

You Will Not Remember This: How Memory Efficacy Influences Virtuous Behavior

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The present article explores the effect of memory efficacy on consumer behavior—particularly on consumer’s likelihood to behave “virtuously,” that is, in line with standards, such as ideals, values, morals, and social expectations. Memory efficacy refers to people’s general belief that they will be able to remember in the future the things they are experiencing or doing in the present. We hypothesize and find across five studies that when consumers have low-memory efficacy (vs. control), they are less likely to behave virtuously because their actions seem less consequential for their self-concept (i.e., less self-diagnostic). Using two different experimental manipulations of memory efficacy, we examine its effect on virtuous behavior in the context of prosocial choices—that is, charitable giving (study 1A) and volunteering (studies 1B and 2). We then explore our proposed underlying mechanism (perceptions of self-diagnosticity) using causal-chain mediation (studies 3A and 3B) and moderation approaches (studies 4 and 5) in the context of food choices. We conclude with a discussion of the practical and theoretical implications of our findings.

Keywords: memory efficacy, self-concept, self-diagnosticity, consumer choice, virtuous behavior

INTRODUCTION

Imagine today is your grandfather’s birthday. You are hosting his birthday dinner, and several family members are coming over to celebrate. You decide to bake your grandfather’s favorite chocolate cake along with a couple

of other dishes. You have around 6 hours until everyone arrives, so you need to start cooking in about 2 hours. You make a mental note of a few missing ingredients and head out to the grocery store. When you get back, you start taking things out of your grocery bags and realize you forgot to buy the most important ingredient: chocolate! You head back to the grocery store thinking about how forgetful you are. Before you reach the automatic doors to go inside the store, you walk by representatives of the Salvation Army ringing a bell and soliciting donations. You have several five-dollar bills in your wallet. Do you stop to make a donation, or do you keep going?

We propose that in this scenario your beliefs about your poor memory will reduce your likelihood to donate. Memory efficacy refers to people’s general beliefs in their ability to remember in the future the things they are doing or experiencing in the present—that is, the general beliefs of having a “good” or “bad” memory (see Bandura 1989; Berry, West, and Dennehey 1989; Dixon and Hultsch 1983). These beliefs can be context dependent, fluctuating from one situation to the next (Begg et al. 1991; Matvey, Dunlosky, and Guttentag 2001). Research on metacognitive judgments of learning shows that learners have

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expectations about what they will remember and what they will forget—and allocate study time accordingly (Mazzoni, Cornoldi, and Marchitelli 1990; Son and Metcalfe 2000). Many factors can influence these memory expectations. For example, learners have lower memory efficacy for information they will need to recall rather than recognize in the future (Mazzoni and Cornoldi 1993), for complex information (Son and Metcalfe 2000), and for long retention periods (Koriat et al. 2004). Memory efficacy can also be dispositional, such that people differ in their beliefs about whether they have a good or bad memory (Bandura 1989; Berry et al. 1989; Dixon and Hultsch 1983). Previous research has focused on the link between memory efficacy and actual memory performance (e.g., effort, recall, and learning) or memory strategies (e.g., calendars, lists)—especially among older adults (Beaudoin and Desrichard 2011; Ponds and Jolles 1996). Much less is known about the effect of memory efficacy on consumer behavior, particularly on consumer's likelihood to behave “virtuously,” that is, in line with standards such as ideals, values, morals, and social expectations.

In the present article, we explore the effect of memory efficacy on consumer choice. Specifically, we investigate the possibility that when consumers have low-memory efficacy (vs. control), they will be less likely to behave virtuously because they will perceive their actions as less representative of who they are (i.e., less self-diagnostic). Indeed, consumers often find themselves in situations—such as our introductory example—that can temporarily lower their memory efficacy by confronting them with their own “forgetfulness.” Indeed, research shows that forgetting is pervasive in consumption contexts (Bettman 1979; Fernandes et al. 2016), with consumers failing to buy about 30% of items they intended to buy (Hui et al. 2013). Furthermore, while consumers are less likely to forget when they use a shopping list (Block and Morwitz 1999), only about half of shoppers use such lists (Thomas and Garland 2004). As another example, after a satisfying hour of retail therapy, a consumer might walk out of a shopping mall with several bags, but with no recollection of where she parked her car. We propose such experiences of forgetting, which induce in consumers a sense that they have a poor memory will make their actions seem less self-diagnostic, which will in turn decrease their likelihood to behave virtuously in a subsequent context (e.g., responding to donation requests, choosing between healthy and indulgent foods). Our work is the first to examine the effects of consumers' beliefs about the efficacy of their memory on virtuous behavior and to explore the role perceptions of self-diagnostics play in this effect. Thus, we extend knowledge on the links between memory efficacy, the self-concept, and consumer behavior. In the sections that follow, we review the relevant literatures and develop a series of hypotheses about the effect of memory efficacy on virtuous behavior.

THEORETICAL DEVELOPMENT

Memory and the Self

Memory is the faculty by which people retain information over time (Matlin 2005; Pham and Johar 1997; Sternberg 1999). People can derive positive and negative utility from their memories of past events and consumption experiences (Baumgartner, Sujan, and Bettman 1992; Brunk, Giesler, and Hartmann 2017; Holbrook 1993; Winterich et al. 2017; Zauberan, Ratner, and Kim 2009). Socio-cognitive theorists conceptualize the self-concept—that is, the collection of thoughts and ideas people have about themselves—as an elaborate memory-based structure (Greenwald and Banaji 1989; Klein and Kihlstrom 1986; Markus 1977). In particular, autobiographical memories (i.e., memories of one's own life) form the basis of the self-concept, providing a continuous inner narrative that contributes to a unified sense of self (James 1890). Research documents a reciprocal link between autobiographical memories and the self-concept (Conway and Pleydell-Pearce 2000; Reed and Forehand 2016).

On the one hand, people's current or aspirational self-concepts determine what they remember or forget about their past (Greenwald 1980; Kouchaki and Gino 2016; Singer and Salovey 1993). For example, consumers with a greater tendency to incorporate brands into their self-concepts are more likely to remember events and experiences related to their favorite brands (Sprott, Czellar, and Spangenberg 2009). Furthermore, research shows people engage in biased remembering for identity-bolstering events and motivated forgetting for identity-threatening events (Dalton and Huang 2014; Reczek et al. 2018). For example, students who believed—due to an experimental manipulation—that extraversion was positively related to academic success were more likely to recall events that made them appear extraverted (e.g., making friends at a dinner party; Sanitioso, Kunda, and Fong 1990). Similarly, May and Irmak (2014) showed that when presented with an opportunity to indulge, impulsive (vs. non-impulsive) consumers with a regulatory goal (e.g., eating healthily) were more likely to twist memories of past behavior, inflating their progress toward the goal, to allow themselves to indulge.

On the other hand, the past events and experiences people remember shape their present self-concepts (Belk 1988; Conway and Pleydell-Pearce 2000; Wilson and Ross 2003). Situational cues activate specific memories, making accessible a given subset of self-knowledge that forms the “working self-concept” (Rhodewalt and Agustsdottir 1986). A study by Fazio, Effrein, and Falender (1981) led participants to behave in an extraverted or introverted manner in an initial interaction with a confederate. Later, self-ratings and a subsequent interaction suggested that participants had incorporated into their self-concept the

traits implied by the memory of their earlier behaviors. Moreover, research shows that elderly persons suffering from Alzheimer's disease—a medical condition that ravages one's memory—will often conceive of themselves in ways that are more connected to the distant past experiences they remember than to the recent events they have forgotten (Klein, Cosmides, and Costabile 2003). Thus, forgotten actions (i.e., inaccessible in memory) have less influence on the self-concept than ones that come to mind more readily.

Moving beyond motivated memory processes or retrospective memory effects on the self-concept, the present article focuses on the prospective effect of memory beliefs—specifically, memory efficacy—on self-concept management processes, and hence on virtuous behavior. Our conceptualization of memory efficacy is consistent with Bandura's (1977) definition of self-efficacy as the belief “in one's capabilities to mobilize the motivation, cognitive resources, and courses of action needed to meet given situational demands” (Wood and Bandura 1989, 408). Within this perspective, self-efficacy beliefs vary along three dimensions: (a) level, which corresponds to the perceived difficulty of the task, (b) strength, which refers to the certainty of performing a task successfully, and (c) generality, which indicates the extent to which beliefs about level and strength extend to other contexts (Bandura 1986).

In line with Bandura's definition, the bulk of research on self-efficacy has conceptualized and studied it as a task-specific belief, with an emphasis on the level and strength dimensions. For example, Berry et al.'s (1989) Memory Self-Efficacy Questionnaire focuses on specific memory tasks, in which individuals indicate if they could remember an increasing number of items from a grocery list (a measure of self-efficacy level) and how confident they are in their ability to recall at each level (a measure of self-efficacy strength). A more recent wave of researchers has explored the generality dimension of self-efficacy defined as one's perceived ability to perform across a broad variety of contexts (general self-efficacy [GSE]; see Chen, Gully, and Eden 2001; Schwarzer and Jerusalem 1995). In the present article, we focus on the generality dimension of memory efficacy: we examine people's general belief in their ability to remember in the future the things they are experiencing or doing in the present.

We propose that, because autobiographical memories are the vehicle through which actions influence the self-concept, believing that they have a poor memory (i.e., having low-memory efficacy) will reduce the extent to which people expect their actions to influence their future self-concept. Thus, as perceptions of memory efficacy decrease, consumers should see their actions as less consequential for how they might come to think and feel about themselves (i.e., as less self-diagnostic). Touré-Tillery and Light (2018, 61) define self-diagnosticity as a tendency to “see one's actions/decisions/choices as a strong indication

of one's nature or characteristics (e.g., traits, personality, preferences, morality)—that is, as serving to identify or characterize the self, whether or not others are present.” There are many antecedents to perceptions of self-diagnosticity (Dhar and Wertenbroch 2012; Touré-Tillery and Fishbach 2018), but a recurring finding is that, when people deem their actions self-diagnostic, they become motivated to behave in a manner that signals desired (or avoids signaling undesired) characteristics to themselves (Prelec and Bodner 2003; Touré-Tillery and Fishbach 2012, 2015). In the next section, we review existing empirical evidence for this proposition.

Virtuous Behavior

Virtuous behaviors are actions, choices, or decisions that provide delayed benefits (long term) or indirect benefits (to society or others) and are in line with standards, such as ideals, values, morals, and social expectations (Baumeister, Vohs, and Tice 2007; Read, Loewenstein, and Kalyanaraman 1999). Behaving virtuously can cost valuable resources, such as time, effort, or money—and often requires self-control. For example, a consumer behaving virtuously might volunteer on a Saturday morning (instead of sleeping in) or donate money to charity (instead of saving it for herself). Another virtuous consumer might exercise self-control by forgoing a tempting chocolate dessert in favor of a cup of fresh fruit. In general, engaging in virtuous acts can boost the self-concept by sending positive signals to the self (and others) about one's values, traits, and characteristics (Bem 1972; Dhar and Wertenbroch 2012; Diener and Srull 1979; Prelec and Bodner 2003). Therefore, because most people have a desire to maintain a positive self-concept, they are motivated to behave virtuously in an effort to present themselves to themselves in a favorable light (i.e., self-signaling; Bodner and Prelec 1996; Dunning 2007; Greenwald and Breckler 1985; Gneezy et al. 2012; Mazar, Amir, and Ariely 2008; Steele 1988).

Research shows that consumers' motivation to engage in such self-signaling behaviors (e.g., making healthy food choices, donating to charity) is particularly high when they perceive their actions as indicative of who they are (i.e., self-diagnostic) but low when they deem their actions non-diagnostic (Savary, Goldsmith, and Dhar 2015; Touré-Tillery and Fishbach 2012). For example, Touré-Tillery and Fishbach (2015) showed that consumers perceive choices merely described as occurring in the middle of an arbitrary sequence (e.g., a midday snack) as less self-diagnostic than choices framed as occurring at the beginning or end of such a sequence (e.g., start-of-afternoon or end-of-morning snack). Consequently, participants in their study were more likely to select indulgent snacks for such middle (vs. beginning or end) choices. Within the same perspective, Touré-Tillery and Light (2018) found that

people who view various aspects of their self-concept as disconnected (i.e., low in self-overlap) tend to consider their actions less self-diagnostic than those who see their various self-aspects as connected (i.e., high in self-overlap). Consequently, participants chronically—or experimentally induced to see themselves as—low (vs. high) in self-overlap were less likely to behave morally as they were less concerned about maintaining a favorable view of themselves.

In sum, research shows that consumers are more likely to self-signal by behaving virtuously when they deem their actions more (vs. less) self-diagnostic. Thus, given our proposition about the effect of memory-efficacy beliefs on perceptions of self-diagnosticity, we predict that consumers will be less likely to engage in virtuous behaviors when they doubt their ability to remember relative to when they have no such doubt. We further predict that the effect of memory efficacy on virtuous behavior will occur through perceptions of self-diagnosticity. In other words, the experience of low-memory efficacy (I do not remember things in general) will reduce the diagnostic value of actions (this does not mean anything) and hence reduces the need to self-signal, freeing consumers from the need to behave virtuously.

H1: When consumers have low-memory efficacy (vs. control), they will be less likely to behave virtuously.

H2: Perceptions of self-diagnosticity will mediate the effect of memory efficacy on virtuous behavior.

We propose that the effect of memory efficacy on virtuous behavior occurs because people low in memory efficacy see their actions as less telling of their personal traits and characteristics. Thus, in situations where it is easy to explain away one's apparent failure to behave virtuously (e.g., by making external attributions for one's choices), people low in memory efficacy (vs. control) should be expected to behave similarly. Such a situation might naturally arise when consumers make choices for others, because such choices are typically based on inferences about what a specific person likes (Kray 2000; Kray and Gonzalez 1999) or about what people in general like. For example, Laran (2010) found that choosers tend to infer that others will be unlikely to exercise self-control and hence make indulgent choices for others. Thus, choices made for another person (e.g., a friend) should be subject to external attributions (I am choosing a cookie for my friend because he has a sweet tooth) and hence should be seen as less diagnostic of the choosers' personal preferences and virtue.

H3: The choice target (self vs. another person) will moderate the effect of memory efficacy on virtuous behavior, such that the effect will attenuate for choices made for another person.

Central to our hypotheses is the notion that low-memory efficacy frees people from the need to behave virtuously by reducing the self-diagnosticity of their actions and hence their need to present themselves to themselves in a positive light (i.e., self-signal). It follows that individual differences in the importance assigned to a given virtue, goal, or value (i.e., the extent to which a person is committed to this value) should moderate the effect of memory efficacy on virtuous behavior, such that this effect should attenuate for people for whom the value is less important. Indeed, more (vs. less) important values and goals correspond to more (vs. less) central aspects of the self-concept (Cantor et al. 1986; Foote 1951; Gollwitzer and Wicklund 1985; Markus and Wurf 1987). Thus, people for whom a goal or value (e.g., eating healthy food) is important should care more about maintaining a self-concept consistent with this value (e.g., health-conscious), and hence their value-relevant choices (e.g., food choices) should be more sensitive to self-diagnosticity cues, such as whether they expect to remember these choices. By contrast, people for whom a value is unimportant should feel no such pressure to maintain a self-concept consistent with this value and hence their value-relevant choices should be unaffected by their memory efficacy beliefs.

H4: The importance of the context-relevant value or goal will moderate the effect of memory efficacy on virtuous behavior, such that this effect will attenuate at lower levels of value importance.

Finally, we note that the experience of low-memory efficacy may lead consumers to use memory strategies (e.g., note taking) to help them remember important things or events (Brown 1978; Dixon and Hultsch 1983; Flavell and Wellman 1977; Hultsch et al. 1988; Troyer and Rich 2002). Within this perspective, one might expect people low in memory efficacy (vs. control) to make a greater effort to remember their choices and hence to behave more virtuously—or similarly—in an effort to maintain a positive self-concept. Against this alternative prediction, we propose that people low in memory efficacy (vs. control) will be less likely to behave virtuously due to perception that their choices are less self-diagnostic. Because virtuous behaviors are typically costlier than their alternatives, we suggest that, even though people wish to make choices that reflect positively on themselves (Bem 1972; Dunning 2007; Greenwald and Breckler 1985; Prelec and Bodner 2003; Steele 1988), they will take advantage of opportunities to relax these standards when the cost to the self-concept is lower.

OVERVIEW OF STUDIES

In five studies, we tested our hypotheses about the effect of memory efficacy on perceptions of self-diagnosticity and hence on consumers' likelihood to behave virtuously.

First, using two different experimental manipulations of memory efficacy, studies 1 and 2 examined its effect on virtuous behavior in the context of prosocial choices (hypothesis 1)—that is, charitable giving (study 1A) and volunteering (studies 1B and 2). We then explored our proposed underlying mechanism in the context of food choices. We note that, in testing the mediating role of perceptions of self-diagnosticsity, the very act of trying to measure this mediating process might interfere with the process itself. Indeed, asking directly about perceptions of self-diagnosticsity (e.g., what I do says a lot about who I am) might interfere with the behavior under investigation or might bias the answer to the question itself. Thus, to explore how perceptions of self-diagnosticsity influence the effect of memory efficacy on virtuous behavior, we designed experimental paradigms that sidestepped these concerns. Specifically, to show that perceptions of self-diagnosticsity mediate the effect of memory efficacy on virtuous behavior (hypothesis 2), study 3 used a causal-chain mediation approach, first manipulating memory efficacy to test its effect on perceptions of self-diagnosticsity (study 3A) and then manipulating self-diagnosticsity to show its effect on virtuous behavior (study 3B). To provide further process evidence, studies 4 and 5 tested the moderating roles of the choice target (self vs. another person; hypothesis 3) and the degree of importance of the context-relevant value or goal (hypothesis 4), respectively.

Finally, we estimated a minimum required sample size of 52 participants per experimental condition to achieve a desired power of 0.80 at an alpha level of $p = .05$, and average effect sizes of $d_{\text{Cohen}} = 0.56$ —based on an effect-size average from previous research using similar measures as the present article (see Duckworth and Kern 2011 for meta-analysis). To maximize power, we aimed for a minimum of 60 participants per experimental condition for studies using continuous dependent measures (i.e., interval or ratio scales) and a minimum of 100 participants per condition for studies using binary-dependent measures (i.e., nominal scales).

STUDY 1: GIVING AND VOLUNTEERING

Study 1 investigated the effect of memory efficacy on virtuous behavior (hypothesis 1) in the context of prosocial choices: donating money (study 1A) and volunteering for charity (study 1B). Participants wrote a short essay about what they did the previous morning (control condition) or a morning 1 month ago (low-memory-efficacy condition), which would cast doubt on their ability to remember. Then, in study 1A, they chose between donating their bonus compensation to charity versus keeping it for themselves, whereas in study 1B they decided whether and how much to work on an anagram task for charity. We predicted that participants in the low-memory-efficacy condition

would behave in a less prosocial manner than those in the control condition.

Study 1A: Giving to Charity

Participants. We recruited 208 undergraduate students (133 females; $M_{\text{age}} = 20.07$, $SD_{\text{age}} = 1.67$) through the research laboratory of Northwestern University in the United States. Participants completed the experiment online in return for monetary compensation, and a bonus of \$0.50 upon full completion of the study. We excluded one participant who did not complete the experimental manipulation (recall task), leaving 207 responses for the subsequent analyses.

Design and Procedure. The study employed a single factor, 2-level (memory efficacy: low vs. control) between-subjects design. Participants took part in a short study on “Habits and Attitudes.” The study started with a recall task, which constituted our experimental manipulation of memory efficacy. In the low-memory-efficacy [control] condition, participants read:

Without referring to your calendar, please take a moment to recall and write about the morning of <<<date>>> (1 month ago) [yesterday morning (<<<date>>>)]. What did you do from the time you woke up to lunchtime? Please be as specific as possible, to the best of your memory ability. Do not refer to your calendar.

This task relied on metacognitive difficulty to change participants’ perceptions of their memory capabilities (see Schwarz 2004). We expected that because recalling exactly what they did a month ago (vs. yesterday) would be difficult, participants would be more likely to question their own memory capabilities. Furthermore, this manipulation mirrors the common human experience of trying to recall past events either in response to external prompts (e.g., “What did you do last weekend/summer/Halloween?”), “Where did you get this sweater from?”), or because one needs the information to make a decision in the present (e.g., “What brand of pancake mix did I get last week?”, “What’s his name again?”).

We note however that the difficulty of recalling could also be depleting for participants, which might in turn reduce self-regulation and hence virtuous behavior. To test this possibility, we conducted a pretest of the manipulation. We randomly assigned 148 participants (sucaa023-FN1¹ on MTurk (69 females; $M_{\text{age}} = 34.61$, $SD_{\text{age}} = 11.19$) to write about yesterday or 1 month ago. We assessed depletion using a five-item scale developed by Shirom and Melamed (2006) to measure perceptions of the availability of self-regulatory resources: (a) “My thinking process is slow;”

¹ This number and the reported analysis excluded three participants who did not complete the memory-efficacy manipulation (i.e., they did not write anything).

(b) “I have difficulty concentrating;” (c) “I feel I’m not thinking clearly;” (d) “I feel I’m not focused in my thinking;” and (e) “I have difficulty thinking about complex thing” (1 = *strongly agree*; 7 = *strongly disagree*). The items appeared in randomized order ($\alpha = .93$).

In the pretest, we also included a manipulation check of memory efficacy consisting of four questions, which we designed using the same approach as existing measures of general self-efficacy (Chen et al. 2001; Schwarzer and Jerusalem 1995), but with a focus on memory beliefs. These four items appeared in randomized order ($\alpha = .91$): (a) “How inaccurate or accurate does your memory tend to be?” (1 = *very inaccurate*, 7 = *very accurate*); (b) “To what extent do you believe your memory is generally unreliable or reliable?” (1 = *very unreliable*; 7 = *very reliable*); (c) “To what extent do you expect to forget or remember most of what you do?” (1 = *definitely forget*; 7 = *definitely remember*); and (d) “In general, how would you rate your own memory?” (1 = *very bad*, 7 = *very good*). We counterbalanced the order of presentation of the depletion questions and the manipulation checks but found no effect of counterbalancing. This pretest confirmed that participants had lower memory efficacy after writing about what they did a month ago ($M = 4.52$, $SD = 1.41$) than after writing about the previous day ($M = 5.34$, $SD = 1.20$; $t(146) = -3.80$, $p < .001$; $d_{\text{Cohen}} = 0.63$). However, we found no effect of the manipulation on the depletion items ($M_{\text{low memory}} = 2.81$, $SD_{\text{low memory}} = 1.38$; $M_{\text{control}} = 2.75$, $SD_{\text{control}} = 1.46$; $t < 1$; $d_{\text{Cohen}} = -0.042$). These results suggested the manipulation influenced memory efficacy without changing feelings of depletion.

In the main study, after writing the essay, participants answered the same four manipulation-check questions as in the pretest. Next, to measure virtuous behavior, we reminded participants that “as an additional token of appreciation, we are providing a bonus amount of \$0.50 for every participant who completes this survey.” We then informed them that they could “choose to donate their bonus to the Cancer Research Institute OR to keep their bonus to receive it as extra compensation at the end of the study” and asked them to indicate their decision (*Donate my bonus to the Cancer Research Institute, Keep my bonus to receive it as extra compensation*; counterbalanced). The Cancer Research Institute is a nonprofit organization dedicated to advancing immunotherapy to treat, control, and cure all cancers. We later donated proceeds from this study—and subsequent studies involving charitable giving—to the corresponding nonprofit organization. The survey ended with a basic demographic questionnaire and debriefing information.

Results. To check the effect of our manipulation on memory efficacy, we combined the four manipulation-check questions ($\alpha = .88$). We found participants who wrote about a morning 1 month ago exhibited lower

memory efficacy ($M = 4.35$, $SD = 1.15$) than those who wrote about their previous morning ($M = 4.91$, $SD = 1.08$; $t(205) = -3.64$, $p < .001$; $d_{\text{Cohen}} = 0.50$).

A logistic regression of donation decision (0 = *keep*, 1 = *donate*) on memory efficacy (0 = *low*, 1 = *control*) revealed that participants in the low-memory-efficacy condition were less likely to donate their bonus (31.37%) than those in the control condition (45.71%; $b = 0.61$, $SE = 0.29$, $z = 2.11$, $p = .035$; odds ratio = 1.84).

Study 1B: Volunteering for Charity

Participants. We recruited 351 US-based participants (187 females; $M_{\text{age}} = 38.14$, $SD_{\text{age}} = 12.62$) online through Amazon’s Mechanical Turk (MTurk) and paid them for their time. We did not exclude any participant.

Design and Procedure. The study employed a single factor, 2-level (memory efficacy: low vs. control) between-subjects design. Participants took part in a short study on “Habits and Attitudes,” in which they completed the same recall-task manipulation of memory efficacy as in study 1A and answered the same four manipulation-check items. Next, to measure virtuous behavior, we informed participants that they could volunteer to solve anagrams to raise money for Feeding America, a nonprofit organization dedicated to feeding people in need through food pantries, soup kitchens, shelters, and other community-based agencies. Specifically, participants read that each anagram they solved would correspond to a 5¢ donation to the organization and that they could solve up to 20 anagrams—for a total donation of \$1 on their behalf. We made it clear that they could solve as many of these anagrams as they wished or none at all (i.e., they could exit the survey at any point). Thus, we could measure virtuous behavior both as (a) whether participants chose to take part in the unpaid task (i.e., volunteering rate) and as (b) the number of anagrams they solved (volunteering effort; which ranged from 0 to 20 anagrams). The survey ended with a basic demographic questionnaire and full debriefing information.

Results. We combined the four manipulation checks ($\alpha = .92$) and found that participants who wrote about a morning 1 month ago exhibited lower memory efficacy ($M = 4.85$, $SD = 1.21$) than those who wrote about their previous morning ($M = 5.48$, $SD = 1.10$; $t(349) = -5.08$, $p < .001$; $d_{\text{Cohen}} = 0.54$).

A logistic regression of volunteering rate (0 = *exit the survey without solving any anagrams*, 1 = *stay in the survey to solve at least one anagram*) on memory efficacy showed that participants in the low-memory-efficacy condition were less likely to help (66.28%) than participants in the control condition (77.65%; $b = 0.57$, $SE = 0.24$, $z = 2.36$, $p = .018$; odds ratio = 1.77). Furthermore, a *t*-test of volunteering effort (number of anagrams solved correctly) by memory efficacy (0 = *low*,

1 = *control*) showed that participants in the low-memory-*efficacy* condition solved fewer anagrams ($M = 4.13$, $SD = 4.52$) than those in the control condition ($M = 5.23$, $SD = 4.66$; $t(349) = -2.26$, $p = .025$; $d_{\text{Cohen}} = 0.24$).

Discussion

These results provided initial support for our hypothesis that when memory efficacy is low (vs. control), consumers will be less likely to behave virtuously (hypothesis 1) and demonstrated the robustness of this effect across participant populations (university students, adults online). We note that the recall-task manipulation of memory efficacy might also have altered participants' construal levels, such that it might have elicited a higher (more abstract) level of construal for those who wrote about 1 month ago (vs. yesterday). Indeed, construal level theory (CLT; Trope and Liberman 2010) advances that people represent psychologically distant objects (e.g., events from 1 month ago) abstractly but construe psychologically proximal objects (e.g., events from 1 day ago) more concretely. Furthermore, based on CLT, intentions related to psychologically distant (vs. proximal) objects should be influenced by higher-order values, which match their level of abstraction. Thus, people should behave more prosocially in high (vs. low) construal levels, such as after writing about 1 month ago (vs. yesterday). Indeed, research shows that temporal distance increases prosocial tendencies (Choi, Park, and Oh 2012; Eyal, Liberman, and Trope 2008). However, despite this competing prediction, we find that consumers are less likely to donate after attempting to recall events from 1 month ago (vs. yesterday). In the next study, we sought to replicate this finding conceptually using a different manipulation of memory efficacy to further test the robustness of the effect.

STUDY 2: HELPING OUT THE RESEARCH TEAM

Study 2 investigated the effect of memory efficacy on consumers' likelihood to behave virtuously (hypothesis 1) using a different manipulation of memory efficacy. Participants read a scenario about forgetting an important item while grocery shopping (low-memory-*efficacy* condition) or getting all their items (control condition). After this memory-*efficacy* manipulation, they decided whether to help the research team by completing an extra survey for no additional compensation. We predicted that participants in the low-memory-*efficacy* (vs. control) condition would be less likely to help.

Methods

Participants. We recruited 309 US-based participants (142 females; $M_{\text{age}} = 37.87$, $SD_{\text{age}} = 11.80$) online through MTurk and paid them for their time. We did not exclude any participant.

Design and Procedure. The study employed a single factor, 2-level (memory efficacy: low vs. control) between-subjects design. Participants first read the following scenario in the low-memory-*efficacy* [*control*] condition:

Imagine today is your grandfather's 80th birthday. You are hosting the birthday dinner, and the entire family is coming over to celebrate. You decide to cook your grandfather's favorite dish, Roast Pork Loin, along with a couple of other side dishes.

You have around 6 hours until the guests start to arrive and hence need to start cooking in about 2 hours. Before heading out to go grocery shopping, you make a mental note of all the ingredients you need to buy. As you are driving over to the grocery store, you repeat in your head all the items you need to buy so that you don't forget anything.

You return from your trip to the grocery store and start pulling out ingredients from the grocery bag. It is then you realize that you forgot to buy the most important ingredient . . . Pork Loins [*You return from your trip to the grocery store and start pulling out ingredients from the grocery bag. You have all the items ready to start!*]

This manipulation was designed to induce an experience of low-memory efficacy by asking participants to imagine a common experience of forgetting something important and obvious while grocery shopping (see Bettman 1979; Fernandes et al. 2016; Hui et al. 2013). In a pretest of this experimental manipulation, we randomly assigned 103 MTurk participants (38 females; $M_{\text{age}} = 35.63$, $SD_{\text{age}} = 11.04$) to read one of the two scenarios. We included the same four manipulation checks of memory efficacy as in previous studies ($\alpha = .94$). Furthermore, to test the possibility that this manipulation operates through changes in mood, we measured the positive and negative affect schedule (PANAS; Watson, Clark, and Tellegen 1988). The PANAS consists of 20 words that describe positive or negative emotions (e.g., interested, upset). For each emotion, participants indicated the extent to which they "feel this way right now" (1 = *very slightly or not at all*, 2 = *a little*, 3 = *moderately*, 4 = *quite a bit*, 5 = *extremely*). We combined the 10 positive- and 10 negative-emotion items to form two separate indexes: a positive-affect index ($\alpha = .93$) and a negative-affect index ($\alpha = .97$). Results showed that participants had lower memory efficacy after reading about forgetting to buy a key grocery item ($M = 4.53$, $SD = 1.58$) than after reading about getting all of their grocery items ($M = 5.54$, $SD = 1.25$; $t(101) = -3.59$, $p < .001$; $d_{\text{Cohen}} = 0.71$). However, there was no effect of the memory-*efficacy* manipulation on positive affect

2 Two of the 20 anagrams could be solved using only a subset of the letters. The remaining 18 could be solved using all letters.

($M_{\text{low memory}} = 2.81$, $SD_{\text{low memory}} = 1.01$; $M_{\text{control}} = 2.97$, $SD_{\text{control}} = 1.00$; $|t| < 1$; $d_{\text{Cohen}} = 0.16$), and the effect of the memory-efficacy manipulation on negative affect did not reach significance ($M_{\text{low memory}} = 1.67$, $SD_{\text{low memory}} = 1.00$; $M_{\text{control}} = 1.37$, $SD_{\text{control}} = 0.76$; $t(101) = 1.73$, $p = .087$; $d_{\text{Cohen}} = 0.34$). This pretest indicated that the experimental manipulation influenced participants' beliefs about their memory efficacy with no significant influence on their mood.

In the main study, the scenario was followed by a filler question about its clarity. We then informed participants that the study was over, and to measure virtuous behavior, we presented them with a request to help the research team by completing a brief survey for no extra compensation. If participants decided to help, they answered three additional (filler) questions. If they chose not to help, the additional questions were skipped. The study ended with a basic demographic questionnaire and debriefing information.

Results and Discussion

A logistic regression of helping decision (0 = skip the survey, 1 = help the research team) on memory efficacy (0 = low, 1 = control) revealed that participants in the low-memory-efficacy condition were less likely to help (50.70%) than participants in the control condition (65.00%; $b = 0.59$, $SE = 0.23$, $z = 2.54$, $p = .011$; odds ratio = 1.81). These results conceptually replicated study 1 and provided additional support for our hypothesis (hypothesis 1). We argue this effect occurs because low-memory efficacy (vs. control) decreases perceptions of self-diagnosticity. In the next study, we tested this mediation hypothesis in the context of food choices.

STUDY 3: CAUSAL-CHAIN MEDIATION

Using a causal-chain mediation design, study 3 tested the role of self-diagnosticity in the effect memory efficacy on virtuous behavior (hypothesis 2), examining this proposed psychological process as both an effect of the independent variable (memory efficacy) and a cause of the proposed dependent variable (virtuous behavior; see also (Spencer, Zanna, and Fong 2005). Study 3A established the causal link between memory efficacy and perceptions of self-diagnosticity, whereas study 3B tested the causal effect of perceptions of self-diagnosticity on virtuous behavior in the context of food choice. We predicted that participants in the low-memory-efficacy condition would perceive their actions as less self-diagnostic than those in the control condition (study 3A), and that low (vs. high) perceptions self-diagnosticity would in turn lead to less virtuous food choices (study 3B).

Study 3A: The Effect of Memory Efficacy on Self-Diagnosticity

Participants. We recruited 121 US-based participants (55 females; $M_{\text{age}} = 34.36$, $SD_{\text{age}} = 11.79$) through Prolific Academic to complete this study online in return for monetary compensation. We excluded one participant who did not complete the experimental manipulation (recall task), leaving 120 responses for the subsequent analyses.

Design and Procedure. The study employed a single factor, 2-level (memory efficacy: low vs. control) between-subjects design. Participants completed the same experimental manipulation of memory efficacy as in studies 1A and 1B (recalling and writing about the previous morning vs. a morning 1 month ago), and then answered the same four manipulation-check questions as before. Next, we measured perceptions of self-diagnosticity using Touré-Tillery and Light's (2018) seven-item self-diagnosticity scale (SDS), designed to measure the extent to which people see their own actions as indicative of the type of person they are. Participants indicated their level of agreement or disagreement with statements such as "What I do says a lot about who I am" and "My actions are an indication of my personality" (1 = strongly disagree, 7 = strongly agree). Finally, to address the possibility that our recall-task manipulation also influences mood, we had participants who complete the PANAS. The survey ended with a brief demographic questionnaire and a debriefing procedure.

Results. First, to check that our measures of memory efficacy and self-diagnosticity represented two distinct constructs, we conducted a factor analysis including our measures of memory efficacy (manipulation check), self-diagnosticity, and mood. This analysis (principal factors component with Varimax rotation) on all 31 items (four memory efficacy items, seven self-diagnosticity items, and 20 PANAS items), revealed eight factors with eigenvalues >1 (ranging from 1.04 to 6.65), and with a cumulative proportion of variance explained equal to 68.93%. The rotated factor loadings showed one factor consisting of the four memory-efficacy questions, another factor consisting of the seven self-diagnosticity questions, and the third factor consisting of the 10 negative PANAS items. The remaining five factors consisted of different subsets of the 10 positive PANAS items. This analysis confirmed that our measures of memory efficacy, self-diagnosticity and mood represented distinct constructs.

Next, to check the effect of the experimental manipulation on perceptions of memory, we combined the four manipulation-check questions to form an index of memory efficacy ($\alpha = .94$). We found that participants asked to write about a morning 1 month ago exhibited lower memory efficacy ($M = 4.37$, $SD = 1.35$) than those asked to

FIGURE 1

RESTAURANT MENU USED IN STUDIES 3B AND 4

Our Entrées

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> ○ (1) Grilled Chicken Platter—
Tender grilled chicken breast served with assorted grilled vegetable and fresh seasonal fruits ○ (3) Steamed Salmon—
Wild caught salmon fillet served with cauliflower rice and fresh vegetables ○ (5) Roasted Vegetables—
Seasonal fresh vegetables, marinated, roasted and chilled; served with a light dipping sauce ○ (7) Baked Whitefish and Thyme—
Whole baked whitefish, spiced and served with roasted mushrooms, cherry tomatoes, and asparagus ○ (9) Mediterranean Chickpea Salad—
Tossed chickpeas, cucumber, bell pepper, red onion, olives, and feta, with a light vinaigrette. | <ul style="list-style-type: none"> ○ (2) Bacon Cheese Burger—
Ground chuck patty covered with melted cheddar and crispy bacon; served with French fries ○ (4) Chicago Style Stuffed Pizza—
With four cheeses, mushroom, green pepper, caramelized onions ○ (6) Baby Back Pork Ribs—
Slow-basted juicy, smoked ribs with BBQ sauce; served with loaded mashed potatoes ○ (8) Classic Beef Lasagna—
A classic recipe with ground beef, assorted sausages, Italian spices and creamy ricotta cheese ○ (10) Honey Butter Fried Chicken—
Deep-fried chicken legs served with spicy sweet potato fries and creamy coleslaw |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

write about their previous morning ($M = 5.29$, $SD = 1.23$; $t(118) = -3.89$, $p < .001$; $d_{\text{Cohen}} = 0.71$).

Then, we averaged the seven items of the SDS to form a self-diagnosticsity measure ($\alpha = .93$) and tested the effect of memory efficacy on this measure. We found that participants in the low-memory-efficacy condition tended to see their actions as less self-diagnostic ($M = 5.57$, $SD = 0.92$) than those in the control condition ($M = 5.89$, $SD = 0.84$; $t(118) = 2.00$, $p = .048$; $d_{\text{Cohen}} = 0.36$).

Finally, to check the potential effect of our memory-efficacy manipulation on mood, we combined the 10 positive-emotion items and 10 negative-emotion items to form two separate indexes: a positive-affect index ($\alpha = .62$) and a negative-affect index ($\alpha = .91$). We found no effect of memory efficacy on positive affect ($M_{\text{low memory}} = 3.59$, $SD_{\text{low memory}} = 0.87$; $M_{\text{control}} = 3.73$, $SD_{\text{control}} = 0.73$; $t < 1$; $d_{\text{Cohen}} = 0.17$) or on negative affect ($M_{\text{low memory}} = 2.27$, $SD_{\text{low memory}} = 1.37$; $M_{\text{control}} = 2.31$, $SD_{\text{control}} = 1.50$; $t < 1$; $d_{\text{Cohen}} = 0.028$), suggesting that the effects of memory efficacy documented so far are unlikely to stem from differential emotional responses.

Study 3B: The Effect of Self-Diagnosticsity on Food Choice

Participants. We recruited 202 US-based participants (79 females; $M_{\text{age}} = 33.73$, $SD_{\text{age}} = 9.90$) through Prolific Academic to complete this study online in return for monetary compensation. We excluded two participants who did not complete the experimental manipulation (self-

diagnosticsity task), leaving 200 responses for the subsequent analyses.

Design and Procedure. The study employed a single factor, 2-level (perceived self-diagnosticsity of actions: low vs. high) between-subjects design and started with an experimental manipulation of self-diagnosticsity, presented as a survey about “people’s daily choices.” Participants read: “Sometimes our actions reveal something about who we are, and sometimes our actions are simply due to the circumstances.” We then asked them to list two things they did the previous day. In addition, in the low-self-diagnosticsity condition, we asked them to “discuss how each thing was mostly due to the circumstances.” This external attribution exercise was meant to put participants in the mindset that their actions are not diagnostic of who they are. By contrast, in the high-self-diagnosticsity condition, we encouraged internal attributions by asking participants to “discuss how each thing says a lot about who you are as a person.”

Next, in an ostensibly separate study about food choices, we measured virtuous behavior by asking participants to review a menu and select the entrée they would be most likely to order for themselves for their next meal. The menu adapted from Fishbach and Zhang’s (2008) featured five healthy entrées and five indulgent entrées displayed in two separate columns to highlight the trade-off inherent in the choice (see figure 1).

The survey ended with a brief demographic questionnaire, a manipulation check for perceptions of self-

diagnosticity (“In general, do you feel like your choices say something about you as a person or are mostly due to the circumstances?” 1 = *definitely the circumstances*, 7 = *definitely me as a person*), and debriefing information.

Results. We first examined the effect of our manipulation on perceptions of self-diagnosticity and found that participants asked to make external attributions for their prior actions generally perceived their choices as less self-diagnostic ($M = 4.41$, $SD = 1.50$) than those asked to make internal attributions ($M = 5.41$, $SD = 1.32$; $t(198) = -5.03$, $p < .001$; $d_{Cohen} = 0.71$).

Next, we ran a logistic regression of entrée choice (0 = *indulgent*, 1 = *healthy*) on perceived self-diagnosticity of actions (0 = *low*, 1 = *high*), which showed that participants in the low-self-diagnosticity condition were less likely to select a healthy entrée (42.99%) than participants in the high-self-diagnosticity condition (58.95%; $b = 0.65$, $SE = 0.29$, $z = 2.26$, $p = .024$; odds ratio = 1.91).

Discussion

Taken together, studies 3A and 3B show the role of perceptions of self-diagnosticity on the effect of memory efficacy on virtuous behavior (hypothesis 2) through causal-chain mediation. An additional study (available in the [web appendix](#)) provided further support to these findings by showing the sequential mediating roles of memory efficacy for the current context (i.e., situational memory efficacy) and perceptions of self-diagnosticity on the effect of memory efficacy on virtuous behavior. In the next study, we continued to explore our proposed underlying mechanism by testing the moderating role of making a choice for one-self (vs. for another person).

STUDY 4: MODERATION BY CHOICE TARGET

Study 4 examined the moderating role of the choice target (self vs. another person; hypothesis 3) to further test the underlying role of perceptions of self-diagnosticity. After completing the recall-task manipulation of memory efficacy, participants chose between healthy and indulgent entrées (from the same menu as study 3B) for themselves or for another person, depending on the condition. We expected to replicate the effect of memory efficacy on virtuous behavior for choices made for the self, but not for choices made for another person. We preregistered the design and analysis plans for this study at <https://aspredicted.org/p22ts.pdf>.

Methods

Participants. We recruited 504 US-based participants (261 females; $M_{age} = 33.71$, $SD_{age} = 11.76$) online through Prolific Academic and paid them for their time.

We excluded one participant who did not complete the recall-task manipulation (in the low-memory-efficacy condition) and one participant who failed the attention check (indicated choosing for themselves when they were supposed to choose for a friend), leaving 502 responses for subsequent analyses.

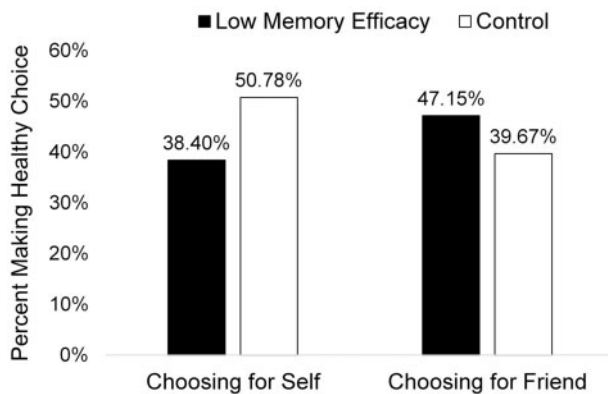
Design and Procedure. The study employed a 2 (memory efficacy: low vs. control) \times 2 (choice target: self vs. other) between-subjects design. After completing the recall-task manipulation of memory efficacy (recalling and writing about the previous morning vs. a morning 1 month ago), participants moved to an ostensibly separate section of the survey, which used the same restaurant-menu paradigm as study 3B to measure virtuous behavior (see [figure 1](#)). We manipulated choice target by randomly assigning participants to review the menu and select the entrée they would be most likely to order for themselves for their next meal (choice-for-self condition) or for a friend for his or her next meal (choice-for-other condition). In addition, to enhance the realism of the choice in the latter condition and reinforce the experimental manipulation, ucaa023-FN3³ we asked participants to “first, write your friend’s name below, and then choose for them.” After their choice, participants completed an attention/manipulation check for the choice-target manipulation (The previous question asked you to make a choice for which of the following people? 1 = *myself*, 2 = *my friend*, 3 = *not sure*).

Finally, we included a two-item manipulation check for the memory-efficacy manipulation: (a) “Will you most likely forget or most likely remember the choices you made in this survey?” (1 = *most likely forget*, 7 = *most likely remember*) (b) “To what extent do you believe your memory of the choices you made in this survey will be unreliable or reliable?” (1 = *very unreliable*, 7 = *very reliable*). Unlike our previous manipulation-check questions, these items focused on the specific situation. Indeed, research on general self-efficacy shows that it has a positive effect on situational or state self-efficacy across various tasks and contexts, such that individuals with a greater general tendency to feel efficacious often bring this belief into specific situations (Shelton 1990; Sherer et al. 1982). Thus, since our recall-task manipulation decreased general memory efficacy in previous studies, we expected it to decrease situational memory efficacy (i.e., memory efficacy for the current context). The survey ended with some basic demographic questions and debriefing information.

3 A pilot of this experimental manipulation revealed that, by default participants tended to make the choice for themselves, so to ensure they made the choice for a friend, we asked them to write their friend’s name before choosing and included a manipulation check. Only one participant in the choice-for-other condition failed this attention check, indicating that the manipulation was successful.

FIGURE 2

MODERATION BY CHOICE TARGET (STUDY 4).



The choice target (self vs. friend) moderates the effect of memory efficacy on healthy food choice, such that this effect attenuates for choices made for a friend (i.e., for a person other than the self)

Results and Discussion

An analysis of variance of the two-item manipulation check of memory efficacy showed no interaction of memory efficacy \times choice target ($F < 1$), and no main effect of choice target ($F < 1$), but only the intended main effect of memory efficacy ($M_{\text{low memory}} = 4.88$, $SD_{\text{low memory}} = 1.66$; $M_{\text{control}} = 5.27$, $SD_{\text{control}} = 1.46$; $F(1, 495) = 7.65$, $p = .006$; $d_{\text{Cohen}} = 0.25$).

Next, A logistic regression of food choice (0 = indulgent, 1 = healthy) on memory efficacy (0 = low, 1 = control), choice target (0 = other, 1 = self), and their interaction showed no main effect of memory efficacy ($b = -0.30$ (0.26), $z = -1.19$, $p = .235$; odds ratio = 0.74) or choice target ($b = -0.35$ (0.26), $z = -1.39$, $p = .164$; odds ratio = 0.70). However, the predicted interaction of memory efficacy by choice target emerged ($b = 0.81$ (0.36), $z = 2.24$, $p = .025$; odds ratio = 2.24). Specifically, participants who made the choice for themselves were less likely to choose a healthy item in the low-memory-efficacy condition (38.40%) than in the control condition (50.78%; $dy/dx = .12$ (.06), $z = 2.00$, $p = .046$; CI = [0.0023; 0.25]). However, when participants chose for a friend, there was no difference in entrée choices between the low-memory-efficacy (47.15%) and control conditions (39.67%; $dy/dx = -.074$ (.06), $z = -1.19$, $p = .233$; CI = [-0.20 0.048]; see figure 2).

Study 4 provided further evidence for the role of perceptions of self-diagnostics in the effect of the memory efficacy on virtuous behavior by demonstrating the moderating effect of making a choice for the self (which is

more self-diagnostic) as opposed to making a choice for another person (which is less self-diagnostic; hypothesis 3). In our studies, we operationalized virtuous behaviors using values, such as prosocial behavior and healthy eating, which are almost universal. Indeed, most communities around the world hold ethical standards that prohibit antisocial behavior (e.g., cheating, lying) but prescribe prosocial behavior (e.g., helping others). Furthermore, the consumption of foods considered healthy (e.g., fruit, vegetables, whole grains) is increasingly becoming a standard, especially in wealthier parts of the world. Indeed, research shows that caring for one's health is considered an important value (Kristensen, Lim, and Askegaard 2016) and that food choices are often moralized, such that consumers who eat unhealthy foods are deemed less moral (Mooijman et al. 2018; Steim and Nemeroff 1995) than consumers who eat healthy foods. However, despite the nearly universal nature of these values, people still vary in the degree of importance they assign to them. For example, although most people know the importance of eating healthily, some care more about this value/goal than others, and thus would be more likely to evaluate their food choices in terms of healthiness or unhealthiness. In the next study, we conducted a final test of the role of perceptions of self-diagnostics in the effect of memory efficacy on virtuous behavior by investigating the moderation of this effect by the degree of importance consumers assign to the context-relevant value or goal.

STUDY 5: MODERATION BY VALUE IMPORTANCE

This two-part study tested the moderating role of participants' commitment to the value of eating healthily in the relationship between memory efficacy and consumers' likelihood to make virtuous food choices (hypothesis 4). In the first part of the study, participants completed a series of questions assessing the degree of importance they assign to the value. Six days later, in the second part of the study (i.e., the main experiment), participants completed the same experimental manipulation of memory efficacy as in the previous study and then selected between an indulgent gift basket (cookies) and a healthy gift basket (fresh fruit) as bonus compensation for the study—conditional on winning a raffle. Separating the measure of value importance from both the manipulation of memory efficacy and the dependent measure of virtuous behavior allowed us to eliminate any unintentional influences these variables might have on each other. We predicted the importance of the value of eating healthily would moderate the effect of memory efficacy on food choice, such that this effect would replicate at higher but not at lower levels of value importance.

FIGURE 3

FOOD BASKETS USED IN STUDY 5

**Deluxe Signature Cookie Basket**

Brimming with delicious gourmet cookies crafted in our own bakery. A variety of delectable flavors with these incredible cookies, made in small batches with meticulous attention using our secret recipes perfected over time.

**Deluxe Organic Fruit Basket**

Medley of fruit, expertly tended, cultivated with care, and picked at the peak of ripeness and freshness. Sourced from small growers, grown and harvested in accordance with the USDA National Organic Program.

Method

Participants. For the first part of the study (value importance), we recruited 500 US-based participants (255 females; $M_{\text{age}} = 36.83$, $SD_{\text{age}} = 10.87$) online through MTurk and paid them for their time. The second phase of the study, the main experiment, recruited participants from the first phase and yielded a final sample of 350 respondents (172 females; $M_{\text{age}} = 36.75$, $SD_{\text{age}} = 10.95$). These participants received monetary compensation for their time, and a chance to win a \$35.00 prize through a raffle.

Design and Procedure. The study employed a 2 (memory efficacy: low vs. control) \times value importance (continuous) between-subjects design, with memory efficacy manipulated and value importance measured. For the first part of the study, participants answered questions assessing the importance of various goals and values to them. This section started with “In general, how important is it for you to...,” followed by items such as “Save money,” “Drink responsibly,” etc. (1 = *not at all important*, 7 = *very important*). Critically, three of these items were face-valid measures of the degree of importance consumers assign to eating healthily: “eat healthy foods,” “eat nutritious foods,” and “be health-conscious.” These questions were followed by some additional measures unrelated to the current theorizing.

Six days after the first survey concluded, we posted the second phase of the study such that it was only accessible to those who had completed the first phase. We did not tell participants that the two surveys were connected. In this second survey, which constituted the main experiment, participants completed the recall-task manipulation of memory efficacy used in previous studies and then answered the

four general-memory-efficacy questions as a manipulation check. As a measure of virtuous behavior, participants made a choice between a healthy food basket (Deluxe Organic Fruit Basket) and an indulgent food basket (Deluxe Signature Cookie Basket) from a well-known retailer, which they expected to receive as bonus compensation conditional of winning the \$35.00 raffle (see figure 3). The survey ended with a basic demographic questionnaire and debriefing information.

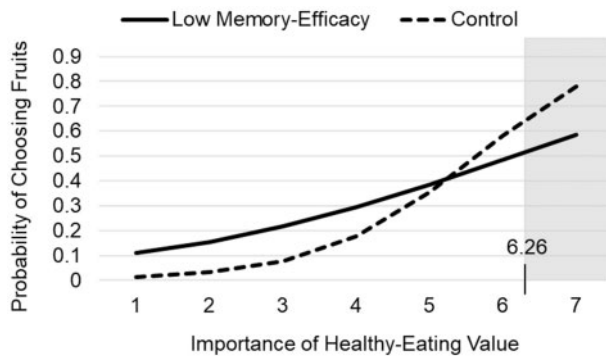
Results and Discussion

To check the effect of our manipulation on memory efficacy, we combined the four manipulation-check questions ($\alpha = .93$). We found that participants asked to write about a morning 1 month ago exhibited lower memory efficacy ($M = 5.02$, $SD = 1.34$) than those asked to write about their previous morning ($M = 5.35$, $SD = 1.26$; $t(347) = -2.39$, $p = .017$; $d_{\text{Cohen}} = 0.25$).

A logistic regression of the choice of gift basket (0 = *indulgent*, 1 = *healthy*) on memory efficacy (0 = *low*, 1 = *control*), value importance (continuous; $\alpha = .94$; $M = 5.48$, $SD = 1.18$), and their interaction revealed main effects of memory efficacy ($b = -2.76$, $SE = 1.34$, $z = -2.06$, $p = .040$; odds ratio = 0.63) and value importance ($b = 0.41$, $SE = 0.14$, $z = 2.85$, $p < .001$; odds ratio = 1.51). Notably, we also found a significant interaction of value importance \times memory efficacy ($b = 0.53$, $SE = 0.23$, $z = 2.24$, $p = .025$; odds ratio = 1.69): at and above +0.66 SD of the mean of value importance (i.e., when value importance ≥ 6.26), participants in the low-memory-efficacy condition were less likely to choose the healthy/fruit gift basket (all $ps \leq .05$). However, below this level

FIGURE 4

MODERATION BY VALUE IMPORTANCE (STUDY 5).



The importance of the healthy-eating value moderates the effect of memory efficacy on healthy food choice. The shaded area represents the region of significance for this effect (i.e., when value importance ≥ 6.26)

of importance, we found no significant effect of memory efficacy (all $ps > .05$). Figure 4 displays these results with a shaded area representing the region of significance for the effect of memory efficacy on healthy food choice. These results supported our hypothesis about the moderating role of the importance of a value on the effect of memory efficacy on virtuous behavior (hypothesis 4).

GENERAL DISCUSSION

We examined the role of memory efficacy on perceptions of self-diagnosticsity and hence on consumers' likelihood to behave virtuously. We defined memory efficacy as people's general belief that they will remember in the future the things they are doing or experiencing in the present. Across five studies, operationalizing virtuous behavior through healthy food choices and prosocial choices, and using different participant pools (university students and adults online), we found that low-memory efficacy decreased virtuous behavior (studies 1 and 2), due to lower perceptions of self-diagnosticsity (study 3). Further demonstrating the underlying role of perceptions of self-diagnosticsity, we showed that the choice target (self vs. another person; study 4) and the degree of importance consumers assign to the context-relevant value (study 5) moderated the effect of memory efficacy on virtuous behavior.

Our studies explored various measures of virtuous behavior. In study 1A, participants donated part of their compensation for completing the study, and in study 1B, they donated their time by working on anagrams for charity. In study 2, participants volunteered to help on an additional survey for no extra compensation. In studies 3 and 4,

participants made a hypothetical choice from a restaurant menu. Finally, in study 5, participants chose a gift basket they expected to receive if they won a raffle. Although the consequences of these choices seem trivial, they are meaningful within their respective contexts and mirror everyday choices faced by consumers. Research shows such mundane choices, although seemingly inconsequential in isolation can have serious individual and collective consequences (Fishbach and Converse 2010; Rachlin 2000; Read et al. 1999). Indeed, people continuously face opportunities to indulge, splurge, or behave selfishly, and when repeated over time, such behaviors can ultimately make for unhealthy individuals and unstable communities (Hofmann et al. 2012; Papies, Stroebe, and Aarts 2007).

Our findings extend research on the self-concept and memory. Previous research has focused on the mutual relationship between these two notions (Conway and Pleydell-Pearce 2000; Dalton and Huang 2014; Greenwald 1980; Singer and Salovey 1993; Wilson and Ross 2003). We show that beyond what consumers actually remember and forget, what they expect to remember and forget can have a powerful influence on their behaviors. The notion of memory efficacy is part of the broader construct of "metamemory," or the knowledge people have about how human memory—including their own memory—operates (Brown 1978; Dixon and Hultsch 1983; Flavell and Wellman 1977). Researchers describe metamemory as a multidimensional construct (Hultsch et al. 1988). For example, Dixon and Hultsch (1983) advanced eight theoretically meaningful dimensions of metamemory, which Troyer and Rich (2002) later refined to the following three: (a) feelings about one's memory, (b) reported frequency of the use of memory strategies, and (c) self-appraisal of one's memory capabilities. Memory efficacy corresponds to this last dimension. While previous research on metamemory focused on its effects on memory performance (e.g., recall) and memory-related behaviors (e.g., use of memory aids), our findings extend this literature by demonstrating the effect of one dimension of metamemory—namely, memory efficacy—on virtuous behavior.

The present results invite a reexamination of recent findings on self-diagnosticsity and moral behaviors through the lens of people's beliefs about their own memory processes. For example, Touré-Tillery and Fishbach (2012) show that people working on a sequence of actions to reach a goal perceive their actions at the beginning and end as more self-diagnostics than their actions in the middle, and hence behave more virtuously at the beginning and end (vs. middle) of such sequences. In theorizing about this sequence effect, Touré-Tillery and Fishbach (2012) allude to the greater "memorability of beginnings and end" (p. 2). More recently, Touré-Tillery and Light (2018) showed that people high (vs. low) in self-overlap (i.e., whose thoughts and feelings about themselves are the same across these self-aspects) tend to see their actions as more self-diagnostics.

Although these authors do not explicitly link their findings to memory processes, research on the structural dimensions of the self-concept suggests that, for people high (vs. low) in self-overlap, thoughts and feelings about actions performed in one self-aspect should be more accessible in memory in other overlapping self-aspects (see [Linville 1985, 1987](#)). Thus, memory-efficacy processes might play a role in these previous findings.

Furthermore, research on self-continuity shows that consumers who expect the defining features of their self-concept to change over time are less likely to exercise self-control, choosing smaller-sooner rewards over larger-later ones (see [Bartels and Urminsky 2011](#); [Ersner-Hershfield, Wimmer, and Knutson 2009](#)). These findings might also stem from metamemory processes, such that a person who feels she has an unstable identity might also believe she will not remember in the future the things she doing in the present (i.e., low-memory efficacy). Given the essential role of memory in providing a stable self-concept, future research could investigate the role of memory efficacy in the development and stability of the self-concept over time.

People's memories of events are prone to various kinds of biases and distortions during the encoding and retrieval processes. For example, [Kouchaki and Gino \(2016\)](#) found that people exhibit "unethical amnesia," such that over time, given their strong desire to maintain a positive moral self-concept, people are less likely to vividly recall memories of their past misdeeds. In turn, this strategic forgetting of personal actions and experiences over time leads to subsequent unethical behaviors. The authors argue that the tendency toward this unethical amnesia can explain why good people repeatedly engage in unethical behaviors and how they are able to distance themselves from such misdeeds over time. Our findings suggest that, beyond such motivated forgetting processes, believing they will forget an action or experience allows people to let go of their inhibitions. Memory efficacy beliefs might amplify motivated forgetting processes, such that people who had low-memory efficacy and indulged or behaved selfishly would be even more motivated to forget their (bad) choices. Future research should explore this possibility.

The memory literature posits a distinction between gist and verbatim memory, with the former referring to the broad meaning and central aspects of an event while the latter refers to the specific details of the event (see [Reyna and Brainerd 1995](#) for a review). In the context of our findings on the effects of memory-efficacy beliefs, this distinction raises an interesting question: under low-memory efficacy, do people expect to forget the gist or the verbatim details? Let us take the example of a Whole Foods customer who declines to donate \$1.00 to the Whole Harvest at the checkout counter after a brief request from the cashier on a snowy Tuesday afternoon. Based on our theorizing, the effect of memory efficacy on virtuous behavior

should occur when this customer expects to forget the gist or meaning of her choice (e.g., lack of generosity), which has a greater potential to damage her self-concept than the verbatim details (i.e., exact words during the exchange, time of day, weather). However, research suggests that gist memories are largely dependent upon verbatim representations. Indeed, if verbatim details of an event are remembered, then the gist will also be remembered or reconstructed accurately from verbatim details ([Reyna and Brainerd 1995](#)). Furthermore, forgetting occurs more rapidly for verbatim than for gist representations ([Reyna and Kiernan 1994](#)), such that if verbatim details are forgotten, the gist might still be remembered but would be easily corruptible and malleable in the absence of verbatim representations ([Brainerd et al. 2003](#)). Thus, assuming that memory-efficacy beliefs mirror actual memory processes, expecting to forget the verbatim details (I won't remember any of this), should lead to expecting to forget the gist and hence should be sufficient to produce the effects documented in the present article.

In our studies, we focused on short-term effects of memory-efficacy beliefs. Participants made prosocial or food decisions almost immediately after an experimental induction of low (vs. control) memory efficacy. Thus, it remains unclear how long-lasting changes in memory efficacy beliefs can be, such that they would influence subsequent behavior. For example, would a consumer be less likely to behave virtuously 1 hour, 5 hours, or 1 day after having experienced low-memory efficacy? Furthermore, we induced low-memory efficacy through the experience of forgetting mundane events or details. It is possible that low-memory efficacy stemming from getting older ([Ponds and Jolles 1996](#)) or from forgetting much more consequential events or details would have different effects on virtuous behavior than what the present article documents. For example, low-memory efficacy due to aging might be associated with other negative or positive feelings about the self ([Brandstädter and Greve 1994](#)), which might in turn influence virtuous behavior in their own way. Future research could investigate the antecedents of memory efficacy and the long-term consequences of changes in memory efficacy.

Finally, our findings have implications for marketers and public policymakers. First, our results suggest that to increase giving, charitable organizations should consider avoiding cues that might decrease the perceived memorability of a donation. Similarly, public policymakers might promote virtuous behaviors and long-term goals by inserting cues of memorability in important decision contexts that require trade-offs between instant gratification and long-term well-being. Indeed, although we have explored the effect of memory efficacy on virtuous behaviors in the context of food choices and prosocial decisions, we expect these effects to occur for other types of virtuous behaviors: saving instead of spending, or exercising instead of

watching one's favorite TV show. Second, marketers may intuitively believe that highlighting the memorability of products and experiences can attract consumers and add value to consumption experiences. Our results suggest that communicating memorability in the context of indulgent consumption (e.g., foods, products, activities), however, might backfire and decrease their selection. Instead, hinting at the forgettable nature of these types of experiences might more effectively increase their consumption. Thus, the well-known slogan "what happens in Vegas stays in Vegas" might free visitors to let go of their inhibitions, not only by suggesting no one will find out but also by signaling that they themselves will not remember.

DATA COLLECTION INFORMATION

The authors consulted with each other regarding all data collection and analyses. The second author managed the collection of data for studies 1A (April 2018), 1B (January 2019), and 2 (October 2019), for the pretest to study 2 (February 2020), and for the supplemental study in the [web appendix](#) (May 2019). The first author managed the collection of data for studies 3A (December 2017), 3B (October 2019), 4 (November 2019), and 5 (February 2019) and for the pretest to study 1A (June 2018). The authors collected data for study 1A through their affiliated institution's research laboratory using a student sample. Data for the remaining studies were collected from online samples of US-based adults (MTurk and Prolific). The first author analyzed data for studies 1A (including pretest), 1B, 3A, 3B, 4, and 5 and for the pretest to study 2, and the second author analyzed data for study 2.

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