memory. To investigate this type of influence, we hypothesized that consumers tend to believe that demanding mental activity between mental list generation and in-store recall will hamper memory, decreasing confidence in their ability to remember to buy a set of products. Actual performance, however, should be relatively impervious to demanding mental activity in the interval between creating a mental list and buying the products in our on-line store to the extent that the mental activity during the interval is unrelated to the memory task (Logan, 2004; Nairne, 2002; Schmeichel et al., 2003). Thus, the expected intensity of mental activity during the interval between acknowledging that items should be purchased and purchasing the items in the on-line store, should reduce consumers' overestimation of memory performance.

Method

One-hundred and nine participants were randomly assigned to conditions in a 2 (Anticipated cognitive effort: High vs. Low; between-participants) x 2 (Memory: Metacognition vs. Performance; within-participant) design. The procedure was similar to previous studies, with

one important exception. In this study we provided new information about the nature of the task between memory predictions and the simulated shopping task. After the presentation of the target products, participants in the high cognitive effort condition were informed that they would be asked to solve difficult mathematical tests for five minutes. A sample problem was then displayed: "If x + 3y = -2 and 2x - y = 10, then x must be equal to …". Participants in the low cognitive effort condition were given the same information except that the word "difficult" was substituted by "easy" and the example test was "Multiply 140 by 5". Participants then made the metacognitive judgments before working on difficult or easy problems for five minutes. Finally, participants performed the same simulated shopping task used in the previous studies. One list of 20 products was used (chicken fillet, green tea, ham, insecticide, ketchup, muesli, spinach,…). For each respondent, the computer randomly selected 10 of these to serve as target ("buy") products and 10 to serve as decoy ("no buy") products.

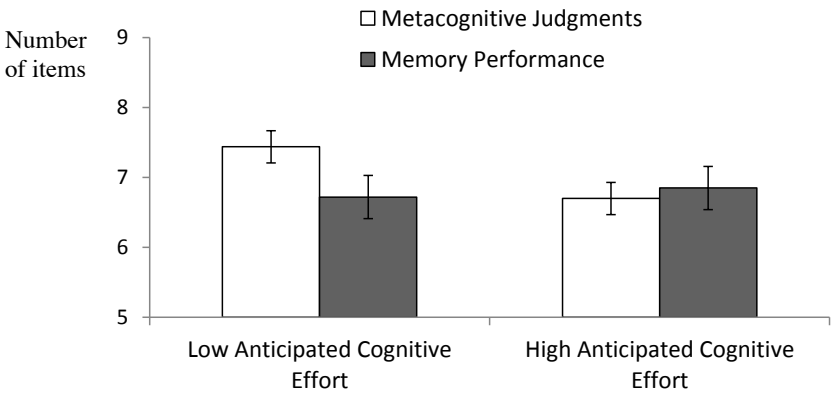
Results and Discussion

A repeated-measures ANOVA with memory metacognition and performance as repeated measures and cognitive effort condition as a between-subjects factor yielded a significant interaction effect ($F(1, 107) = 4.58$, $p < .05$; partial $\omega^2 = 0.032$; see figure 6). Memory metacognition was higher in the low cognitive effort condition ($M = 7.44$, $SD = 1.80$) than in the high cognitive effort condition ($M = 6.70$, $SD = 1.64$, $F(1, 107) = 4.95$, $p < .05$). However, memory performance was not significantly different in the low cognitive effort condition ($M = 6.85$, $SD = 2.08$) and the high cognitive effort condition ($M = 6.72$, $SD = 2.58$, $F(1, 107) = 0.09$, $p > .76$). There was no significant main effect of memory (metacognition vs. performance, $F(1, 107) = 2.02$, $p = .15$). On average, predictions of memory ($M = 7.07$, $SD = 1.75$) were not

significantly higher than memory performance (M = 6.78, SD = 2.33). However, as predicted, metacognitive judgments were higher than memory performance in the low cognitive effort condition ($F(1, 107) = 6.28$, $p = .01$) but not in the high cognitive effort condition ($F(1, 107) = 0.26$, $p > .61$).

Figure 6: Study 3 Results

Metacognitive Judgments and Memory Performance as a Function of Cognitive Effort



Consistent with our predictions, participants in study 3 incorrectly believed that exerting strenuous mental activity between thinking of items to buy and buying them posed a threat to their ability to remember the items. As the activity during the interval became more cognitively demanding, participants became less confident about their memory performance, resulting in lower forecasts of how many items would be remembered. Unlike studies 2 and 3, where participants did not predict that the nature of the to-be-remembered items would affect memory performance, participants in study 4 did alter their forecast between conditions. The results are

consistent with the claim that consumers' lay beliefs about what might affect their memory, in this case about mental activity between thinking of items to buy and buying them, affect their metamemory judgments. These metamemory judgments should, in turn, affect consumers' behavior. For example, consumers shopping on weekends or other occasions when they are less busy (e.g., during vacation periods) might not bother writing a shopping list, to their detriment. Although we did observe significant overestimation of memory performance in the low cognitive effort condition, this effect was not strong enough to produce a main effect of memory measure (metacognition vs. performance). This is not surprising given the impact of expected cognitive effort on metamemory judgments and the fact that participants in all conditions expected to expend at least some cognitive effort solving math problems while waiting to perform the simulated shopping task.

Study 4: Shopping Lists

This study examines whether metamemory judgments are predictive of consumers' decisions to write a shopping list. Consumers who predict they will remember to buy fewer items should be more inclined to write a shopping list. Moreover, we expect these predictions about future memory to be sensitive to the difficulty of the memory task: the more difficult the memory task, the more participants should be inclined to write a shopping list.

Method

One hundred and twenty-one participants were randomly assigned to a single factor design with three levels (difficult task vs. easy task vs. control). In the difficult task condition, participants were asked to remember 15 items. In the otherwise identical easy task condition,

participants had to remember five items randomly selected from the 15 items of the difficult task condition. To check for instrumentation effects, we added a control condition that differed from the 15-items condition only by omitting the metamemory judgment. Because consumers may not spontaneously make a conscious assessment of whether they will later remember something, we removed the requirement to make a metamemory judgment in this condition as it could highlight a possibility of forgetting that would otherwise not be noted.

After the items were presented, participants in the easy and difficult conditions were asked to indicate how many items they would be able to buy 10 minutes later. Participants in the control condition went directly to the next screen. On this screen, an unexpected message appeared saying that they could ask for paper and pen to write down the items. The shopping items were listed again on that screen so that participants in all conditions had equal opportunity to write down all the shopping items. To obtain paper and pen, participants had to open the cubicle door, walk to the control room to find the study administrator, ask for a pen and paper, return to the cubicle, and continue the study procedure. The effort to obtain paper and pen and write down the items lengthened the duration of the study by approximately 20%. We felt it was important to include a small cost for list creation as is the case in the grocery shopping situation. Participants expected a memory test following a delay of 10 minutes, but when they finished writing down the items or when they simply pressed continue without asking for paper and pen, the study ended and they were thanked and debriefed.

Results and Discussion

A logistic regression testing the effect of difficulty of the memory task (difficult, easy, or control) on the decision to ask for paper and pen revealed a main effect of condition (Wald's χ^2

(2) = 14.42, $p < .01$). As expected, participants in the easy memory task condition were less likely to ask the paper and pen (20% asked) than those in the difficult memory task condition (50% asked; Wald's χ^2 (1) = 10.14, $p < .01$) and those in the control condition (66.6% asked; Wald's χ^2 (1) = 13.07, $p < .01$). There was no statistically significant difference in the decision to ask for the paper and pen between the control and the difficult memory task conditions (Wald's χ^2 (1) = 0.77, $p = .38$). We also predicted that the number of items participants think they would forget will predict their decision to ask for paper and pen. A logistic regression of the decision to ask for pen and paper on the number of items that participants predicted they would forget (i.e., metamemory) revealed that the higher the number of items participants thought they would forget, the higher the propensity to ask for paper and pen ($\beta = .35$, χ^2 (1) = 6.91, $p < .01$).

An ANOVA was used to estimate the effect of the difficulty of the memory task on the number of products participants predicted they would forget. This analysis revealed that when the memory task was easy participants predicted they would forget fewer items ($M = 0.42$) than when the memory task was hard ($M = 5.32$; $F(1, 83) = 95.65$, $p < .0001$). The same analysis was performed on the relative number of products they predicted they would forget to the total number of products they were asked to remember in that condition. This analysis revealed that when the memory task was easy participants predicted they would forget fewer items relative to the total ($M = 8.6\%$) than when the memory task was hard ($M = 35.5\%$; $F(1, 83) = 49.66$, $p < .0001$, partial $\omega^2 = 0.364$).

This study confirms our hypothesis that shopping list usage depends on metamemory judgments and that this result cannot be explained as an instrumentation effect due to explicitly measuring the metamemory judgment. (The control condition shows that shopping list usage was not boosted by explicit measurement.) The finding that metamemory is a strong predictor of

shopping list usage is perhaps not counterintuitive, but it establishes the behavioral relevance of metamemory in the form of a substantively important, but hitherto unstudied, effect.

2.3. General Discussion

Shopping for groceries and other basic commodities absorbs a significant portion of our consumer lives. Failing to remember to buy items that are needed is an annoyance that is both common and easily avoidable by the use of shopping list. Shopping without a list is a problem when consumers think they will be able to remember most items they need to buy, but actually cannot remember to buy them without memory aids. In this research, we find that consumers often overestimate their ability to remember. This is because some of the antecedents of memory metacognition—ease of item generation when constructing a mental list at the time of metamemory prediction, and naïve theories about when memory will be accurate—are not always positively related to actual memory performance. Ease of item generation depends heavily on transient, momentary memory activation and naïve theories are not always correct.

Actual memory performance after a delay depends less on the temporary activation and more on memory determinants such as product familiarity (cf. chronic base-level activation of the to-be-remembered items, study 1) and awareness of a common theme among the items to-be-bought (cf. incoming activation from related concepts, study 2). In addition, the degree of overestimation can be affected by naïve theories about memory performance, such as the incorrect belief that cognitive effort exerted during the time interval between realizing the need to buy an item and the shopping trip would decrease memory performance (study 3). Finally, we find that consumers' optimism about their ability to remember to buy items is an important predictor of shopping list usage (study 4), which should have a direct effect on actual forgetting

to buy. At a more general level, we introduce a theoretical framework about consumer metamemory and its discrepancy with actual memory performance.

2.3.1. Theoretical Implications

This research contributes to both the consumer behavior and the cognitive psychology literatures in several ways. First, we highlight the importance of metamemory in shopping behavior. That is, we show that the number of items consumers think they are going to remember at the store predicts whether they write a shopping list. Writing a shopping list is most commonly associated with grocery shopping. This is because grocery shopping often requires consumers to remember the products they needed to buy. But consumers also forget to buy items on other shopping occasions. For example, during the Christmas season alone, 44% of consumers forget to buy thank you notes, 37% forget to buy holiday cards or letters, 36% forget to buy batteries (for Christmas lights), and 25% forget to buy wrapping paper (NYTimes, 2011). Thus, the use of shopping lists may be useful not only for grocery shopping but also for other buying situations.

Second and most important, we propose a general framework of memory for products in a store. We know a lot about consumers' retrospective memory—how consumers build memory for things that occurred in the past—but we know very little about how they remember (or forget) to do things in the future (Krishnan and Shapiro, 1999). Our framework provides important insights into why consumers often do not make enough preparation for future memory requirements (e.g., a shopping list) and, therefore, end up forgetting items at the store.

Third, we investigate novel and real-life factors that cause the dissociation between memory metacognition and performance. Only recently have researchers begun to uncover the conditions that produce the dissociation between memory and metamemory (Kornell and Bjork,

2009; Kornell et al., 2011; Rhodes and Castel, 2008). We contribute by proposing a model that highlights novel factors that explain the dissociation between memory and metamemory. For example, although previous literature has shown that metacognitive judgments are less accurate immediately after learning than after a short delay when temporary activation is decreased (Rhodes and Tuber, 2011), no attention has been paid to the role of base-level (study 1) and incoming activation (study 2) of items in reducing the discrepancy between metamemory and memory performance. In addition, previous research has shown that sometimes people fail to employ the correct metacognitive beliefs when predicting their memory. For example, people sometimes fail to apply the belief that studying leads to learning (Kornell and Bjork, 2009) or the belief that memory decreases over time (Koriat et al., 2004). The findings of study 3 add to the literature by showing that, when predicting memory, consumers apply the incorrect belief that anticipated cognitive demand disrupts memory performance.

2.3.2. Substantive implications: Bye, bye, forgetting to buy

Our studies speak to the everyday life of consumers and their decisions about writing shopping lists. The procedures of the studies were designed to maximize internal validity while replicating as closely as possible the structural characteristics of real-life consumer situations. For example, in most studies, participants learned about products they needed to buy one at a time and while engaging in a secondary task. Moreover, instead of a simpler (and more standard) assessment of actual memory, we designed an online store to assess memory performance in order to provide a context that, within the constraints posed by our lab setting, resembled real shopping behavior as much as possible. A shopping trip may be a replenishing trip where the consumer is filling up the pantry and refrigerator with the usual items they buy or, instead, may

include items that are less familiar products or brands. Although the less familiar items are not predicted to be any more difficult to remember, they are less memorable. Therefore, consumers are likely to be equally motivated to write a list in the familiar and unfamiliar conditions, when in reality they are more likely to need a list in the unfamiliar item situation. The trip may instead be a special trip for a particular meal. Here the items should be related in the shopper's mind. Although shoppers are relatively more accurate in this condition, they do not predict any differences in memory performance. Moreover, consumers may take how much mental energy is required between now and the shopping trip (e.g., a tough day at the office vs. a lazy day at home) into account when deciding whether to write a list when, in fact, the intervening task difficulty does not substantially affect memory performance.

Although our empirical strategy centered on shopping for groceries, implications of our findings should extend to other situations in which memory is crucial. For example, consumers may be more likely to forget to pay the bills that they are not very familiar with. When people are busy, they may be more likely to perform things in advance (e.g., book a flight for a conference) as they think that the likelihood of remembering the task is low. Our results should also have implications for non-consumer situations. As successful memory performance often requires the use of memory aids (Intons-Peterson and Fournier, 1986), it is important to understand the drivers of the dissociation between how well people think they will remember and how well they can actually remember. This is because if people become accurate about how well they will remember, they may be more likely to adequately prepare memory aids for future memory requirements.

Overall, it appears that the lesson learned here is that consumers are likely to be overconfident about their memory and that several factors that affect predictions of memory

performance do not affect actual memory performance whereas factors that affect actual memory performance fail to influence metamemory predictions. Consumers might be better off erring on the side of caution and using a simple rule: Don't ask yourself if you'll remember. Just write a shopping list.

Chapter 3.

Motivational Effects of Reminders on Accelerating or Delaying Task Completion

It is 9 a.m. and you are in the coffee room talking about running with a colleague. You resolve that you need to visit the running shoe store over the weekend to check out a replacement pair of trail shoes. You head back to your office and you are about to leave for a meeting when you realize you still haven't mailed in the rebate for the printer you bought last week. You write a post-it and put it on the corner of your desk to fill the rebate form and send it off in the afternoon when you have more time. How likely are you to buy the shoes compared to mailing in the rebate? Is the answer affected by the use of a post-it for the second task but not for the first? Are you more likely to complete on schedule the task you planned to do later (visit the running shoe store over the weekend) than the task you planned to do sooner (submit the rebate form)?

The most important variable that determines whether consumers choose an option or perform certain behavior is whether they consider the given option or behavior (Berger, Sorensen, and Rasmussen 2012; Hauser 1978). Nedungadi (1990) showed that considering an option is sometimes strictly a matter of memory. Other work indicates a connection between motivation and the likelihood that an alternative is considered (Hauser and Wernerfelt 1990; Mitra and Lynch 1995). Memory and motivation jointly determine whether people prioritize a certain option, task or behavior. The present paper examines how reminders intended to enhance memory for behavioral options affect performance of future and of ongoing consumer tasks.

Reminders represent any kind of internal or external retrieval cue that consumers use to remember to perform a task. We conducted a pilot study in which we asked participants to list 10

consumer tasks they intended to perform over the next two weeks and the reminders they would use to remember these tasks. Content analysis revealed that reminders could be reliably sorted into nine categories (kappa = .91). These categories were broadly classified into two types of reminders: physical reminders under one's control (e.g., "a to-do list in my cell phone"; "a post-it") and mental notes to do the task when some condition occurs (e.g., "if I see my Dad, I will remember"; "the crowded space on my desk will remind me"), cf. Gollwitzer (1999).

Prior research shows that reminders help consumers to remember various tasks they set out to execute including: grocery shopping (Shapiro and Krishnan 1999); saving money (Karlan et al. 2011); and an array of health-related tasks from taking medicines (Sheeran and Orbell 1999; Zurovac 2011) and getting screened for cancer (Sequist et al. 2009) to eating healthy (Armitage 2007), using sunscreen (Armstrong et al. 2009), and doing exercise (King et al. 2008; Lee et al. 2012). Reminders improve memory for a task by increasing its accessibility. But do reminders always work? And how do reminders influence task performance?

We show that reminders have subtle and unexpected effects due to not only memorial, but also motivational processes they engender. Paradoxically, setting reminders changes when tasks are scheduled for execution. Generating reminders drives people to accelerate or delay tasks depending on whether they think in detail about how to complete the tasks before setting the reminder. When people elaborate on how to complete a task, reminders increase preoccupation with the tasks and cause anticipation of their execution. When people don't elaborate on how to complete a task, reminders decrease preoccupation with the tasks and cause their procrastination. The trait of "propensity to plan" predicts elaboration on the tasks and, hence, determines whether tasks with reminders are moved up or back in one's list of priorities. These effects on when people schedule the tasks then affect whether those tasks are completed.

3.1. How Do Reminders Affect Task Performance?

The problem of forgetting to execute an intention is investigated in work on prospective memory, or memory for intentions (McDaniel and Einstein 2007). This research stream studies the factors that facilitate remembering the execution of future behavior and advocates the use of reminders for successfully completing plans (Intons-Peterson and Fournier 1986; McDaniel et al. 2004). Reminders increase the accessibility of the task by promoting strong associations between to be executed actions and the future context in which they should be executed (Gollwitzer 1999). This buffers memory against distraction (McDaniel et al. 2004) and decay (Tobias 2009).

The vast majority of studies find a positive effect of reminders (cf. Goschke and Kuhl 1993; Guynn et al. 1998). Reminders work as a memory aid that supports retrieval of a task by increasing its accessibility. This positive effect of reminders on task completion has been shown exclusively in the context of a single to-be-remembered task. However, most people have more than one task to execute (Little 1989), and task conflict is a fact of life as we juggle competing priorities (Miller, Galanter and Pribram 1960). Tasks to be executed compete for attention (Lewin 1935). The very few studies of reminders for multiple tasks have not found beneficial effects. With multiple tasks, the effect on scheduling, and ultimate completion of the behavior, may depend on the interplay of how creating a reminder increases or decreases motivation along with increasing memory. Dalton and Spiller (2012) showed that implementation intentions – thought to work via a reminder function – reduce commitment when generated to enact multiple behaviors. Thus, effects of reminders on motivation may overcome its memory benefits.

3.1.1. Positive Effects of Reminders on Motivation to Focus on a Task

In work on individual tasks, interrupted but unfulfilled tasks remain active, intruding into one's thoughts and attention (Zeigarnik 1927). If setting a reminder highlights that a task is left unfulfilled, then reminders may increase the accessibility of tasks, thereby increasing motivation to pursue it. Multiple processes drive a person to keep paying attention to an unfulfilled task. People ruminate about unfulfilled tasks so as to reevaluate how best to pursue them (Martin and Tesser 1989). In addition, people automatically detect information in the environment that is relevant for cuing the task (Förster, Liberman, and Higgins 2005). This may occur without people's full control or even when they attempt to focus on other tasks (Goschke and Kuhl 1993; Moskowitz 2002). Therefore, reminders may drive tasks to persist at the top of mind.

3.1.2. Negative Effects of Reminders on Motivation to Focus on a Task

But recent research has shown that completing a step on the way to a goal can decrease its urgency (Fishbach and Dhar 2005; Wilcox et al. 2010; Zhang, Fishbach, and Dhar 2007). Setting a reminder may have such an effect as a "first step", reducing task motivation – "I'll do it mañana." If so, setting a reminder may actually reduce task motivation compared to a case where no reminder is set. Reminders may reduce preoccupation with the reminded task as if enough progress has been already made. Reminders allow us to remove a task from our heads and cede control to the physical reminder on the desk or the agenda. As a consequence, reminders allow us to stop thinking about a future task and focus on other tasks we are doing.

3.1.3. The Role of Elaboration Prior to Setting a Reminder

When does setting a reminder increase motivation towards a task and when does it reduce motivation towards a task? We propose that the answer depends on whether people elaborate about how to complete a task before setting a reminder. If setting a reminder follows elaboration about steps on the way to completing the task, then the reminder may be a stronger memory cue and may increase motivation. If consumers elaborate in advance about how to execute a task, generating a reminder highlights that there are many things to be executed before the task is completed. This is likely to cause persistent thoughts about the tasks after setting reminders, and, therefore, to increase the accessibility of tasks and motivation to execute them.

In addition, creating a reminder may increase motivation by making one closer to a first step on the way to task completion. Work on the goal gradient effect shows that the motivating power of a goal is stronger when one is closer to attainment (Kivetz, Urminsky, and Zheng 2006). Jhang and Lynch (2013) have shown that when people think about subgoals along a path of overall goal pursuit, their motivation increases as they come close to attaining a subgoal. Someone who does not elaborate on the task will think in terms of distance from achieving the overarching goal– which will seem far away. But someone who elaborates on the same task and breaks it into steps will perceive herself to be closer to achieving a first step than the overarching goal. Therefore, the value of a unit of progress will be more motivating. If, before setting a reminder, consumers think of steps along the way rather than the global task, the task is more likely to remain active, increasing motivation. Thus, generating reminders interacts with degree of prior elaboration (and, we argue below, propensity to plan) to affect an array of dependent variables.

3.2 Behavioral Consequences of Reminders

3.2.1. Task Scheduling

A number of behaviors may be affected by the activation level of a task in the wake of setting a reminder. First, we consider when the consumer schedules a task in a queue of tasks that all demand attention. We expect that when consumers do not elaborate on tasks before setting reminders, setting a reminder feels like goal progress (cf. Fishbach and Dhar 2005; Wilcox et al. 2010), allowing release of task motivation. That causes those consumers to schedule the task later than they would have in the absence of setting a reminder. On the other hand, if setting a reminder is preceded by unpacking of the task and other forms of elaboration, this can more than offset the effects above, and consumers may schedule a task earlier than they would have had without setting a reminder.

3.2.2. Task Completion (as a Function of Scheduling)

Changes in scheduling of tasks, we posit, will be paralleled by changes in actually accomplishing a task by the time one has set for it. The later the tasks are scheduled, the lower the likelihood of their being completed.

This seems surprising, because if one says one will complete a task in 5 days rather than by tomorrow, one has more time to get it done. But Tversky and Shafir (1992) asked participants to answer a questionnaire and return it within 5 days, 3 weeks, or with no deadline. The later the external deadline, the lower the likelihood of returning the questionnaire. Similarly, Silk (2010) found that consumers were much more likely to return mail-in rebates if given a 1-day or 1-week deadline rather than a 3-week deadline—even though consumers preferred the longer deadline if given a choice. Ariely and Wertenbroch (2002) found that imposing evenly spaced deadlines to

students rather than allowing them to deliver all assignments at the end of a course improves their performance. Moreover, those setting their own deadlines spacing them evenly performed as well as those whose evenly spaced deadlines were externally imposed. This means that the later people schedule tasks, the lower the likelihood of completing those tasks as scheduled and the poorer the quality of completion. When consumers schedule tasks to be completed later, they do not necessarily start working on those tasks well in advance. As time goes by, the activation of unfulfilled tasks decreases and people become more likely to forget about those tasks.

3.2.3. Task Preoccupation and Ability to Refocus on a New Task

Reminders allow tasks to be suspended and resumed at a later time. As a result, after setting a reminder, people may stop thinking about the reminded task and switch attention to some new focal task, thus benefitting performance on this new focal task. Consistent with this, Masicampo and Baumeister (2011a) found that interference of unfulfilled goals (the Zeigarnik effect) was eliminated when consumers made plans for goal fulfillment, reducing intrusive thoughts about the incomplete task. As soon as participants have formulated the conditions under which a task should be performed, the drive to complete the task ceased and they could better focus on something else they were supposed to do. In that case, we would expect that continued preoccupation with the initial task being scheduled might be associated with better performance on that task, but worse performance on some new focal task. We conjecture, therefore, that if reminders decrease preoccupation with the tasks for which one set reminders, they should increase ability to refocus on some new task put before one. If reminders increase preoccupation (as when consumers elaborate on tasks before creating reminders), then ability to refocus on a new task should suffer. Thus, reminders are a two-edged sword.

3.3. Propensity to Plan as a Cause of Differential Elaboration

We conjectured before that when reminders are preceded or accompanied by elaboration, consumers schedule tasks earlier, complete them on time, but have difficulty refocusing on new tasks. When reminders are not preceded or accompanied by elaboration, they produce exactly the opposite effects. This raises the natural question, "What makes people elaborate on tasks?"

We focus in this research on the individual difference variable of "propensity to plan" for the use of one's time (Lynch et al. 2010). Consumers high in propensity to plan more frequently set goals, think about subgoals and means to attain them, use reminders and props to see the big picture and understand constraints, and like to plan. We expect, therefore, that those high in propensity to plan are not only more likely to choose to set reminders, but they are also more likely to engage in elaboration about how to complete a task. Such increased elaboration– e.g., breaking a task down into component parts or steps– will increase task activation conditional on the presence of reminders.

Those low in propensity to plan may create different types of reminders and may not break an overall task down on multiple steps. People will, in general, be closer to attainment of a subgoal than to achieving the overarching goal served by the subgoal (Jhang and Lynch 2013). If that is true, goal gradient effects might cause reminders to increase preoccupation with tasks for those high in propensity to plan but not for those lower in propensity to plan. If so, then by the logic in the preceding section, we would anticipate that:

H1: Those higher in propensity to plan for the use of their time will schedule the execution of tasks earlier with than without reminders, and those lower in propensity to plan will schedule the execution of tasks later with than without reminders.

Based on past work suggesting that scheduling tasks later decreases the chances of meeting one's own self-set deadlines (Ariely and Wertenbroch 2002), we predict that:

H2: Those higher in propensity to plan will be more likely to meet their own self-set schedules with reminders than without reminders, but those low in propensity to plan will be less likely to meet their own self-set schedules with reminders than without reminders.

We attribute these interactive effects of propensity to plan and reminders on task scheduling and completion to the differential effects of reminders depending on the extent to which people have elaborated on tasks when they think about scheduling them.

H3: The interaction of propensity to plan with reminders noted above is due to the tendency of those high in propensity to plan to elaborate on how to complete a task.

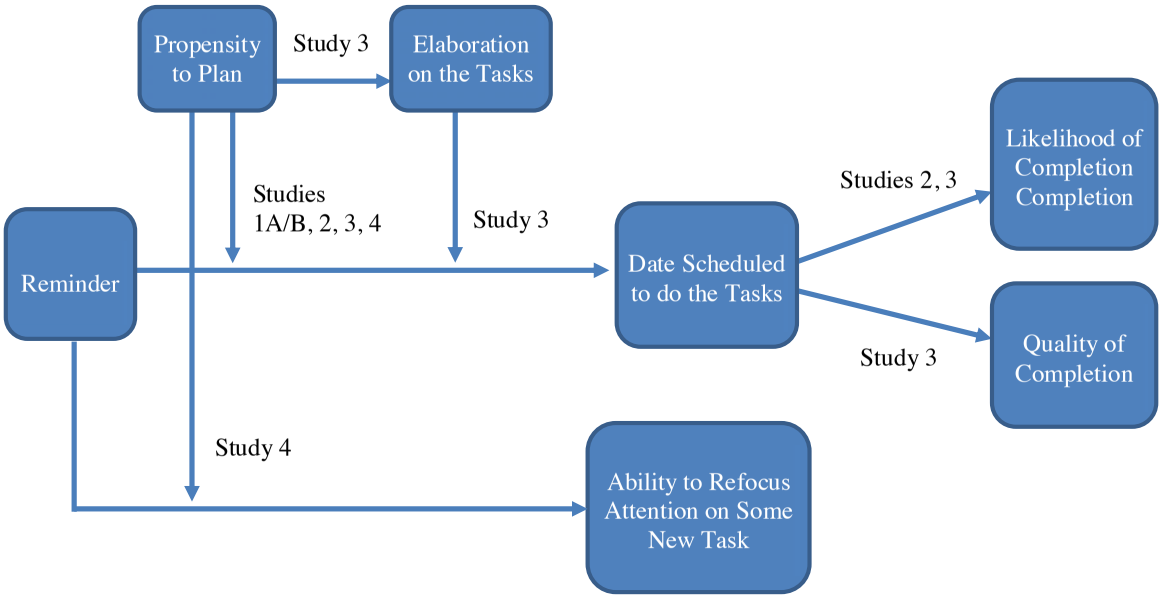
We expect that when consumers have elaborated on a task and thought about subtasks to accomplish it, generating a reminder will increase activation and preoccupation with taking the next step. When consumers have not elaborated on a task, generating a reminder will allow them to banish the task from their minds. Because of the pivotal role of activation of a task as a function of setting a reminder, we expect spillover effects on ability to refocus on a new task.

H4: Those higher in propensity to plan will be less able to refocus on a new tasks after setting a reminder compared to the case where no reminder was set for that task, but those low in propensity to plan will be more able to refocus on new tasks after setting a reminder compared to the case where no reminder was set.

The framework in figure 7 depicts the proposed relationships. The presence of reminders interacts with propensity to plan on when people schedule tasks to be executed. Reminders also interact with how detailed the plan was made. Propensity to plan influences how detailed plans are made. Among people high on propensity to plan, plans are more detailed and steps needed to

complete the tasks are set (Lynch et al. 2010). As a consequence, reminders cause task acceleration and increase preoccupation with the task. This ultimately leads to sooner, more likely and better completion of tasks. Among people low on propensity to plan, plans are not carefully set. As a consequence, reminders cause task procrastination and decrease preoccupation with the task. This ultimately leads to later, less likely and worse completion of tasks.

Figure 7: Theoretical Framework and Studies*



*A line connecting two boxes depicts a main effect. A line connecting a box with another line depicts an interaction.

3.4. Empirical Strategy

In our experimental paradigm, we asked participants to list ten tasks they intended to perform over the following week(s), manipulating whether participants were prompted to specify reminders. Later we asked participants to schedule the tasks. All of our studies show that reminders interact with propensity to plan to affect when people schedule tasks (H1). Study 2 replicates the interaction using a design in which the presence of reminders was manipulated within-participants, allowing us to see how selective reminders change which tasks are scheduled sooner. Moreover, Study 2 tests whether reminders indirectly affect whether tasks are completed on time by affecting the mediator of when they are scheduled (H2). Study 3 provides evidence for the process of this interaction by examining the extent to which participants relied on a detailed plan specification. Propensity to plan is positively related to elaboration on the plan. Among those who elaborate on the plan, reminders accelerated task scheduling. Among those who do not elaborate on the plan, reminders delayed task scheduling (H3). Study 3 also shows that tasks scheduled to be completed later are less likely to be executed and are more poorly performed (H2). Study 4 demonstrates that the interactive effects of reminders and propensity to plan on task scheduling carry over to preoccupation or lack of preoccupation with the tasks being scheduled (H4). This affects ability to refocus on some new task when it is appropriate to do so. Among those high on propensity to plan, reminders increase preoccupation with the just-scheduled tasks, inhibiting refocusing. Among those low on propensity to plan, we find the opposite pattern.

STUDY 1A – REMINDER × PROPENSITY TO PLAN → TASK SCHEDULING

Study 1A examines the effects of having a reminder on the time to complete a goal. We hypothesize that, among those high on propensity to plan, the reminder brings forward the planned time to complete a task. Among those low on propensity to plan, the reminder postpones the planned time to complete a task. The reminder is a cue for action to finish the task among those high on propensity to plan, for those with low propensity to plan, a reminder is a way to defer a task one does not want to complete now.

Method

Participants and Procedure. One hundred and twelve undergraduates participated in the study in return for class credit. They were randomly assigned to two levels (with reminder vs. without reminder). Participants were asked to list ten tasks they intended to perform over the next two weeks. After listing each task, about half of them (those in the reminder condition) were also asked to set one reminder for each task by indicating what they would do to remember to perform the task. They did not actually physically create these reminders, but simply indicated what reminder they would use. All participants then scheduled when they intended to perform those tasks by writing down the exact date. After, participants answered the Lynch et al. (2010) scale of propensity to plan for the use of time in the short run (next few days). Then, they were debriefed for suspicion, told about the purpose of the study, thanked, given credit and dismissed.

Design. The manipulation of the presence of reminders (with vs. without reminder) was included as a dichotomous predictor. We also included the repeated background factor of ordinal position of the task in the original listing. Propensity to plan was a continuous predictor. The key dependent variable was the number of days from the study when the respondent scheduled tasks.

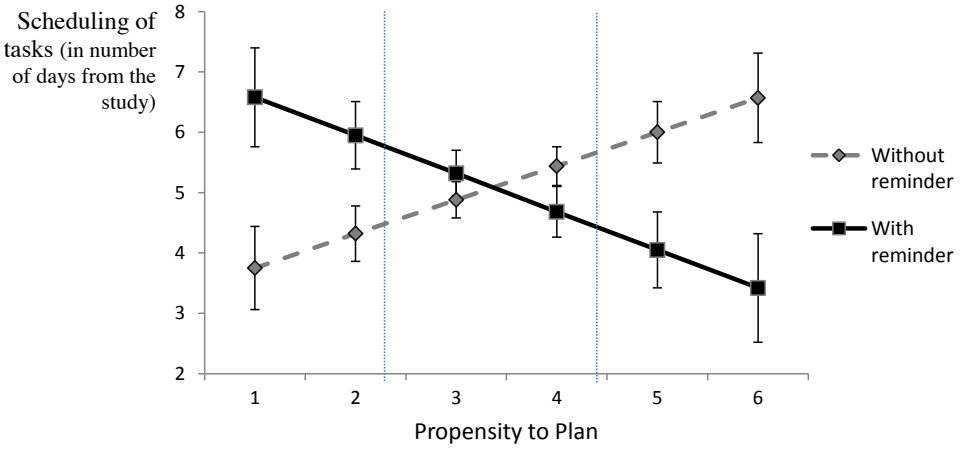
Results

We averaged and mean centered the responses to the propensity to plan for time in the short-run scale (M = 3.38; SD = 1.11; α = 0.89). We analyzed time to complete the 10 tasks as a mixed ANOVA with repeated measures of listing ordinal position of the task, between subjects factor of reminder (with vs. without) and propensity to plan as a continuous predictor. Though our key predictions are about the average scheduling dates in the two conditions collapsing across the 10 tasks listed, we also found a main effect of ordinal position of the measure (F(9, 972) = 15.90, p < .01). Linear trend tests confirmed that participants listed first the tasks they intend to do sooner and then the tasks they intend to do later (F(1,108) = 81.84, p < .01, partial ω^2 = 0.426). No other trend components were significant. We found a similar pattern in the next studies and will not discuss these effects hereafter.

The key result was an interaction between reminder and propensity to plan on average scheduled time to complete the tasks (F(1, 108) = 8.50, p < .01, partial ω^2 = 0.063). To decompose this interaction, we used the Johnson-Neyman technique– dubbed "floodlight" analysis by Spiller et al. (2013)– to identify the regions on the propensity to plan scale where the simple effect of reminders was significant. This approach illuminates the entire range of the data rather than arbitrarily spotlighting at plus and minus 1 SD. We found that for any propensity to plan score of 4.40 or higher, participants schedule the tasks sooner on average when they have a reminder (B = -0.64, SE = 0.32, p = .05), and for any score of 2.30 or lower, they schedule the tasks later on average when they have a reminder (B = 0.62, SE = 0.31, p = .05). See figure 8.

Figure 8: Study 1a Results

Day Scheduled to Finish the Task as a Function of Reminder Presence and Propensity to Plan*+



* The points and the standard errors on the graphs are based on the regression estimates.

+ The vertical dotted-lines crossing the graph indicate the Johnson-Neyman points where the difference between the solid and the dashed lines starts to become significant (see Spiller et al., 2013).

Discussion

Study 1A supported H1. Reminders cause people high in propensity to plan to move tasks up on their calendars and caused people low in propensity to plan to move tasks back on their calendars. Random assignment ensures that the simple effect of reminders on scheduling is not due to some property of the task.

As a secondary issue, we tested whether those high and low in propensity to plan created different types of reminders. We coded the reminders that participants listed into two categories

noted earlier: a) reminders that are under the control of the individual (e.g., a post-it), and b) reminders that are not fully under the control of the individual (e.g., the dust in my bedroom will remind me to clean it). We did find that those high in propensity to plan generated a higher proportion of reminders of the type under control (B = 0.20, *SE* = 0.07, $t(39) = 2.78$, $p < .01$), but type of reminder generated did not mediate the interaction in Figure 2. The number of reminders with cues under one's own control exerted no effect on the time scheduled to perform the tasks ($p = .72$), and type of reminders did not mediate the interaction of reminders and propensity to plan on scheduling of tasks. Thus, the main conclusion from this study was that reminder makes those high on propensity to plan to schedule the task sooner, but those low on propensity to plan to schedule it later. The meditational mechanism awaits investigation in Study 3.

STUDY 1B – SELF-ASSIGNED REMINDERS × PROPENSITY TO PLAN → TASK SCHEDULING

Study 1B aims to replicate the previous findings by measuring instead of manipulating the presence of reminders. One might argue that setting reminders is an unnatural act for some consumers, such as those low in propensity to plan. Thus, the focus of Study 1B is on endogenous rather than exogenous decisions to create reminders for some tasks but not for others. Participants were asked to list 10 tasks they intended to perform over the following seven days. Next, participants were asked to indicate whether they would use a reminder for each task. Finally, they scheduled when they would complete them. We expect to replicate the interaction between propensity to plan and the presence of reminders despite the fact that propensity to plan is positively related to the proportion of tasks with a reminder.

Method

One hundred ninety-three undergraduates participated in the study in return for study credits. In this and in Study 4 where key variables were confounded with effort to answer the study, all participants first completed an attention filter (Oppenheimer, Meyvis, and Davidenko 2009). Sixty-five participants failed to pass an attention filter in Study 1B, yielding a final sample of 128 participants. Thereafter, the procedure exactly matched Study 1, except that a) tasks were to be completed in the next week rather than next two weeks, and b) after listing each of 10 tasks task, all participants were asked to indicate whether they intend to use a reminder to remember to perform the task. Those who said "Yes" were also asked to indicate what they would use to remember to perform the task. Next, participants scheduled when they intended to perform each task (from "Today" to "7 days from today").

Results

We averaged and mean centered the responses to the propensity to plan for time in the short-run scale (M = 4.18; SD = 0.95; α = 0.87). Propensity to plan was strongly related to the average number of reminders produced (r = .60, $p < .01$), as expected.

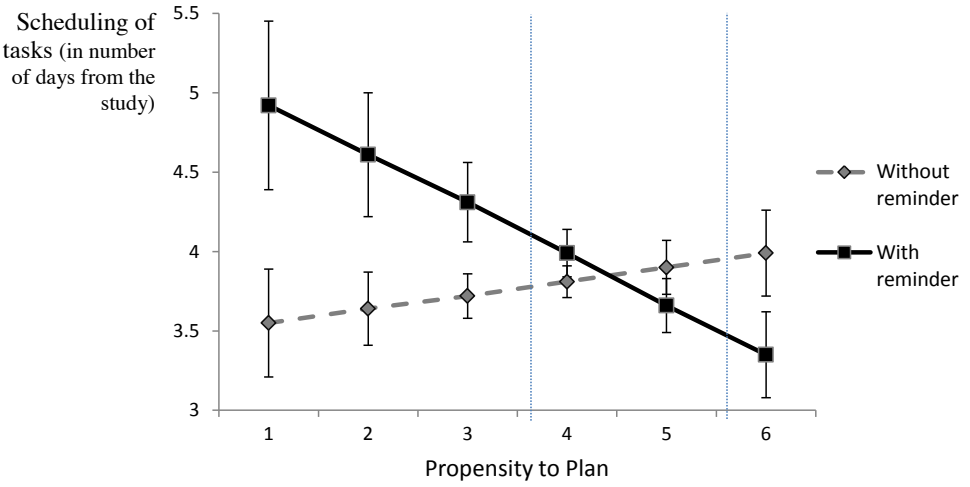
We used generalized estimating equations (GEE), a multilevel analysis, to estimate our regression parameters. This model accounts for the correlated nature of within-subject responses (Liang and Zeger 1986). Whether participants listed a reminder (1) or not (-1) was modeled as a dichotomous within-subjects predictor, propensity to plan was included as a continuous between-subjects predictor. The dependent variable was when participants scheduled the tasks was included as the dependent variable (0 to 7 days from today). This model revealed only a significant interaction between propensity to plan and use of a reminder (B = -0.39, SE = 0.14, p

< .01, r = .24). (This effect was not reliable when subjects failing the attention filter were included.)

We used the "floodlight" analysis again to identify the region(s) on the propensity to plan scale where the simple effect of reminders was significant. Those who scored the maximum score (5.55) on propensity to plan scheduled tasks sooner when they have a reminder (B = -0.41, SE = 0.21, p = .05). For any propensity to plan score of 3.57 or lower, participants schedule the tasks later when they have a reminder (B = 0.35, SE = 0.18, p = .05). See figure 9.

Figure 9: Study 1b Results

Day Scheduled to Finish the Task as a Function of Reminder Presence and Propensity to Plan*+



* The points and the standard errors on the graphs are based on the regression estimates.

+ The vertical dotted-lines crossing the graph indicate the Johnson-Neyman points where the difference between the solid and the dashed lines starts to become significant.

Discussion

Unsurprisingly, propensity to plan is positively related with the number of reminders produced. Critically, participants high on propensity to plan tend to schedule the tasks with reminders sooner than the tasks without reminders and participants low on propensity to plan tend to schedule the tasks with reminders later than the tasks without reminders. Therefore, study 1B replicates the results of study 1A with an alternate procedure where participants decide for themselves which tasks they would use reminders rather than having the experimenter manipulating the presence of reminders. Study 2 aims to replicate these effects when presence or absence of reminders is again within participants, but manipulated rather than measured to remove selection interpretations. In addition, study 2 tests whether effects of reminders on scheduling will translate into effects on completion (H2).

This deduction relies on the premise that tasks scheduled earlier will be more likely to be completed. We conducted a pretest in which we conceptually replicate Ariely and Wertenbroch (2002) in the context of the paradigm we use in the remainder of our studies. We asked eighty-five undergraduates to list three tasks they intended to perform over the following week. One week later, we contacted participants again to check whether they completed those tasks. Sixty-five participants completed both halves of the study. Our main prediction is that the later the tasks are scheduled to be executed, the lower their likelihood of being completed. We found that a) tasks listed earlier were scheduled earlier; b) tasks listed earlier were completed more often; c) controlling for listing order of tasks, there was a negative partial effect of time scheduled to do the tasks on the likelihood of actual completion of the tasks ($B = -0.32$, $SE = 0.12$, $p < .01$, $r = .32$). We had also measured propensity to plan in this study and found that it did not moderate

any of the effects. Later scheduling hurts task completion both for those high and low in propensity to plan.

STUDY 2 – REMINDERS × PROPENSITY PLAN → TASK SCHEDULING → ACTUAL COMPLETION

In real life, people create reminders for only a subset of tasks they intend to perform, as suggested by Study 1B. Study 2 uses a within participants manipulation of the presence of reminders. In this study, participants were asked to set reminders for half of the tasks they listed, permitting a within-participants analysis of the effects of reminders. Our conjecture is that participants high on propensity to plan will schedule tasks with reminders earlier than tasks without reminders. Those low on propensity to plan will postpone tasks with reminders relative to tasks without reminders. We further expect that a propensity to plan x reminders interaction on task completion will be mediated by its effect on when tasks are scheduled (H2).

Method

Participants and Procedure. Two hundred forty-two undergraduates participated in the study in return for study credits. We first measured respondents' propensity to plan of the use of their time in the short-run. Second, we asked participants to list 10 tasks they planned to complete in the next two weeks. Third, we asked participants to set reminders for the first or last five tasks that they listed, asking what reminders, if any, they might use to perform the tasks on time. Fourth, participants scheduled the 10 tasks. After respondents had finished scheduling all 10 tasks, they were thanked and dismissed. Two weeks after the study, all participants were contacted by email and asked to indicate whether they completed each task.

Design. The two primary independent variables were propensity to plan and presence of reminders. Propensity to plan was a continuous between participants factor as in previous studies. The presence of reminders was a within-participant factor. We also varied between subjects whether we first asked participants to schedule Tasks 1-5 or Tasks 6-10 from those initially listed. For one of the two sets of five tasks, we first asked respondents what reminder, if any, they might use to remember to perform the tasks on time. We varied between subjects whether reminders were prompted for Tasks 1-5 from the original list or 6-10.

The two dependent variables were the scheduling of tasks and the completion of tasks. We measured the average number of days from the study when the respondent scheduled tasks. We also measured the average number of tasks later reported as completed.

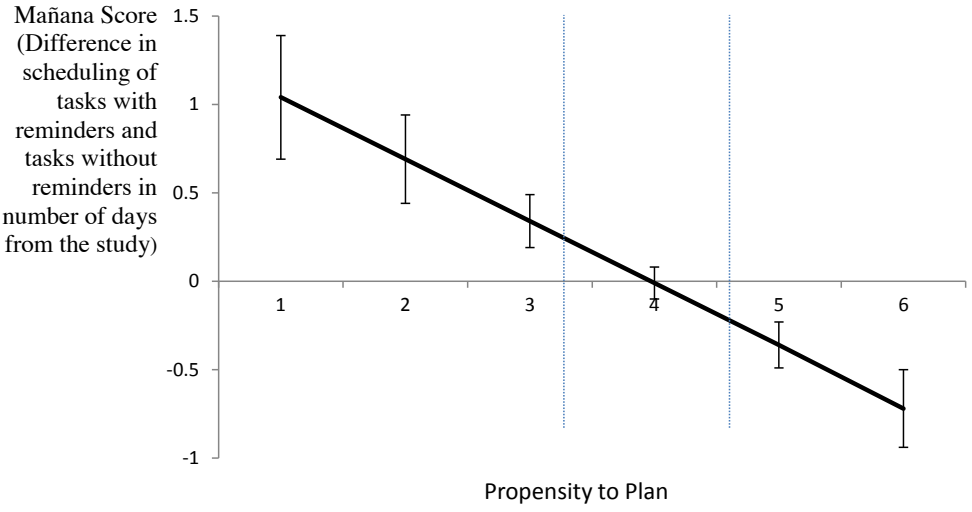
Results

Task scheduling. We averaged the time participants scheduled five tasks with reminders (M = 3.46 days; SD = 1.32) and the five tasks without reminders (M = 3.50 days; SD = 1.30). We computed the "Mañana" difference score (With – Without), where a positive difference reflects setting later scheduled dates for tasks with reminders relative to those without reminders (M = -0.04; SD = 1.84). This score was regressed on the mean-centered propensity to plan (α = .82; M = 4.12; SD = 0.85). We found a negative effect of propensity to plan (B = -0.35, SE = 0.11, p < .01, r = .21). The interaction between propensity to plan and whether the reminder was asked for the first (-1) or the last five tasks (1) was not reliable (p = .10). There was also no interaction between propensity to plan and whether the first five tasks were scheduled before (-1) or after (1) the last five tasks (p = .66). Nor was there a three-way interaction between propensity to plan and the two counterbalancing factors (p = .75).

To understand this effect of propensity to plan on the difference in the scheduling of tasks with and without reminders, we used the "floodlight" analysis to identify the region(s) on the propensity to plan scale where the difference score was significantly different from 0. This analysis revealed that for any propensity to plan score of 4.56 or higher, tasks accompanied by reminders were scheduled earlier than those without a reminder (B = -0.20, SE = 0.10, p = .05), and that for any propensity to plan score of 3.22 or lower, tasks with reminders were scheduled later than those without reminders (B = 0.26, SE = 0.13, p = .05). See figure 10.

Figure 10: Study 2 Results

Day Scheduled to Finish the Task with Reminders minus Days Scheduled to Finish the Task without Reminders as a Function of Reminder Presence and Propensity to Plan*+



* The points and the standard errors on the graphs are based on the regression estimates. A positive difference score reflects scheduling tasks with reminders later than those without.

[+] The vertical dotted-lines crossing the graph indicate the Johnson-Neyman points where the difference in scheduling of tasks with and without reminders starts to differ significantly from 0.

These results provide additional evidence that a reminder leads people high on propensity to plan to schedule the tasks sooner, and those low on propensity to plan to postpone the tasks they intend to perform. Because reminders were manipulated within-participants, we can attach a causal interpretation not possible in Study 1b. That is, setting reminders for some tasks but not others changes the relative position of tasks with reminders in one's scheduling queue.

Task completion. Next, we examine the actual completion of tasks. One hundred twenty-three participants responded to the email about whether they had completed the tasks. Attrition was unrelated to propensity to plan and the size of the difference between average date of tasks with and without reminders (*p*s > .60). Overall, participants completed 860 (69.9%) of the 1240 tasks they had scheduled including 70.7% of tasks with reminders and 69.1% of tasks without reminders. For each participant, we computed the difference between the percentage of tasks completed with reminders and without reminders.

Repeating our previous analysis but now only for the 123 responding about completion, propensity to plan had a negative effect on the "Mañana" score (the difference in time between when participants scheduled tasks with and without reminders) (B = -0.40, SE = 0.14, $p < .01$, r = .25). In addition, the "Mañana" score influenced the difference between the percentage of tasks that participants completed with reminders versus without reminders (B = -0.03, SE = 0.01, $p < .05$, r = .18). Whichever task set was scheduled later on average had a lower average completion percentage. We used the Hayes' (2012) SAS *process* macro with 3,000 bootstrapped samples to test for the indirect effect. This analysis provided evidence for "indirect only" mediation (Zhao, Lynch, and Chen 2010); there was only a significant indirect effect from propensity to plan to the

difference in the percentage between tasks completed with and without reminders through the effect on the difference in time between when tasks with and tasks without reminders were scheduled. The 95% bootstrapped confidence interval on the indirect effect did not include 0 (0.003, 0.029).

Discussion

Study 2 shows that reminders change task prioritization. People high on propensity to plan prioritize tasks with reminders relative to tasks without reminders. People low on propensity to plan procrastinate on tasks with reminders relative to tasks without reminders. In addition, study 2 shows that this has consequences for task completion because tasks scheduled to be executed later are less likely to be completed.

STUDY 3 – ELABORATION ON THE TASK × REMINDER → TASK SCHEDULING

The studies thus far show how propensity to plan modifies the effects of reminders. We view propensity to plan as a stable individual difference that predicts the key construct of elaboration on a task when setting a goal to complete it. We had two main goals for Study 3. First, we aimed to provide insight into the process of the interaction reminders x propensity to plan on task scheduling. Individuals high on propensity to plan generate plans more often and think through those plans in greater depth. This means that people high on propensity to plan are more likely to elaborate on how they will successfully complete a given task. In study 3, we asked participants to rate the degree of elaboration. When people elaborate on task details and sub-steps, a reminder should increase preoccupation with the task. This is because when people think about the steps to complete a task, they are "inside the system" (Zhao, Lee, and Soman

2012), and the reminder should drive more attention to the fact that there are many things to do in order to complete a task. When people do not think about the necessary steps to complete a task, the reminder should indicate that enough progress has been already made and that people can safely focus on something else being sure that the reminder will ensure task completion.

Second, we wished to replicate the indirect effect from the interaction between reminders and propensity to plan on when tasks are scheduled and extend this indirect effect to another dependent variable: how well tasks were performed.

Method

Participants and Procedure. Three hundred sixty-five undergraduates participated in the study in return for study credits. The procedure was very similar to study 2. Participants were first asked to answer the propensity to plan for time in the short-run scale. Then, they were informed that they would be asked to describe on the computer screen 10 tasks they planned to perform over the next two weeks and when they planned to perform those tasks. After listing each task, about half of participants were also asked to set a reminder by indicating what they would do to remember to perform the task. Next, all participants scheduled when they intended to perform each task (from "Today" to "14 days from today"). After scheduling each task, participants reported how much they elaborated on the task as follows: "Please indicate how much, if at all, did you think about how you will successfully complete this task on schedule," 0 = "Not at all" and 6 = "A great deal." This procedure was repeated for all 10 tasks. Participants were then told that after two weeks the experimenter would contact them again to see whether they completed the tasks. Next, they were thanked, given credit and dismissed. After two weeks,

they were contacted and asked to indicate whether they completed each task on time (1 = Yes, 0 = No) and, if so, how well they performed it (from 1 = very poorly to 10 = very well).

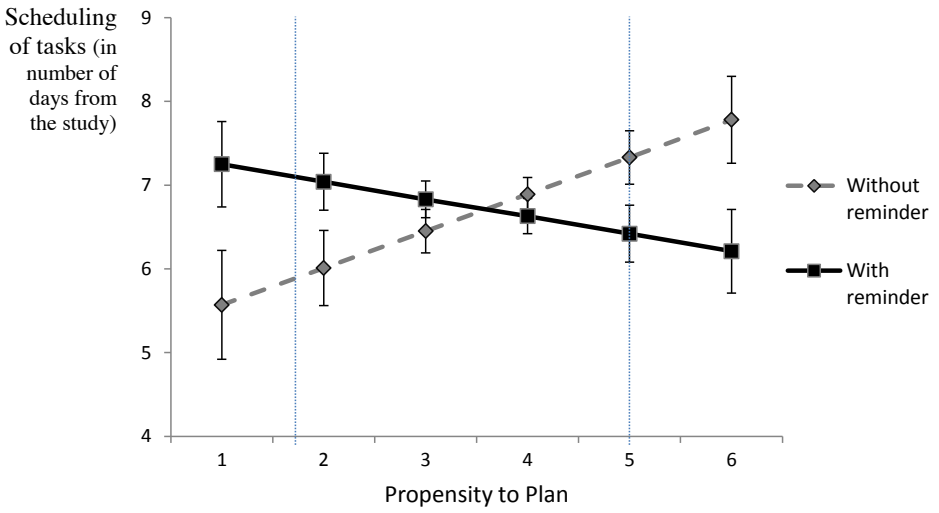
Design. As in study 2, the key independent variables were the presence of reminders (with vs. without reminders) and propensity to plan. Participants were randomly assigned to the conditions of the presence versus absence of reminders. In addition, there was a repeated factor of whether the task was listed in the 1st through 10th ordinal position. The key dependent variables were for each task a) task scheduling, b) a rating of elaboration on how the participant would accomplish the scheduled task, and a c) later measure of whether the task was completed on time, and d) if so, how well the task was accomplished (cf. Ariely and Wertenbroch 2002).

Results

Reminders X Propensity to plan → Task scheduling. We averaged and mean centered the responses to the propensity to plan scale (M = 3.66; SD = 0.99; α = 0.87). A repeated measures ANOVA with time to perform the 10 tasks as the repeated measures, reminder (with vs. without) as a between-participants factor and propensity to plan as a continuous predictor revealed a significant interaction between reminder and propensity to plan on time to complete the tasks ($F(1, 361) = 4.99$, $p = .02$, partial $\omega^2 = 0.011$). A "floodlight" analysis revealed that those who scored 5 or higher on propensity to plan tend to schedule the tasks sooner when they have a reminder (B = -0.45, SE = 0.23, $p = .05$), and that those who scored 1.75 or lower on propensity to plan tend to schedule the tasks later when they have a reminder (B = 0.60, SE = 0.31, $p = .05$). See figure 11a.

Figure 11a: Study 3 Results

Day Scheduled to Finish the Task as a Function of Reminder Presence and Propensity to Plan*+



* The points and the standard errors on the graphs are based on the regression estimates.

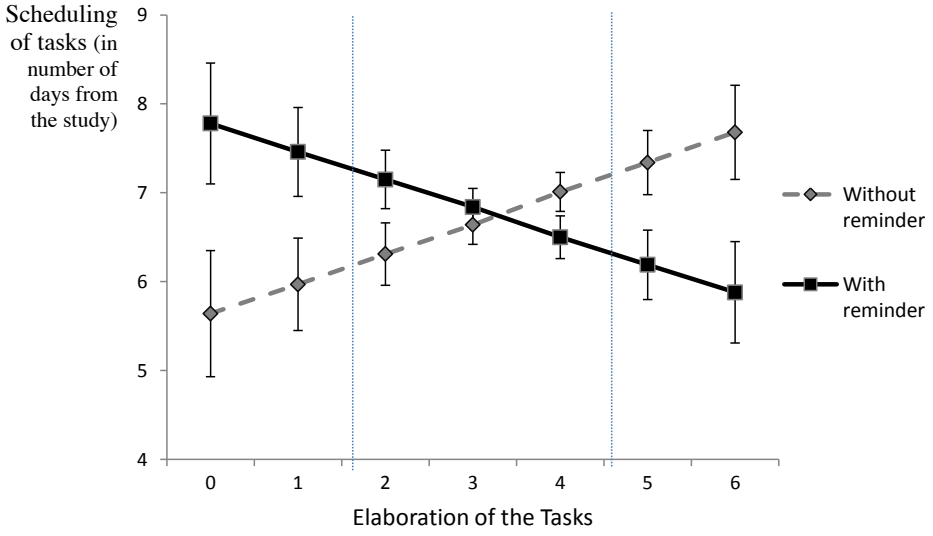
+ The vertical dotted-lines crossing the graph indicate the Johnson-Neyman points where the difference between the solid and the dashed lines starts to become significant.

Reminders X Elaboration on the task → Task scheduling. We mean centered the (0 to 6) variable that reflects the extent to which participants thought about how to successfully complete the tasks ($M = 3.43$, $SD = 1.02$). Propensity to plan was correlated with elaboration on the task ($r = .18$, $p < .01$). Critically, presence or absence of reminders interacted with elaboration on the task to predict task scheduling ($F(1, 361) = 5.51$, $p = .02$, partial $\omega^2 = 0.012$). A floodlight analysis revealed that those who scored 4.6 or higher on how much they thought about how to complete the tasks tend to schedule the tasks sooner when they have a reminder (B = -0.42, SE =

0.21, p = .05). Those who scored 1.58 or lower on how much they thought about how to complete the tasks scheduled the tasks later when they have a reminder (B = 0.56, SE = 0.29, p = .05). See figure 11b.

Figure 11b: Study 3 Results

Day Scheduled to Finish the Task as a Function of Reminder Presence and Elaboration on the Tasks*+



* The points and the standard errors on the graphs are based on the regression estimates.

+ The vertical dotted-lines crossing the graph indicate the Johnson-Neyman points where the difference between the solid and the dashed lines starts to become significant.

Consistent with our predictions, these results indicate that propensity to plan correlates with the extent to which participants thought about how they would complete the tasks (r = .18, p

< .001) and that both variables moderate the effect of reminders on when tasks were scheduled. We also conjectured that the interactive effect of reminders x propensity to plan on task scheduling is mediated by degree of elaboration on the tasks. That is, because those high on propensity to plan divide the task in sub-steps, the presence of reminders highlights that they need to start working on the tasks given that there are many things to do before completion. In contrast, because people low on propensity to plan only think about the overarching task, the presence of reminders signals that they don't need to worry about the tasks given that reminders are in place to resume tasks later. Therefore, we predict that elaboration on the task is the key correlate of propensity to plan that explains why people high on propensity to plan react differently from people low on propensity to plan to the presence of reminders. We test this mediation in the following analyses.

(Propensity to plan → Elaboration on the task) X Reminders → Task scheduling. When including both propensity to plan, elaboration on the task and their interactions with reminders as predictors of task scheduling, the interaction propensity to plan x reminders decreased to only marginally significant (B = -0.27, $F(1, 359) = 3.48$, $p = .06$) and the interaction elaboration on the task and reminders remained significant (B = -0.28, $F(1, 359) = 4.07$, p = .04). The Hayes' (2012) SAS PROCESS macro with 3,000 bootstrapped samples indicated a "complementary" mediation (Zhao et al. 2010), including a significant indirect effect from propensity to plan to elaboration on the task x reminders on task scheduling (95% CI: -0.011, -0.149).

These results provide evidence that elaboration on the task explains the opposite reactions of people high and people low on propensity to plan to the presence of reminders on when tasks are scheduled to be executed. Because people high on propensity to plan are more likely to think in advance about the steps to complete a task, reminders accelerate task scheduling. Because

people low on propensity to plan are less likely to think in advance about how to complete a task, reminders postpone task scheduling. Next, we test whether the interaction reminders x propensity to plan extends to whether tasks are completed and how well they are executed.

Propensity to plan X Reminders → Task scheduling → Actual completion. Two hundred twenty-one participants responded whether they completed the tasks. Attrition was unrelated to when participants scheduled the tasks ($p = .26$) and to whether they had a reminder ($p = .77$), and attrition was marginally lower among those high in propensity to plan ($F(1, 363) = 3.30$, $p = .07$, leaving unaffected the following key findings.

Participants completed on average 7.6 of the 10 tasks (SD = 1.49). We first tested the link between when tasks were scheduled to whether they were completed. Replicating our previous results, on average, the further in time participants scheduled the tasks, the lower the number of tasks they completed (B = -0.09, $SE = 0.04$, $p = .04$, r = .15). Next, we used Hayes' (2012) SAS *process* macro with 3,000 bootstrapped samples to examine the indirect effect from the interaction between propensity to plan and the presence of reminders on when participants schedule the tasks to the number of tasks they completed. This analysis indicated only an indirect effect (95% CI: 0.001, 0.096).

Elaboration on the task X Reminders → Task scheduling → Actual completion. The indirect effect including the more proximal mediator of elaboration was estimated. In this model, the interaction between elaboration and the presence of reminders is the independent variable, task scheduling is the mediator and actual completion is the dependent variable. This indirect effect was significant (95% CI: 0.001, 0.103). The entire sequence: (Propensity to plan → Elaboration on the task) X Reminders → Task scheduling → Actual completion, was marginally significant at 90% CI (0.001, 0.026).

Propensity to plan X Reminders → Task scheduling → Quality of completion. We also examined the effect of when participants scheduled the tasks on the quality of task completion (1777 tasks were completed and rated by participants on how well they were completed). A multilevel model (using GEE as in Study 1B) indicated that the later participants scheduled each task, the lower the quality of completion (B = -0.05, SE = 0.01, $p < .0001$, r = .32). The Hayes' (2012) SAS *process* macro with 3,000 bootstrapped samples indicated an indirect effect from the interaction between propensity to plan and the presence of reminders on when participants schedule the tasks to the quality of completion (95% CI: 0.004, 0.033).

Elaboration on the task X Reminders → Task scheduling → Quality of completion. The indirect effect including the more proximal mediator of elaboration was estimated. In this model, the interaction between elaboration and the presence of reminders is the independent variable, task scheduling is the mediator and quality of completion is the dependent variable. This indirect effect was significant (95% CI: 0.005, 0.033). The entire sequence: (Propensity to plan → Elaboration on the task) X Reminders → Task scheduling → Quality of completion was also significant (95% CI: 0.001, 0.010).

Discussion

This study replicates the previous findings that the presence of reminders lead people high on propensity to plan to schedule tasks earlier and people low on propensity to plan to schedule tasks later. In addition, it shows that the effect of reminders on the schedule of tasks is also moderated by the extent to which participants think about how to complete a task. Finally, elaborating on the task explains why participants high and low on propensity to plan react differently to the presence of reminders. People high on propensity to plan are more likely to

think in advance about how to complete a task. As a consequence, reminders cause tasks to be scheduled earlier as they highlight that there are many steps to be executed before the task is completed. People low on propensity to plan are less likely to elaborate on the task. As a consequence, reminders cause tasks to be postponed as enough progress has been made towards completing the task. In study 4, we intend to test the trade-offs of setting reminders. We expect that setting a reminder helps the completion of tasks among people high on propensity to plan at the expense of attentional resources to handle other tasks that demand their immediate attention. Reminders hurt the completion of tasks among people low on propensity to plan but release attentional resources to handle other tasks that demand their immediate attention.

STUDY 4 – REMINDER × PROPENSITY TO PLAN → ABILITY TO REFOCUS ON A NEW TASK

We posited in H4 that if those high in propensity to plan schedule tasks with reminders earlier and are more preoccupied with those tasks, they will have a hidden cost of decreased ability to refocus attention on a new task. Conversely, if reminders cause those low in propensity to plan to procrastinate on reminded tasks, there will be a silver lining of allowing them to banish those tasks from their thoughts and to refocus on some new task that demands attention.

To test this conjecture in Study 4, we replicated the procedures of Study 1: measuring propensity to plan; asking respondents to list 10 tasks to be performed in the next week; asking half of the respondents to list a reminder they would use for each listed task; asking all participants to schedule the planned date of completion for each task. However, when this phase of the study was complete, participants were presented with an ostensibly unrelated reading

comprehension task of a passage from the story "The Case of the Velvet Claws". Our key dependent variable in Study 4 was a measure of ability to focus attention on that task.

We expected to replicate our findings from the prior studies that reminders would interact with propensity to plan to affect task scheduling, and we expected a parallel pattern of responses on performance on this new reading comprehension tasks. Specifically, we expected that when tasks were moved ahead or back in one's schedule, this would reflect preoccupation with those tasks that would persist, inhibiting the ability to focus on "The Case of the Velvet Claws" story. Thus, those high in propensity to plan would schedule tasks 1-10 sooner with reminders than without reminders, and consequently those with reminders would be less able to focus on the story. Those low in propensity to plan would schedule tasks later with reminders than without reminders, and consequently those with reminders would be better able to focus on the story.

Method

Participants and Procedure. Two hundred ninety-five undergraduates participated in the study in return for study credits. The procedure was identical to that in Study 1, with three exceptions. First, we employed an attention filter at the beginning of the study given that our focal dependent variable involved paying attention to the reading comprehension task. Eighty-one participants failed the attention filter, leaving 214 participants for the analyses reported.

Second, after participants completed the propensity to plan scale, the listing of 10 tasks, the manipulation of whether or not they were prompted for reminders, and the scheduling of 10 tasks, we asked them to rate the importance of each 10 tasks relative to all other things they have to do over the following seven days (0 = "Not at all important" to 6 = "Extremely important").

Third, after scheduling tasks 1-10, participants completed a reading comprehension task (cf. Masicampo and Baumeister 2011b). They read the first 1,714 words of The Case of the Velvet Claws by Erle Stanley Gardner. Participants were informed that they would be reading a text from a popular novel and that they would later answer questions about the plot. Participants were asked to focus all of their attention on the task, but we acknowledged that people often "zone out" while reading. Hence, we told participants, they would be asked about their attention at various points throughout the task. After the first 497 words, participants were then asked: "Was your attention on the text or on something else?" The same question was made after the next 557 words and at the end of the text. After the reading, participants indicated how well they were able to focus on the story on 4 scales. Then, they were asked to indicate how important each task they listed. Finally, participants were debriefed for suspicion, thanked, and dismissed.

Design. Reminders and propensity to plan were our key independent variables. We randomly assigned participants to either generate reminders for all 10 tasks listed or not to generate reminders, and we measured propensity to plan. The key dependent variables in this study were:

a. scheduling of tasks (in days from the day of the study),
b. the average of seven items measuring preoccupation, combining: three ratings of distraction at three points in time during reading "The Case of the Velvet Claws": "Was your attention on the text or on something else?" 0 = "I was reading the text and was very much paying attention to the story" to 6 = "I was reading the text, but my attention was elsewhere" (reverse-scored), four items of focusing attention on the text: how well were you able to focus on the story, to what extent were you distracted by the thoughts of the ten tasks you intend to perform over the next week that you had written earlier (reverse-scored), how well

did you understand the story, how much effort did you put into understanding the story on scales from 0 = "Not at all" to 6 = "Very", alpha = .82. This variable measured the ability to refocus on a new task. We predict that reminders decrease attention to a new task among those high on propensity to plan and increase it among those low on propensity to plan.

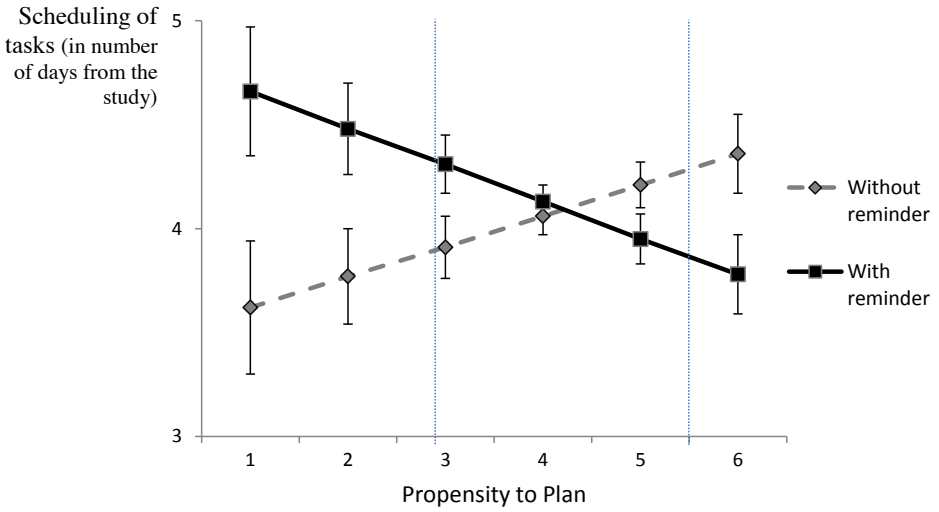
c. We measured importance to examine whether reminders altered perceived task importance.

Results

Reminders X Propensity to plan → Task scheduling. The task scheduling results closely followed those from Study 1. We averaged and mean centered the responses to the propensity to plan scale (M = 4.19; SD = 0.93; α = 0.88) and included this in a model along with the between participants variable of reminders vs. no reminders and the repeated factor of ordinal position of the task in the listing of 10 tasks. We included in this analysis the measure of average importance of the tasks, and found no effect of perceived importance of tasks on scheduling (F(1, 209) = 1.11, p = .30). We replicated the previous result of an interaction between reminder and propensity to plan on date tasks were scheduled (F(1, 209) = 5.59, p = .02, partial ω^2 = 0.021). The same interaction was found without the covariate (F(1, 210) = 4.96, p = .03, partial ω^2 = 0.018). A floodlight analysis revealed that those who scored 5.5 or higher on propensity to plan scheduled the tasks sooner when they had reminders (B = -0.21, SE = 0.11, p = .05), and those who scored 2.9 or lower scheduled the tasks later when they had reminders (B = 0.21, SE = 0.11, p = .05). See figure 12a.

Figure 12a: Study 4 Results

Day Scheduled to Finish the Task as a Function of Reminder Presence and Propensity to Plan*+



* The points and the standard errors on the graphs are based on the regression estimates.

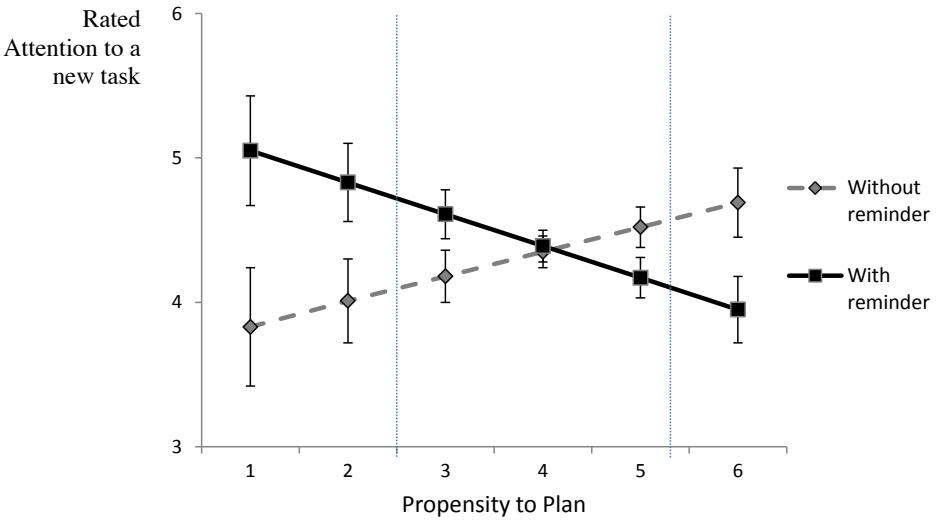
+ The vertical dotted-lines crossing the graph indicate the Johnson-Neyman points where the difference between the solid and the dashed lines starts to become significant.

Reminders X Propensity to plan → Ability to refocus on a new task. As predicted, we saw a very similar pattern on our measure of attention to a new task. We averaged the 0 to 6 measures of attention to the text and of comprehension of the story (with appropriate reverse scoring) to create a variable of attention to a new task (M = 4.37; SD = 1.12; α = 0.82); 0 means minimal attention, and 6 reflects maximal attention. As predicted, there was a significant interaction between reminder and propensity to plan on preoccupation with tasks ($F(1, 209) = 5.42$, $p = .02$, partial $\omega^2 = 0.02$). There was no effect of perceived importance of the tasks on preoccupation

with the tasks ($F(1, 209) = 2.14$, $p = .15$). And the same interaction was found without the covariate ($F(1, 210) = 4.49$, $p = .03$; partial $\omega^2 = 0.016$). A floodlight analysis revealed that for any propensity to plan score of 5.3 or higher, participants paid less attention to a new task when they had a reminder (B = -0.23, SE = 0.12, $p = .05$), and for any propensity to plan score of 2.5 or lower, participants paid more attention to a new task when they had a reminder (B = 0.31, SE = 0.16, $p = .05$). See figure 12b.

Figure 12b: Study 4 Results

Attention to a New Task as a Function of Reminder Presence and Propensity to Plan*+



* The points and the standard errors on the graphs are based on the regression estimates.

+ The vertical dotted-lines crossing the graph indicate the Johnson-Neyman points where the difference between the solid and the dashed lines starts to become significant.

Discussion

Study 4 shows that reminders interfere with the ability of people high on propensity to plan to attend to other tasks that come up after task scheduling. In contrast, reminders release attentional resources among those low on propensity to plan benefiting their capacity to handle other tasks that demand their immediate attention.

Reminders absorb attentional resources among those high on propensity to plan as they are likely to make a detailed plan of how they will complete a given task. This result fits broadly with other work showing how detailed planning interferes with thinking unrelated to the plan. Bayuk, Janiszewski, and Leboeuf (2010) found that, when participants are in a concrete mindset, implementation intentions encourage a narrow-minded focus that lowers appreciation of out-of-plan opportunities to complete a goal.

3.5. General Discussion

Consumers must consider behaviors in order to choose to perform them, and consideration is a function of both memorial and motivational factors (Berger et al. 2012; Chandon et al. 2009; Hauser and Wernerfelt 1990; Mitra and Lynch 1995; Nedungadi 1990). Reminders are often considered to be strong medicine for task completion because they increase memory for the task (Guynn et al. 1998; Intons-Peterson and Fournier 1986; McDaniel et al. 2004), but the evidential base in support of this claim comes entirely from studies with reminders for a single task. Recent work on "implementation intentions" by Dalton and Spiller (2012) suggests the danger in extrapolating from work on reminders for a single task to effects of

reminders with multiple tasks. We find in our research that generating reminders has surprising motivational and cognitive effects.

3.5.1. Task Scheduling and Task Completion

When consumers have multiple tasks to execute, reminders have decidedly mixed effects. Consumers high in propensity to plan are motivated to schedule tasks sooner when they generate reminders than when they do not. The same point holds more generally under conditions when consumers elaborate on tasks they plan to complete prior to setting reminders. Elaboration on tasks, like high propensity to plan, is associated with breaking larger tasks into subtasks, highlighting the need to get started. Tasks scheduled sooner are more likely to be completed by the scheduled time, so reminders help these consumers complete the tasks.

However, for consumers low on propensity to plan, generating reminders has exactly the opposite effect. Those low in propensity to plan are less prone to elaborate on tasks they plan to undertake; the tasks are at a more molar level that inspires less urgency. Generating a reminder can be a tool for self-delusion for consumers thinking at this molar level, who act as if writing a task down on a post-it note is sufficient to ensure that the task will be completed. Reminders cause these consumers to schedule tasks later than they would if they generated no reminders for the same tasks. Procrastinating the scheduled of these tasks leads to lower completion of the tasks, despite the greater time allowed for completion (cf. Ariely and Wertenbroch 2002).

3.5.2. Effects of Reminders on Ability to Refocus on a New Task

Reminders also present a mixed blessing because generating reminders also affects ability to refocus on a new task. People high in propensity to plan benefitted from reminders in terms of

completing the tasks for which the reminder was set. But that came at a cost of inability to refocus on a new task. Conversely, people low in propensity to plan were harmed by reminders, making them push tasks back and not get around to completing them even under a very lenient schedule. But that ability to banish one task from consciousness left them more "present" in ability to refocus on the new reading task presented to them in Study 4.

3.5.3. Limitations and Future Research

Our research has several limitations that suggest open questions for future research. We have studied the effects of stating what reminder one would use in a setting where one has no opportunity to create a physical reminder if one is specified. We noted at the outset that many of the reminders people set for themselves – particularly reminders set by those low in propensity to plan – are not of this physical nature, but are rather "mental notes". Nonetheless, we would presume that actually writing a post it note or actually setting a reminder on one's iPhone would create a better memory cue than simply saying in the study that one would create such reminder. That is relevant to our finding that those low in propensity to plan were actually less likely to complete tasks after generating reminders than without doing so. One might argue that if participants had actually taken the time to generate physical reminders whenever they specified reminders of this type, we would have observed less of a tendency for reminders to hurt task completion by those low in propensity to plan. One might also argue that, for those high in propensity to plan, the detrimental effects of setting reminders on ability to refocus may in part have reflected preoccupation with actually following through to set a physical reminder. These issues deserve future investigation.

Our research raises a number of other important questions for future research. Do our findings about the effects of reminders on timing of task scheduling and on task completion generalize to tasks that have a predetermined schedule (redeem coupon for car wash before it expires at end of week), or are they limited to cases where there is inherent flexibility in timing?

In our work, we did not follow up with our participants at a much longer delay to find out whether they had ever gotten around to completing the tasks that they had failed to complete in the time originally scheduled. Thus, we are unsure of whether failure to complete a task *on time* implies that these tasks were less likely to be completed *at all*. This leaves unanswered the fascinating question of, "what is the effect on perceived commitment to a task of failing when one sets a reminder to complete the task by the specified time?" (cf. Soman and Cheema 2004). Related to this issue, are constantly present reminders (e.g. Post It notes on one's computer screen) more discouraging than less salient reminders when the task is not completed on time? Does the daily reminder of failure signal to oneself that one is less and less committed?

We showed that reminders are helpful to some people (those high in propensity to plan) but actually detrimental to others. Can people learn over time not to set reminders when they see they are ineffective? Is that why we found in Study 1b that people low in propensity to plan create fewer reminders?

We studied the effects of reminders generated by consumers themselves. But marketers provide external reminders in many forms in an effort to influence consumers. Do these function like self-set reminders? Companies often send special deals, early bird specials, and other promotions to its customers. These promotions can work as reminders. Companies also send reminders when they send their customers information about hotel and theater reservations or confirmations, bills to be paid, subscriptions to be renewed, prepaid cell phone credit to be

topped up. When these promotions attract consumers' interest and an intention to purchase the product is formed, consumers may use the promotion (or the paper notice of the promotion) as a reminder to buy the product.

Future work should examine whether the effects we observe when people generate their own reminders will generalize to situations like those noted above when the reminder is not self-generated. Self-generated cues are more effective than externally provided ones (Slamecka and Graf 1978). One might not observe effects parallel to ours with externally provided promotions unless one observes parallel individual differences in elaboration on a plan to use the promotion when it is received. If these externally presented reminders prove to be like self-set ones in affecting task scheduling and task completion, marketers can increase the efficiency of their promotions by focusing their resources on consumers likely to be higher in propensity to plan. Many promotions go beyond offering some special pricing terms, also functioning as reminder advertising that induces consumer to consider an action (Mitra and Lynch 1995). But what are the motivational effects of these promotions, particularly when they are ubiquitous and thus constitute "multiple tasks?" One might speculate that consumers high in propensity to plan might be more likely than those low in propensity to plan to follow through to redeem those promotions. Lynch et al. (2010) showed that propensity to plan is related to knowable demographics. These same variables may prove helpful in predicting sensitivity to promotions.

Chapter 4.

Conclusion

Previous research has extensively documented the positive effects of reminders on task completion: reminders help memory and often increase motivation such as in the case of implementation intentions for single tasks. This thesis draws attention to the dysfunctions of the use of reminders. Consumers don't actually know when they need shopping lists to help their memory and reminders can actually have detrimental effects on motivation. In the following sections, I discuss the related implications and potential future research on the development of interventions that help consumers use reminders to their benefit.

4.1. Optimists without Shopping Lists

The research presented in Chapter 2 shows that consumers are bad at predicting their memory and therefore end up not using a shopping list when they actually need one to remember what they have to buy at the supermarket. Consumers use salient information to predict their memory. And factors that influence memory after a delay may not be salient. As a result, consumers are often overconfident about their ability to remember what they need to buy at the grocery store and do not actually know when they are more likely to forget. The implication is that consumers should not believe that they are likely to remember what they need to buy because that assessment is often wrong. They should simply write the shopping list.

There is a lot of evidence showing that memory for intentions does not come to mind easily. In a recent review, Dismukes (2012) explains that "much PM (*prospective memory*) research has focused on what enables the retrieval of intentions from memory and why this retrieval so often fails" (p. 215). The two grand theories of prospective memory (the multi-

process theory and the preparatory attention and memory model) agree that, without any preparation, people are unlikely to remember to perform a task in the future. The multi-process theory argues that intentions only come to mind when chronically activated or when cues in the environment trigger them (McDaniel and Einstein 2000). The preparatory attention and memory model argues that, even under those conditions, memory for intentions creates a processing cost that usurps cognitive resources from whatever else the person is doing (Smith 2003). Memory for intentions requires the use of reminders that activate an intention at the time it should be performed.

Consistent with this, research shows that consumers fail to buy about 30% of planned items (Hui, Inman, Huang, and Suher 2013). Gilbride, Inman and Stilley (2013) report that consumers don't spend on average about 24% of their planned budget. Unfulfilled purchases are substantially lower if we look only at consumers with a shopping list. Block and Morwitz (1999) report that on average 16% of planned items written on shopping lists are not purchased. Consumers have difficulty retrieving their grocery needs from memory (Bettman 1979). Therefore, they need to rely on external cues which aid retrieval from memory (Lynch and Srull 1982). We add to this literature by showing that consumers are often not aware that their memory is bad after a delay and by examining why they are overconfident about their memory. Much remains to be examined about memory in the grocery store. I highlight some of those research questions below.

4.1.1. How Do Planned Intentions To Buy Come To Mind?

We know from cognitive psychology the situations in which memory is really bad. Memory suffers when: e.g., consumers learn in a different environment than the environment in

which they are tested (Goodwin et al. 1969), the cues at learning are not present at test (Tulving and Thomson 1973), people walk through doors (Radvansky, Tamplin, and Krawietz 2010), recognize familiar words (Glanzer and Bowles 1976), recall unfamiliar words (Dobbins, Kroll, Yonelinas, and Liu 1998), among many other situations. However, we don't know whether and when grocery shopping maps onto these situations. For example, when consumers are busy, they are more likely to use deliberative shopping: visiting areas of the store which contain only planned product categories and a greater probability of purchasing given that one is in that corridor (Hui, Bradlow, and Fader 2009). How does this shopping style affect memory? Are consumers more likely to use recall memory when busy and recognition memory when they have more time to show? If so, is memory for familiar items better when consumers are busy and for unfamiliar items when consumers have more time to go through the aisles?

We also know that memory for goals is less susceptible to decay than memory for events (e.g., Zeigarnik 1927). In addition, when people pursue a goal, the accessibility of that goal in memory increases as goal attainment becomes near (van Osselaer and Janiszewski 2012). And after the goal is fulfilled, its accessibility is inhibited such that cognitive resources are freed for other pursuits (Förster et al. 2005). Thus, having a strong goal to buy an item may facilitate retrieval. For example, when we buy things for ourselves with some goal related to it (e.g., cook a specific food, fix something at home), we may be more likely to remember to buy as compared to when we follow the request from our partner to buy something for her/him.

4.1.2. How Do Unplanned Intentions To Buy Come To Mind?

Shoppers cover on average around 37% of the grocery store (Hui et al. 2013). And only about 10% of shoppers go around all aisles inside the store (Stilley, Inman and Wakefield 2010).

This suggests that most shoppers don't have a lot of time at the supermarket to inspect products in order to decide whether they need them. Alba, Huchinson, and Lynch (1991) argue that most grocery shopping is memory based, rather than stimulus based. Still, on average, about 40% of consumers' shopping budget is spent on unplanned purchases (Hui et al. 2013; Stilley et al. 2010). How do unplanned intentions come to mind at the grocery store? Iyer (1989) reports that 42% of shoppers say that they bought an unplanned item because they made a recipe inside store. Stilley et al. (2010) show that consumers plan some slack of purchases inside the store because they anticipate they are likely to realize that a product is needed while at the grocery store, among other reasons. And Gilbride et al. (2013) indicate that unplanned purchases fuel additional unplanned purchases at the end of the shopping trip when consumers are already depleted.

And how do in-store factors such as layout, displays and organization of products help unplanned and planned purchases come to mind? Bell, Corsten and Knox (2011) report that unplanned buying is higher on trips in which the shopper chooses the store for favorable pricing and lower on trips in which the shopper chooses the store as part of a multistore shopping trip. Lamberton and Diehl (2013) show that when the store is organized around the benefits of products (as opposed to its attributes), consumers perceive the products as more similar and therefore are more equally satisfied with its options. Perhaps organizing the store around the benefits of the products makes it easy for consumers to find the planned items and reduces the likelihood of coming up with an unplanned item. And how do shopping lists help unplanned and planned purchases come to mind? Does categorizing the items on the shopping list affect memory? Probably organizing the lists into meaningful categories serves as a retrieval cue. Does the level of categorization matters? Maybe a narrow categorization drives consumers to consider

buying similar products that would be otherwise considered as substitutes. Those questions await future investigation.

Another interesting question is how cultural factors influence in-store behavior. For example, in the U.S., consumers spend on average 49 minutes inside the grocery store (Hui et al. 2009), whereas, in a Western European country, consumers spend on average 18 minutes inside the grocery store (Bell et al. 2011). Grocery stores in the U.S. are larger than in Europe. An average store in the U.S. has 46,000 square feet (Food Marketing Institute 2012), whereas in The Netherlands an average store has 9,000 square feet (Deloitte 2012). And, about 80% of U.S. consumers go to the supermarket by car (Hilman 1994; Jiao, Moudon, and Drewnowski 2011), whereas, in a Western European country, only 48% of shoppers go by car to the grocery store (Bell et al. 2011). This suggests that consumers in Europe are less tempted to buy unplanned items given that they spend less time inside the store than consumers in the U.S. In addition, consumers in Europe, who normally walk, bike or take public transportation to go to the grocery store, have the extra cost of carrying the unplanned items for longer distances than consumers in the U.S., who normally drive to the grocery store.

4.1.3. How Do We Know That We Are Going To Forget Something?

People have a hard time making estimates for their future memory. For example, in Koriat et al.'s (2004) studies, participants think they are likely to remember some information even one week after being presented with that information, and don't realize that after 10 minutes memory has already decayed. Kornell and Bjork (2009) report that people have a stability bias in their memory: they don't realize that future study opportunities would increase

learning and improve recall. People overrely on their current memory in making predictions about their future memory state (Kornell et al. 2011).

This is consistent with research in other domains. Kahneman and Tversky (1979) argue that when making predictions about the future, people do not take into account all the factors that drive future behavior. Instead, they focus on a few determinants. This selective mechanism is often biased by a self-centric tendency. That is, individuals take an "inside" perspective, focusing on positive behaviors that are more accessible in their minds, while failing to consider less optimal behaviors. In Kahneman and Tversky's (1979, 1982) studies, mental simulations about the future are biased toward the positive scenarios, with an optimistic version of the future often emerging. In the planning domain, people think they will take less time to execute a task than they actually take (i.e., the planning fallacy; Buhler, Griffin, and Ross 2002). Recent research has documented a similar bias for some consumer behaviors (Tanner and Carlson 2012). Consumers make idealized predictions when estimating the likelihood of performing a certain behavior in the future. This also fits with the notion of the illusion of explanatory depth (Fernbach, Sloman, Louis, and Shube 2013). People overestimate their understanding of how everyday objects work, an unrealistic sense of knowing that can be made evident by asking them to provide a detailed explanation.

This suggests that when estimating their knowledge, people use surface information that is likely to produce a feeling of knowing, but that does not support true understanding. Similarly, when estimating their future memory, people use cues that are likely to produce a feeling of being able to recall in the near and the distant future, but that are actually not strong antecedents of memory after a short delay. Identifying our misconceptions about memory is a first step towards remedying the problem of forgetting. Future research should focus on how can we

debias people to make better assessments of their own memory. When our metacognition is wrong, we don't take the necessary preventive actions not to forget. As Benjamin, Bjork and Schwartz (1998) putted: "If you do not know what you do not know, you cannot rectify your ignorance" (p. 65).

4.2. Getting Tasks Done

One of the most fundamental problems with planning is that people often do not complete their plans. Past work has looked at motivational reasons for failing to follow through on plans. When people become demotivated to pursue a task, they leave it aside for later either because the task loses its meaning or because some other more urgent, important or rewarding task is brought to mind (Steel 2007). Procrastination is a major cause of insufficient retirement savings (Akerlof 1991) and of failing to adhere to medical treatment (Morris, Menashe, Anderson, Malinow, and Illingworth 1990).

People are motivated to finish what they have started. As a result, as they get close to finishing a task, the value of a unit of progress is quite motivating (Kivetz, Urminsky, and Zheng 2006). This drives people to focus on finishing a task once they are close to complete it. For example, air travelers do not want to take a route that causes them to go temporarily backwards even if total flight time is reduced (Soman and Shi 2003). Touré-Tillery and Fishbach (2012) show that people have two active and parallel motivations: an outcome-focused motivation to reach the end state ("getting it done") and a means-focused motivation to adhere to one's standards in the process of reaching that end state ("doing it right"). The motivation to adhere to one's own ethical and performance standards is lower in the middle than in the beginning or the

end of goal pursuit. People relax their standards in the middle as actions at the beginning and end provide a better signal of the true nature of the self (Touré-Tillery and Fishbach 2012).

Despite the fact that people are motivated to finish what they have started, procrastination is very frequent. This is because people often commit to more tasks than they can attend (Zauberman and Lynch 2005). People often think they will have spare of time in the future and say yes to future commitments, only to regret making those commitments at a later point in time (the "Yes… Damn!" effect, Zauberman and Lynch 2005). And in the face of a perceived constraint, people consider delaying a task ("I can't go run today, but can do it tomorrow"; "I am too busy today, I will do it tomorrow"). This illusion of time slack in the future causes consumers to procrastinate even the most enjoyable experiences (Shu and Gneezy 2010). And, contrary to people's intuition, having a longer deadline decreases the likelihood of completing a task rather than increasing it (Shu and Gneezy 2010).

The attentional system selects the most relevant information for proximal goal pursuit. Our attentional system monitors information that is relevant to our current goals and leaves out of consideration information that is not relevant (Most, Scholl, Clifford, and Simons 2005). The selection of relevant information is determined by our motivations (Corbetta and Shulman 2002; Desimone and Duncan 1995). For example, the attentional bias to food related information is higher among hungry participants (Mogg, Bradley, Hyare and Lee 1998) and those with low BMI (Nummenmaa, Hietanen, Calvo, and Hyona 2011). This process of monitoring of relevant information for current goal pursuit seems to occur automatically without the necessity of an explicit intention to attend to this information (Moskowitz, 2002; Vogt, De Houwer, Moors, van Damme, and Crombez 2010).

Highly accessible alternatives are more likely to be considered (Frederick, Novemsky, Wang, Dhar, and Nowlis 2009). But people attend to goal-relevant information even when engaged in an effortful task in which goal-relevant stimuli appeared as distractors (Rothermund 2003), when goal-relevant information is presented in competition with threatening stimuli that are known to demand attention (Vogt, De Houwer, Crombez, and van Damme 2013), when goal-relevant information is subliminally presented (Ansorge, Kiss, and Eimer 2009), when the goal itself is only unconsciously active (Moskowitz, 2002).

This suggests that activated goals guide early attentional processes. Chapter 3 of this thesis shows that reminders may drive attention to the reminded tasks and cause those tasks to become more activated in mind. Chapter 3 also shows that reminders may also have the opposite effect in some situations such as when people associate reminders with the idea that the task is partially completed and that attention can be directed to other tasks. This is consistent with the notion that multiple unfulfilled tasks that one has to perform compete for attention.

Chapter 3 demonstrates that depending on whether people elaborate on how to complete the task, reminders drive attention to the reminded task (when people elaborate) or to another non-reminded and more urgent task (when people don't elaborate). In addition, Chapter 3 shows that an individuals' propensity to plan predicts when people elaborate on tasks and thus causes reminders to differentially influence task completion. Reminders interact with propensity to plan to predict when people schedule tasks. For people high on propensity to plan, reminders cause tasks to be scheduled sooner. And for people low on propensity to plan, reminders cause tasks to be scheduled later. This has downstream effects on completion because the later people schedule tasks, the lower the likelihood and the quality of completion.

Generating reminders, an act intended to promote remembering of planned tasks, can therefore increase or decrease the motivation to perform them. For people low in propensity to plan – who elaborate little on tasks before setting reminders – generating reminders causes tasks to be scheduled later and to be less likely to be completed on time, but it frees up cognitive resources to be used for other tasks that demand immediate attention. The opposite is true of those high in propensity to plan. This research contributes to an emerging literature on multiple goal pursuit investigating the effects of memory cues on motivation. It is fruitful for the development of interventions that help consumers to fulfill their planned goals.

The opposing effects of reminders between people high and people low on propensity to plan is because people high on propensity to plan are more likely to elaborate on how to complete a task. Elaboration involves generation of subgoals, which are more proximate than the overall goal. Thus, reminders make accessible for people high on propensity to plan that a subgoal is close to be completed, whereas for people low on propensity to plan that an overarching goal is still far from being completed and thus other more urgent tasks can be prioritized.

4.2.1. How Does Planning Affect the Pursuit of Multiple Goals?

Planning has been always important. The capacity to plan for the future has been crucial to us, inasmuch as planning and thinking ahead is a uniquely human capacity (Suddendorf 2006). Planning is the consideration of the situation in which the future task will be performed and the set of behavioral options given that situation (Laibson, Repetto, and Tobacman 1998). Planning turns an abstract goal into behavioral actions. And, once goals become concrete, people feel

more pain if they fail to succeed those goals than pleasure if they complete them (Heath, Larrick, and Wu 1999).

Thus, planning often benefits task completion as it encourages people to think about the steps to achieve a goal (Sniehotta et al. 2005) and increases the accessibility of the necessary actions (Levav and Fitzsimons 2006). While the majority of papers has focused on the benefits of planning, recent research shows that planning can have negative consequences (Bayuk et al. 2010; DeWitte, Verguts, and Lens 2003; Towsend and Liu 2012; Ülkümen and Cheema 2011). When people become too focused on their plans, they miss unplanned opportunities to perform a task (Bayuk et al. 2010).

Although sometimes planning releases cognitive resources – such as when people consider a task half-done after planning (Masicampo and Baumeister, 2011a), other times planning is actually depleting – such as when one is far away from completing the goal (Towsend and Liu 2012). In addition, planning a specific goal (e.g., save $500) rather than a non-specific goal (e.g., save as much as I can) increases the perceived difficulty of that goal, which in turn decreases the attainability when people focus on how (as compared to why) to pursue a goal (Ülkümen and Cheema 2011).

Fernbach, Lynch and Kan (2013) find that people engage in less planning than they should on economically rational grounds. Fernbach et al. (2013) asked participants to buy eight items in a simulated online shopping task with three stores. Participants received a bonus for finding and purchasing each item. Payoffs were doubled for successful purchases at the third store. The researchers find that as slack of time decreases, people become more likely to plan and at the extreme to prioritize. However, adaptation is often late and people normally overestimate future time slack. As a result, participants don't behave as expected by utility maximization

reasons. They spend too much time in the first two stores and are unable to find all the items they need when they get to the third store.

People often don't adapt to changes in the environment and fail to adjust their strategies accordingly. Like the government that fails to implement regulations and monetary policies on time during economic crisis (Reder 1982), consumers often don't anticipate future shortages, adapt too little and are reluctant to change their strategies.

Future research may examine how people can turn abstract plans into more concrete implementation strategies. In addition, future research may investigate how plans can be better developed in order to increase commitment and at the same time allow some flexibility for the goal pursuit via other unplanned strategies. Jhang and Lynch (2013) show that when one divides molar goals into molecular subgoals, they get more motivated as they approach the completion of those subgoals. People are unwilling to pause a task as they get closer to complete a subtask. Dividing a task in subtasks makes it easier for consumers to monitor their progress and be less likely to be stuck in the middle of goal pursuit (cf. Bonezzi, Brendl and De Angelis 2011).

Dividing a task in subtasks may be especially helpful for task completion when consumers use reminders that keep the task accessible in mind. Consumers can reduce the length of the middle position of a goal pursuit by dividing the task into subtasks and thus create short sequence of tasks activated by memory cues that help them keep track of their progress and of the task demands.

4.2.2. How Do Reminders Work?

Research has demonstrated a generally beneficial effect of external reminder use for memory and motivation in laboratory settings (Einstein and McDaniel 1990; Meacham and

Colombo 1980). However, recent research indicates that reminders may not always confer benefits (Dalton and Spiller 2012; Guynn, McDaniel, and Einstein 1998). It has been argued that most critical in aiding prospective memory performance is that the reminders refer to both the target events and the intended activity (Guynn et al., 1998). But even the most sophisticated reminders proposed so far –implementation intentions – have no benefit when participants have to perform multiple tasks (Dalton and Spiller 2012).

Making implementation intentions for only one goal (linking the future context with the corresponding task) increases the likelihood of completion – by making goal pursuit automatic (Gollwitzer 1999). But making implementation intentions for multiple goals does not increase goal pursuit (Dalton and Spiller 2012). This is because difficulty associated with multiple goals offset the effect of implementation intentions. Chapter 3 of this dissertation suggests that reminders can help multiple goal pursuit when people divide the task in subgoals. However, this beneficial effect of reminders occurs at the expense of attention resources for other pursuits.

Ideally, reminders would help people allocate cognitive resources optimally – to remember to complete consumer tasks in the future without disrupting focus on some new task undertaken after setting the reminder. The present research shows that reminders involve a trade-off. They help people high on propensity to plan to resume an interrupted task in the future and to maintain vigilance for opportunities to complete it. But they harm the execution of other tasks that demand immediate attention. Reminders hurt those low on propensity to plan to resume an interrupted task and they decrease the urgency to start working on the task. But they also free up cognitive resources to be used for other tasks that require immediate attention.

Understanding the positive and negative effects of reminders is a necessary step towards developing optimal interventions that promote multiple task completion. Those interventions

may try to reduce the negative effects of reminders in the pursuit of multiple goals for people high on propensity to plan as well as for people low on the scale. Those interventions may try to alleviate the cognitive load of setting reminders among those high on propensity to plan and inhibit the procrastination of tasks with reminders among those low on propensity to plan. Much remains to be examined about the effects of reminders in more naturalistic designs such as when people pursue of multiple goals.

For example, it is not clear whether the results presented in Chapter 3 would replicate when reminders are provided to participants rather than initiated by themselves as in the current studies. One may suggest that self-initiated reminders are more personally relevant and thus should work better than externally-provided by the experimenter. However, recent research shows no difference in the effectiveness of self-initiated reminders and externally-provided reminders (Henry, Rendell, Phillips, Dunlop, and Kliegel 2012).

One's propensity to plan can be inferred from easily obtained measures such as the FICO scores (Lynch et al. 2010) and behaviors (e.g., whether the consumer has an agenda, pays the bills on time, has no debt and some savings). When consumers are high on propensity to plan, companies may use reminders to increase the likelihood of its customers to remember to buy. When consumers are low on propensity to plan, other strategies are likely to be more successful. Companies can for example send a message saying that consumers have a short time to buy the product. This way procrastination is not allowed. Companies can also send reminders for people low on propensity to plan saying the exact steps they need to perform to execute a task. This way they are more likely to behave as those high on propensity to plan.

Future research may examine the life-time of reminders. Are reminders less likely to work the longer the time delay between its activation and the time to perform a task? Are

reminders less likely to work the second time they are activated? The answer to those questions will enable the development of optimal interventions that help consumers fulfill their goals.

4.3. Final Thoughts

A good theory has practical applications. In fact, good theories are often developed by trying to understand phenomena that standard theories could not explain. The field of prospective memory in itself started by trying to understand why experienced pilots sometimes fail to perform basic procedures. We believe our findings have practical implications for why people don't use reminders when they need one and why reminders sometimes don't work. Good theories also have implications beyond their focus of investigation. We hope our findings will increase our understanding of when reminders and planning help and when they hurt task completion.

As an applied discipline, marketing gains knowledge when applying principles of basic science such as psychology. This process of learning from other disciplines and applying to the field of consumer behavior may engender new knowledge. The issues investigated in Chapter 2 of this thesis of how our future tasks come to mind and how we think about the things we have to remember have been long examined in prior research in cognitive psychology. Its application to grocery shopping revealed that consumers are often overconfident about their memory and thus failed to use a shopping list. While prior research has examined the antecedents of either memory predictions or of memory performance, the research in Chapter 2 focused on the dissociation between predictions and performance. Previous research showed that people use the ease with which items are retrieved to predict their memory and that when they use more deliberative thoughts to predict their memory, they make better predictions. We show that the mispredictions

of memory are much more pervasive. We learned that people do not use correct information to predict their memory after a delay. Instead, they use cues and factors that are salient but that sometimes have no actual effect on memory. These findings helps us understand why retrieval so often fails and why people cannot avoid forgetting important tasks (e.g., take the baby out of the car, take the medications on time, prepare the tax return, pay bills on time).

Similarly, the issue investigated in Chapter 3 of this thesis of how reminders work has long been examined in prior research. However, our interpretation is that previous research has been focused too much on developing reminders that work very well in laboratory settings, but that have meager effects in real-life. Its application to consumers' multiple tasks revealed that reminders have differential effects for people high on propensity to plan and for people low on propensity to plan. Beyond that, we learned that propensity to plan is related to an action (thinking the specific actions to perform a task), which causes reminders to work. This is important to understand why reminders sometimes fail and to develop interventions that help people low on propensity to plan finish their tasks.

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Summary

Not many people use memory cues. For example, only 50% of consumers make shopping lists. If memory cues are important for memory (as previous research shows), why don't people use them more often? In the first essay of my dissertation, I found that people don't use memory cues because they are overconfident about their memory. That is, consumers often incorrectly predict that they will remember to do something, do not take appropriate actions to help them remember (e.g., write a shopping list or stick a Post-It on the fridge or the steering wheel) and end up forgetting to do what they should be doing (e.g., buy grocery items, pay bills, take the baby out of the car).

But do reminders always help task completion? Almost all previous research on prospective memory and implementation intentions finds that reminders help people execute tasks. Very few papers found no effects of reminders on task completion (3 papers). Those three papers examined the effect of reminders in the context of multiple tasks. The second essay of my dissertation shows that, when multiple tasks are involved, reminders sometimes benefit, but sometimes harm task completion. Reminders help people high in propensity to plan to resume an interrupted task in the future and to maintain vigilance for opportunities to complete it. But they harm the execution of other tasks that demand immediate attention. On the contrary, reminders hurt those low on propensity to plan to resume an interrupted task and they decrease the urgency to start working on the task. But they also free up cognitive resources to be used for other tasks that require immediate attention.

Companies often send special deals, early bird specials, and other promotions that may work as reminders to buy the product. These reminders may accelerate the purchase of the product among consumers high on propensity to plan. But, it may delay the purchase of the product among consumers low on propensity to plan. Companies also send reminders when they send its customers information about hotel and theater reservation or confirmations, bills to be paid, subscriptions to be renewed, prepaid cell phone credit to be topped up. Consumers use reminders for several tasks including going out for groceries, eating healthy, housekeeping and maintenance, taking medicines, calling for pizza. It is important to understand for whom the reminder helps and for whom it hurts task completion and performance such that companies and policy makers can tailor appropriate interventions for different groups of individuals. For example, propensity to plan is related to income, education and strongly related to the FICO credit scores. Perhaps for those at the bottom of the income distribution, for those with low education levels and for those with low FICO credit scores, reminders should not be used. Among those individuals, a more effective intervention to get something done might be to ask them to either perform the task immediately or as soon as possible. In that case, procrastination is discouraged and, hence, tasks are more likely to be completed.

(Summary in Dutch)

Niet veel mensen passen geheugensteuntjes toe. Zo maakt slechts 50% van de consumenten gebruik van een boodschappenlijstje. Echter als geheugensteuntjes belangrijk zijn voor ons geheugen (zoals eerder onderzoek heeft aangetoond), waarom gebruiken mensen hen dan niet vaker? In het eerste essay van mijn proefschrift laat ik zien dat mensen geen geheugensteuntjes gebruiken omdat zij te zelfverzekerd zijn over hun geheugen. Dit betekent dat consumenten vaak verkeerd voorspellen dat zij zich zullen herinneren iets te moeten doen, zij geen gepaste acties ondernemen om hen zich dit te helpen herinneren (b.v. het schrijven van een boodschappenlijst of het plaatsen van een Post-It op de koelkast of het stuur) en uiteindelijk vergeten wat zij zouden moeten doen (b.v. het kopen van bepaalde boodschappen, het betalen van rekeningen, het meenemen van de baby uit de auto).

Maar werken geheugensteuntjes altijd bij het volbrengen van taken? Bijna al vorig onderzoek naar het prospective memory en implementatie intenties laat zien dat geheugensteuntjes mensen helpen bij het uitvoeren van taken. Slechts enkele onderzoeken vonden dat geheugensteuntjes geen effect hadden op het volbrengen van taken (3 artikelen). Deze drie artikelen onderzochten het effect van geheugensteuntjes in een context van meerdere taken. Het tweede essay van mijn proefschrift laat zien dat in een situatie met meerdere taken, geheugensteuntjes het volbrengen van taken zowel ten goede kan komen dan wel kan schaden. Geheugensteuntjes helpen mensen met een sterke neiging om te plannen door hen aan te zetten onderbroken taken in de toekomst weer op te pakken en door waakzaam te zijn voor mogelijkheden tot voltooiing van de taak. Echter schaden deze geheugensteuntjes hen in de uitvoering van andere taken die onmiddellijke aandacht vragen. Tegenovergesteld, geheugensteuntjes schaden mensen met een lage neiging om te plannen in het hervatten van onderbroken taken en leiden deze geheugensteuntjes tot een afname in drang aan nieuwe taken te beginnen. Daarentegen zorgen deze geheugensteuntjes er ook voor dat cognitieve capaciteit beschikbaar is om te gebruiken in andere taken die onmiddellijke aandacht vereisen.

Bedrijven maken vaak gebruik van speciale aanbiedingen en promoties welke werken als een geheugensteuntje om een product te kopen. Deze geheugensteuntjes versnellen mogelijk het aankoopproces van het product voor consumenten met een sterke neiging om te plannen. Echter het vertraagt mogelijk het aankoopproces van het product voor consumenten met een lage neiging om te plannen. Daarnaast passen bedrijven ook geheugensteuntjes toe wanneer zij consumenten informatie toesturen over hun hotel of theater reservering, wanneer rekeningen betaalt dienen te worden, wanneer abonnementen verlengd moeten worden, en wanneer prepaid telefoon opgewaardeerd moeten worden. Consumenten gebruiken herinneringen bij verscheidene taken, zoals het doen boodschappen doen, gezond eten, het schoonmaken van het huis, het innemen van medicijnen of het bestellen van pizza. Het is belangrijk om te begrijpen wie geheugensteuntjes ten goede komt en wie door geheugensteuntjes in het volbrengen van taken wordt geschaad, zodat bedrijven en beleidsmakers de juiste interventies kunnen ontwikkelen voor verschillende groepen mensen. Bijvoorbeeld, de neiging om te plannen is gerelateerd aan inkomen, educatie, en sterk gerelateerd aan FICO krediet scores. Wellicht zouden herinneringen niet gebruikt moeten worden voor personen aan de onderkant van de inkomensladder, met een laag educatie niveau, of met lage FICO krediet scores. Een effectievere interventie in dit geval is mogelijk hen te vragen de taak meteen of zo snel mogelijk uit te voeren. Op die manier wordt het uitstellen van taken ontmoedigd en is de kans groter dat taken worden volbracht.

Curriculum Vitae

Daniel Fernandes (1983) obtained his master's degree in 2008 in Business Administration at UFRGS in Brazil. In the same year, he started his PhD research in Marketing at Erasmus University. Daniel's research interest centers on transformative consumer research and includes consumers' memory, planning, financial literacy, decision-making and self-regulation. In the financial domain, he investigates the role of financial knowledge on financial decision-making and the factors that explain this relationship. Outside of the financial domain, Daniel studies consumers' memory and when reminders help consumers to complete their tasks. He presented his research at various international conferences and published in the *Journal of Marketing Research*, the *International Journal of Research in Marketing*, and the *Journal of Consumer Psychology*. Chapter 2 of his dissertation is under review at the *Journal of Consumer Psychology* and Chapter 3 is under review at the *Journal of Consumer Research*. He was a visiting research scholar at the Colorado University in 2010. From September 2013, he will serve as an Assistant Professor in Marketing at Católica-Lisbon School of Business and Economics.

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THE FUNCTIONS AND DYSFUNCTIONS OF REMINDERS

Consumers have to remember to do things in the future such as buying ingredients for dinner on the way home from work or paying bills before the due date. Planning to execute an intention involves assessing how likely one is to remember to perform the task in the future. The present research shows that consumers are overconfident about their ability to remember to perform consumption tasks in the future. Consumers use salient factors to predict their future memory and thus fail to consider that they are likely to forget. As a result, consumers often don't prepare a shopping list when they actually need one. The present research also examines reminders more broadly and the effects of generating reminders on the behavior of consumers juggling multiple competing priorities. Consumers high on propensity to plan, who elaborate more when forming plans, schedule tasks with reminders to be executed earlier than tasks without reminders, and consequently are more likely to complete the tasks for which they have reminders. This acceleration reflects preoccupation with the reminded tasks that carries over to inhibit ability to refocus on some new task. For those low in propensity to plan, reminders have exactly the opposite effect. Such consumers schedule tasks later when they specify reminders than when they do not, and consequently are less likely to complete the tasks on the schedules they set. The silver lining is that reminders allow those low in propensity to plan to release preoccupation with those tasks to focus on something new.

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