CHOICE SET SIZE PREFERENCE ACROSS THE ADULT LIFE SPAN: THE ROLE OF SELF-EFFICACY, MAXIMIZING, AND MOTIVATION

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Across a variety of decision domains, older adults desire fewer options than younger adults, but underlying mechanisms of these age differences remain unknown. Three studies (total N = 586) were conducted to investigate the extent to which age differences in choice set size preferences are driven by decision-making self-efficacy, maximizing, motivational priorities, and other theoretically implicated covariates. First, a large-scale survey (Study 1) examined the age trajectory of, and underlying influences on, choice set size preferences in a life-span sample. Subsequent laboratory-based experiments (Studies 2a-2c) manipulated self-efficacy, maximizing, and motivational priorities, respectively, among younger adults and measured effects on choice set size preferences and information search. Finally, a laboratory-based quasi-experimental design (Study 3) assessed the effect of experimentally manipulated self-efficacy on older versus younger adults' decision making. Combined results suggest that age differences in choice set size preferences are linear, gradual, and relatively domain-general. They are not mediated by any of the variables tested, with the exception of vocabulary scores, which accounted for 1.5% of variance in choice set size preferences above and beyond age. However, inter-individual differences, if not age differences, in choice set size preferences and information seeking may be amenable to altering via manipulations of decision-making self-efficacy. Implications for research on aging and decision-making, as well as public policy, are discussed.

BIOGRAPHICAL SKETCH

Andrew Reed graduated from Swarthmore College with a B.A. in History and Psychology with High Honors. He entered the Ph.D. program in Developmental Psychology at Cornell in the fall of 2005, where his primary research focus was on age differences in decision making. In 2008, he completed his master's thesis on the effects of positive affect on decision satisfaction. Following completion of his doctoral dissertation, Andrew will begin a post-doctoral fellowship in the Psychology Department at Stanford University.

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CHAPTER ONE: INTRODUCTION

Contemporary decision makers are often faced with a glut of options from which to choose, whether the choice itself is as trivial as a candy bar or as consequential as health insurance. Many people may welcome having so many options, insofar as people typically prefer larger over smaller choice sets (Chernev, 2006; Haynes, 2009; Iyengar & Lepper, 2000). On the other hand, not all people want the same amount of choice, and accumulating evidence suggests that the desire for large choice sets wanes with age. Specifically, older adults, relative to younger adults, prefer fewer options (Reed, Mikels, & Simon, 2008; Rozin, Fischler, Shields, & Masson, 2006) and place lower value on increased choice (Mikels, Reed, & Simon, 2009). Such age differences in choice set size preferences appear to be robust and generalize across various decision domains (Reed et al., 2008). The underlying causes, however, remain unclear.

The present studies investigated potential explanations of age differences in choice set size preferences implicated by previous theorizing or empirical research. Particular emphasis was placed on three constructs which are associated with choice-related aspects of decision-making and appear to change with age: Self-efficacy, which refers to confidence in one's ability to achieve positive outcomes for a given task or domain (Bandura, 1997); maximizing versus satisficing, which refers to the habitual tendency in decision-making to aim for the best possible choice versus one that is good enough (Schwartz et al., 2002); and age-related changes in the relative prioritization of emotion-regulatory versus information-seeking goals (Carstensen, 2006). Combined results of these studies shed light on the complex mechanisms of age differences in decision making.

Choice Set Size: Preferences and Consequences

Before answering the focal question of why preferences for more or less choice change with age (i.e., descriptive explanations), it is instructive to consider why people *should* prefer larger versus smaller choice sets and vice versa, based on the relative "benefits" versus "costs" of choice in decision making. Beginning with Iyengar and Lepper's (2000) seminal work on the detrimental effects of increased choice in decision making, a wave of studies over the past decade examined the consequences of choosing from larger versus smaller choice sets. However, cumulative results of these studies cast doubt on early findings and suggest that the effects of choice are neither reliable nor robust (Scheibehenne, Greifeneder, & Todd, 2010).

In a recent meta-analysis of 50 studies on "choice overload", which refers to the notion that increased choice impairs satisfaction and motivation to choose, Scheibehenne and colleagues (2010) found evidence of significant heterogeneity in results across studies. Several studies demonstrated that choosing from large versus small choice sets may impair motivation and incur emotional costs, from increased frustration with the decision process to decreased satisfaction and greater regret regarding one's choice (Chernev, 2006; Haynes, 2009; Iyengar & Lepper, 2000). By contrast, multiple studies found no effect of large versus small choice sets on likelihood to choose or satisfaction (Scheibehenne, 2008; Scheibehenne, Greifeneder, & Todd, 2009), while other studies reported evidence of *increased* motivation when choosing from larger versus smaller choice sets (Gao & Simonson, 2008; Kahn & Wansink, 2004).

To explain the high degree of variance in effect sizes across studies, Scheibehenne and colleagues (2010) tested potential moderators of the choice overload effect via a meta-regression analysis. Results indicated that increased choice

promotes motivation in studies examining consumption quantity as opposed to other dependent variables (e.g., satisfaction, likelihood to choose). Increased choice also appears beneficial to individuals with clear preferences or expertise. In addition to these substantive moderators, the meta-regression also indicated two moderators related to the study publication: Specifically, studies that were published (versus unpublished) and older (versus more recent) were more likely to report significant evidence of choice overload effects.

To supplement the results of the meta-regression analysis, Scheibehenne and colleagues (2010) posited several moderators of the choice overload effect that were relatively idiosyncratic (i.e., appearing in only one study). One category of hypothesized moderators consists of characteristics of the choice environment. For instance, choice overload effects appear more likely for decisions involving more (versus fewer) trade-offs among options (Chernev, 2005), more (versus less) information to consider (Greifeneder, Scheibehenne, & Kleber, 2010), and considerable (versus minimal) time pressure faced by decision-makers (Inbar, Hanko, Botti, & Gilovich, 2008). Scheibehenne and colleagues (2010) also hypothesized that characteristics of the decision maker moderate the choice overload effect. For example, individuals are more prone to choice overload effects when they anticipate having to justify their decisions (versus not; Scheibehenne et al., 2009) or maximize (versus satisfice; Dar-Nimrod, Rawn, Lehman, & Schwartz, 2009). Although these proposed moderators are supported by evidence from individual studies, the limited number and idiosyncratic nature of studies testing each moderator hinders, if not precludes, meta-analytic support. As such, Scheibehenne and colleagues (2010) concluded that, while there appear to be "potentially important preconditions" (p. 421) for the choice overload effect, it remains unclear what conditions might be *sufficient*

for the effect to occur. Clearly, then, additional research is needed to further investigate the effects of choice set size on decision making.

In contrast to the plethora of studies examining the effects of choice set size on decision-related *outcomes*, relatively few studies have examined the extent to which individuals *desire choice*, let alone influences on these preferences. What few studies do exist, however, consistently show that people typically prefer larger versus smaller choice sets, even when it is not necessarily adaptive (or even maladaptive) to do so. For example, when choosing between two hypothetical banks, participants preferred a bank which offered 2 types of accounts versus one with only 1 account, even when the additional account option wasn't beneficial (Bown, Read, & Summers, 2003). Likewise, supermarket shoppers are more likely to sample varieties of jams when there are 24 versus 6 options, even though they are less likely to purchase any of the alternatives from the large versus small choice set (Iyengar & Lepper, 2000). Preferences for larger versus smaller choice sets have been demonstrated for decisions ranging from the mundane (e.g., snacks, chocolates, and pens) to the consequential (e.g., vacation hotels; Chernev, 2006), suggesting that increased choice is a powerfully enticing factor in decision making. Recent studies suggest, however, that it is by no means universal.

Age Differences in Choice Set Size Preferences

The so-called "lure of choice" (Bown et al., 2003) appears to wane across the life span. For example, older adults report a preference for significantly fewer options (roughly half) relative to younger adults across a variety of decision domains, from hospitals to apartments (Reed et al., 2008). Moreover, in the study by Reed and colleagues (2008), age was negatively correlated with choice set size preferences within the group of older adults, suggesting that age differences in choice set size

preferences are not merely the result of cohort effects. Though the age difference in choice set size preferences was significant across all domains, a smaller difference was observed among healthcare versus everyday domains, suggesting that choice set size preferences may be domain-sensitive, if not domain-specific.

Age differences in choice set size preferences are even apparent in significant medical decisions, as revealed in a large-scale survey demonstrating that patients' desire for choices and active roles in decision making (i.e., shared or patient-centered decision-making) peaks at around the age of 45, and is lower thereafter (Levinson, Kao, Kuby, & Thisted, 2005). Moreover, age differences in preferences for choice appear to transcend nationalities, as demonstrated by a cross-cultural study of choice set size preferences for ice cream flavors in which age was negatively associated with preferring large (50 flavors) versus small (10 flavors) choice sets (Rozin et al., 2006).

Not only do older adults desire fewer choices when making decisions, but they also place significantly lower value (reflected in reduced willingness to pay) on increased choice in decisions (Mikels et al., 2009). Thus, converging evidence suggests reduced preferences for, and valuation of, large choice sets with age. These effects have been observed across a variety of choice domains and populations, suggesting a robust developmental trend. However, all prior studies used self-report measures and/or hypothetical decisions, which casts doubt on the generalizability of their results to behavioral choice paradigms involving real consequences. In addition, because these studies were largely descriptive in nature, the underlying causes of age differences in choice set size preferences remain opaque. In previous work I hypothesized that these findings might reflect cognitive and/or motivational influences (Reed et al., 2008), but to date none of these hypotheses have been tested.

Based on an extensive review of the research literature regarding choice set size preferences and age differences in decision making, I identified three factors as

potential mediators of the age differences discussed above: Decision-making self-efficacy, maximizing, and motivational priorities with respect to emotion-regulatory versus information-seeking goals. Each of the three factors is discussed separately and in more detail below.

Decision-Making Self-Efficacy and Choice Set Size Preferences

One potential explanation for the previously observed age differences in choice set size preferences is that older adults simply perceive large choice sets as exceeding their decision-making abilities. There is little question among researchers that increased choice poses a greater challenge to decision-makers through elevated information-processing demands (Schwartz, 2004). Whether such demands deter versus attract decision makers, however, may depend on individuals' decision-making self-efficacy (DMSE). According to self-efficacy theory, people tend to avoid or expend little effort on activities that they perceive as excessively challenging, but engage effortfully and persist with tasks that they believe themselves capable of completing successfully (Bandura, 1982). For instance, people with higher DMSE prefer decisions that are more challenging and complex (Tabernero & Wood, 2009) and seek more information when making decisions (Seijts, Latham, Tasa, & Latham, 2004) than those who are relatively low in efficacy. The positive association between self-efficacy and information seeking has been replicated across a variety of domains, including consumer choices (Hu, Huhmann, & Hyman, 2007), careers (Blustein, 1989), and health-related decisions (Woodward & Wallston, 1987). However, no previous studies have directly investigated the effects of DMSE on preferences for choice set size, let alone across age groups.

The implications of self-efficacy theory for choice set size preferences are clear: People with high decision-making self-efficacy should desire more choice (i.e.,

more challenge) than people with low self-efficacy. From this perspective, older adults may prefer less choice because they have lower DMSE and wish to avoid the excessive challenges posed by large choice sets. This hypothesis assumes that older adults indeed have reduced DMSE relative to young adults, but support for this assumption is limited.

Empirical evidence for age differences in DMSE is equivocal, with one study finding an increase in DMSE with age (Löckenhoff & Carstensen, 2007), one reporting a decrease (Woodward & Wallston, 1987), and one reporting no association between age and DMSE (Finucane & Gullion, 2010). While these inconsistent results may result from differences in sample characteristics, it is also possible that they reflect measurement issues. For instance, measures which differentiate among the components of healthcare decision-making (e.g., understanding information, obtaining the best care) reveal negative associations between age and decision-making self-efficacy (Woodward & Wallston, 1987), whereas generalized measures of DMSE across several healthcare domains do not (Finucane & Gullion, 2010; Löckenhoff & Carstensen, 2007).

Using component-based measures of decision-making self-efficacy may therefore be crucial to detecting age differences. This notion is supported by research on memory self-efficacy, where measures that differentiate between various aspects and domains of memory in everyday life, such as the Metamemory in Adulthood Questionnaire (Dixon & Hultsch, 1983), consistently find an inverse association between age and memory self-efficacy (Hertzog & Hultsch, 2000). In addition, because extant studies of age differences in decision-making self-efficacy are limited to health-related decisions, it is possible that age differences in self-efficacy are more consistent for other domains of decision-making (e.g., consumer and financial decisions). Consequently, using measures of decision-making self-efficacy that tap

into a wide range of decision domains (i.e., domain-based DMSE) as well as specific components of decision-making (i.e., component-based DMSE) may provide a more accurate portrayal of age differences. The present research adopted this two-pronged approach to measuring DMSE.

Maximizing versus Satisficing and Choice Set Size Preferences

Another major influence on choice-related aspects of decision-making is the extent to which individuals habitually attempt to select the best possible option (i.e., maximize) or attempt to choose an option that is simply "good enough" (i.e., satisfice; Schwartz et al., 2002). Schwartz and colleagues (2002) conceptualized maximizing versus satisficing as a relatively stable, trait-like individual difference variable, and subsequent research examined differential decision tendencies based on this characteristic. Findings demonstrate that people who maximize, relative to those who satisfice, prefer and place greater value on larger versus smaller choice sets, despite the evidence that maximizers—but not satisficers—are less satisfied with decisions among larger versus smaller choice sets (Dar-Nimrod et al., 2009)[1]. For instance, individuals who reported higher versus lower maximizing tendencies were more likely to frequent ice cream parlors with extensive selections (i.e., 200 flavors) versus relatively limited selections (i.e., 20 flavors) and more willing to sacrifice their time (e.g., by volunteering to complete a supplemental questionnaire) to choose among 30 versus 6 chocolates (Dar-Nimrod et al., 2009). Maximizers also seek more information when making decisions and are less satisfied overall with their decisions relative to satisficers (Iyengar, Wells, & Schwartz, 2006; Schwartz et al., 2002).

[1] This seemingly ironic finding evokes two potential explanations: On one hand, maximizers may be oblivious to the detrimental effects of large choice sets on their satisfaction. Alternatively, they may prioritize the goal of selecting the best possible alternative over emotion-regulatory goals such as maximizing satisfaction.

Importantly, the tendency to maximize appears to wane with age, such that older adults report reduced maximizing tendencies relative to young adults (Tanius, Wood, Hanoch, & Rice, 2009). However, no prior study has examined whether age-related changes in maximizing mediate age differences in choice set size preferences. Given that maximizers prefer more choice when making decisions than satisficers, and that older adults are less likely to be maximizers than younger adults, it is plausible that older adults desire fewer choices than younger adults because of their reduced propensity to maximize.

Motivational Priorities and Choice Set Size Preferences

Although trait-like characteristics such as maximizing versus satisficing tendencies may contribute to age differences in choice set size preferences, differential motivational priorities may play a role as well. This is because larger versus smaller choice sets pose diverging consequences with respect to information-seeking goals and, in certain contexts, with respect to emotion-regulation goals.

In some decision contexts, larger versus smaller choice sets may be detrimental with regard to satisfaction and regret, for instance when there are relatively high degrees of tradeoffs among options or large amounts of information to consider (Chernev, 2005; Greifeneder et al., 2010). Although the choice overload effect is not reliable across studies (Scheibehenne et al., 2010), mere belief that larger choice sets engender dissatisfaction and regret may be sufficient to influence choice set size preferences. For instance, among individuals who are motivated to pursue emotion-regulatory goals, the belief that excessive choice is associated with worse subjective experiences should engender avoidance of large choice sets.

Although larger choice sets may potentially undermine emotion regulatory-goals, they are integral to achieving information-related goals. For instance, to make a

fully-informed decision one must consider all available alternatives, not simply a subset of options. People who pursue information-seeking goals may actually obtain more information than they are capable of storing in working memory, which in turn may contribute to choice overload effects in certain situations (Iyengar, 2010). Thus, information-related goals may be somewhat incompatible with emotion-regulatory goals with respect to choice set size preferences. Consequently, decisions among larger versus smaller choice sets may necessitate explicit tradeoffs between emotional versus informational gains and losses.

The outcome of such tradeoffs may vary with age because of a relative shift in goal priorities across the adult life span. According to socioemotional selectivity theory (Carstensen, 2006), young adults perceive their future as open-ended and pursue goals related to information-seeking, whereas older adults view the future as relatively limited and, consequently, prioritize emotion-regulatory goals aimed at the present moment. Importantly, the decision-making strategies of older versus younger adults appear to reflect these diverging motivations (Mather, 2006). For instance, older adults disproportionally view positive versus negative information (Löckenhoff & Carstensen, 2007, 2008) and misremember their chosen options as being more positive (Mather & Johnson, 2000). Moreover, age differences in decision strategies (e.g., pattern of information search) and choice quality can be moderated via simple motivational manipulations (Löckenhoff & Carstensen, 2007, 2008; Mikels et al., 2010). Although such evidence suggests that shifting motivations result in age-related changes in decision strategies and outcomes, it is not known whether these effects extend to choice set size preferences. Based on socioemotional selectivity theory (Carstensen, 2006), one would predict that older adults prefer smaller choice sets in order to preserve their satisfaction and avoid an unpleasant decision-making experience (Reed et al., 2008).

From Choice Set Size Preferences to Information Seeking

Decision-making self-efficacy, maximizing, and motivational priorities are likely to influence aspects of decision making beyond choice set size preferences. In particular, all three constructs have been associated in previous research with the extent of information search. Evidence suggests that people who engage in more extensive information search have relatively higher decision-making self-efficacy (Seijts et al., 2004), are more prone to maximizing versus satisficing (Iyengar et al., 2006), and prioritize information-seeking versus emotion regulatory goals (Löckenhoff & Carstensen, 2007, 2008). Because these tendencies shift with age, it is perhaps not surprising that older adults, relative to younger adults, seek less information when making decisions (Mata & Nunes, 2010). And while the driving forces behind age differences in information search are not fully understood, they may share underlying mechanisms with choice set size preferences. After all, larger choice sets contain more information and afford more information-seeking than smaller choice sets, meaning that if one is motivated to seek larger choice sets, the same motivations should engender greater information seeking. Thus, the present studies incorporated measures of information seeking to test whether the proposed mechanisms of choice set size preferences also contribute to age differences in information seeking.

Additional Factors Influencing Choice Set Size Preferences

To identify the driving forces behind age differences in choice set size preferences, the present research focused on self-efficacy, maximizing, and motivational priorities because previous research and/or theorizing suggested that these constructs are closely related to decision making (in some cases specifically

related to choice set size preferences) *and* shift with age. I also examined secondary variables associated with decision making, aging, or the proposed mediators of age differences in choice set size preferences (i.e., DMSE, maximizing, and goal priorities). Some of these factors are directly linked to the primary constructs of DMSE, maximizing, and goal priorities:

Beliefs about choice. The hypothesized influence of self-efficacy on choice set size preferences assumes that people believe that added choice is associated with increased cognitive demands in decision-making. Similarly, the hypothesized influences of motivational priorities on choice set size preferences assume that individuals perceive increased choice to be detrimental to subjective decision quality. However, no prior studies have tested individuals' beliefs about the consequences of increased choice or how these beliefs influence their choice set size preferences. The present research examined whether such beliefs are indeed related to choice set size preferences and age.

Future Time Perspective. Because motivational priorities are thought to shift across the life span as a function of future time perspective (Carstensen, Isaacowitz, & Charles, 1999), it is necessary to measure this construct in order to fully test hypotheses derived from socioemotional selectivity theory (Carstensen, 2006). However, it is important to note that advanced chronological age is not the only factor that limits future time perspective in adulthood. For instance, future time perspective constricts in adults of all ages as a function of real or imagined life events from geographical relocations to terminal illnesses, and such shifts are accompanied by corresponding changes in goal priorities (for a review, see Carstensen et al., 1999). Thus, it is important to consider and assess the role of future time perspective independent of age.

Other factors may influence choice set size preferences by elevating decision-making competence, which should, extrapolating from self-efficacy theory (Bandura, 1997), lead to increased DMSE. Thus, the following factors should be considered indirect (as opposed to direct) influences on choice set size preferences:

Preference clarity. Research by Chernev (2003) suggests that large choice sets may be disproportionately appealing to individuals whose attribute preferences for a given decision are highly accessible. For instance, one study by Chernev (2003) examined decisions among chocolates. Prior to making a choice, some participants indicated what their ideal chocolate would be with respect to attributes such as flavor and nut content. Participants who clearly articulated their preferences in this manner were significantly more likely to choose from larger versus smaller assortments (containing 16 options versus 4 options, respectively) than participants who did not articulate their preferences before choosing. This finding raises the possibility that age differences in choice set size preferences reflect a difference in preference accessibility between younger and older adults. However, this hypothesis remains purely speculative given the absence of prior research examining age differences in preference accessibility. To address this knowledge gap, the present research directly assessed preference accessibility in relation to choice set size preferences and age.

Need for cognition. The need for cognition (NFC), which refers to the tendency to "engage in and enjoy effortful cognitive endeavors" (Cacioppo, Petty, Feinstein, & Jarvis, 1996, p. 197), declines modestly with age (Cacioppo et al., 1996). Because larger versus smaller choice sets pose greater information processing demands and are thus more cognitively challenging (Iyengar, 2010), it is plausible that individuals high in NFC would desire more choice. On the other hand, evidence of the relationship between NFC and decision making is equivocal at best (for a discussion, see Reyna & Brainerd, 2008). For instance, some studies found that high-NFC

individuals, compared to low-NFC, are relatively resistant to framing effects (Carnevale, Inbar, & Lerner, in press; Smith & Levin, 1996), whereas others found no relation between NFC and framing effects (Bruine de Bruin, Parker, & Fischhoff, 2007; LeBoeuf & Shafir, 2003). Likewise, one study found that NFC was correlated with information seeking for multi-choice, multi-attribute judgments of consumer products (Verplanken, Hazenberg, & Palenewen, 1992), whereas another found no relationship between NFC and information seeking for related decisions (Verplanken, 1993). Thus, evidence of the relationship between NFC and decision-making processes and outcomes appears at least partly dependent on the decision-making paradigm. For instance, as Stanovich and West (2008) point out, the association between NFC and framing effects varies across between- vs. within-subjects designs because within-subjects designs "signal that than issue of consistency is at stake" (p. 689). That is, participants in within-subjects experiments perceive a need to be consistent in their choices, and this motivation suppresses the effects of individual difference characteristics, such as need for cognition, on decision making.

On the other hand, studies using adult life-span samples have yielded consistent evidence linking NFC to overall decision-making competence across age groups (Bruine de Bruin et al., 2007; Finucane & Gullion, 2010). Although prior research has not examined the relationship between NFC and choice set size preferences (let alone in the context of aging), it is possible that NFC might contribute to age differences in choice set size preferences. Based on this reasoning, the present studies included measures of NFC.

Short-term memory. Recent studies have suggested that age differences in short-term memory contribute to reduced decision-making competence and relatively poorer decisions among older versus younger adults (Finucane & Gullion, 2010; Henninger, Madden, & Huettel, 2010). Thus, insofar as short-term memory is

associated with age differences in the ability to make high quality decisions, it may well influence preferences for choice set sizes.

Numeracy. Numeracy, the ability to interpret and process numerical information, has been identified as a key influence on decision-making (Nelson, Reyna, Fagerlin, Lipkus, & Peters, 2008; Reyna, Nelson, Han, & Dieckmann, 2009). For instance, in a recent review of the literature on health numeracy, Reyna and colleagues (2009) concluded that low-numerate persons have deficits in interpreting graphical information, are more susceptible to the way in which probabilistic information is presented, and are more likely to fall prey to framing effects. However, the effects of numeracy on decision-making are not entirely consistent across (or even within) studies. For instance, while three studies by Peters et al. (2006) found that highly numerate individuals are less susceptible to decision-making biases (e.g., framing effects) and more likely to make optimal risky choices relative to low-numerate individuals (Studies 1-3), a fourth study demonstrated an inverse relationship between numeracy and the quality of judgments regarding risky choices (Study 4). Subsequent research by the same authors found that the effects of numeracy on choice quality may depend on the structure of the decision, including how information is presented (Peters, Dieckmann, Dixon, Hibbard, & Mertz, 2007).

As Reyna and colleagues (2009) acknowledge, research on the relationship between numeracy and effective decision making is hampered by broad and inconsistent definitions of numeracy, and the relationship itself is not fully understood. Nonetheless, some reasonable conclusions can be drawn. Insufficient numeracy, at least for health-related domains renders effective decision making an "elusive goal" (Reyna et al., 2009, p. 966) and "constrains informed patient choice" (Nelson et al., 2008, p. 261). Moreover, as concluded by Peters et al. (2006), numeracy appears to improve decision quality in some situations, but impair it in others.

Older adults suffer relative deficits in numeracy (Donelle, Hoffman-Goetz, & Arocha, 2007; Finucane & Gullion, 2010), and recent studies have demonstrated that, across adult age groups, numeracy predicts decision-making competence (Finucane & Gullion, 2010) and choice quality (i.e., for multi-choice, multi-attribute decisions (Tanius et al., 2009). Because age declines in numeracy have been linked to deficits in decision-making competence, it is plausible that developmental changes in the capacity to process decision-relevant numerical information contribute to observed age differences in choice set size preferences.

Finally, one additional factor may influence general decision making tendencies and, as an extension, choice set size preferences:

Personality. Previous research has indicated that personality traits may be correlated with decision-making preferences. For instance, conscientiousness and openness to experience are positively correlated with information seeking and desire for autonomy versus delegation (Flynn & Smith, 2007). Combined with evidence for age-related declines in openness throughout adulthood and declines in conscientiousness in later life (Terracciano, McCrae, Brant, & Costa, 2005), these findings suggest that personality may play a role in age differences in choice set size preferences. To investigate this possibility, the present research incorporated measures of personality traits.

Research Overview

To investigate the role of self-efficacy, maximizing, and motivational priorities in age differences in choice set size preferences, I conducted three studies using correlational and experimental methods. These studies were designed to examine the three primary factors simultaneously (Study 1) and in isolation from one another

(Studies 2a-c, Study 3). Combined, these studies provide a comprehensive portrait of multiple influences on choice set size preferences across the adult life span.

Study 1 (Chapter 2) examined associations between choice set size preferences and various decision-related constructs across adulthood using a large-scale survey design. One important aim of this study was to examine the trajectory of choice set size preferences across the adult life span, especially in light of the inconsistent results of prior research in this area. For instance, while one study found evidence of a linear relationship between age and preferences for smaller versus larger choice sets (Rozin et al., 2006), results of another study suggested a curvilinear relationship in which the desire for choices peaks in mid-life (Levinson et al., 2005). Importantly, neither of these studies examined multiple domains of choice preferences or used fine-grained measures of choice set size preferences, creating the need for additional research.

Another primary goal of Study 1 was to examine the underlying mechanisms of age differences in choice set size preferences. As discussed above, age differences in choice set size preferences may reflect age differences in maximizing, decision-making self-efficacy, or motivational priorities. Importantly, these factors do not necessarily operate independently, but may show meaningful associations with each other *and* with the additional factors discussed above. For instance, because maximizing is more challenging and requires greater information seeking than satisficing (Dar-Nimrod et al., 2009; Iyengar, 2010; Schwartz et al., 2002), it is plausible that maximizers have relatively high decision-making self-efficacy and need for cognition, prioritize information-seeking goals, and perceive their future time horizons as expansive. In a similar vein, satisficers may have lower levels of self-efficacy and need for cognition, prioritize emotion-regulatory goals, and perceive their future time horizons as limited, given that satisficing is a relatively less challenging but more satisfying strategy (Dar-Nimrod et al., 2009; Iyengar, 2010; Schwartz et al.,

2002). Study 1 was designed to reveal such associations by examining the relations among self-efficacy, maximizing, and motivational priorities and their links with age and choice set size preferences, as well as various covariates.

Chapter Three reports three laboratory-based studies which built upon the descriptive, correlational results of Study 1 and elucidated the specific effects of self-efficacy (Study 2a), maximizing (Study 2b), and motivational priorities (Study 2c) on younger adults' choice set size preferences and information seeking for consumer decisions. These studies included novel experimental manipulations of the three factors to isolate causal relations and rule out potential confounds. Although these studies did not explicitly address the question of developmental influences, they helped clarify the basic mechanisms behind choice set size preferences and provided the foundation for a 'capstone' study incorporating age comparisons.

Chapter Four reports a quasi-experimental life-span developmental study (Study 3) that examined whether manipulating self-efficacy in younger and older adults would alter age differences in choice set size preferences for consumer decisions. In this study both young and older adults received the same experimental manipulations of decision-making self-efficacy used in Study 2a before completing a decision task similar to that of Studies 2a-2c. By synthesizing the experimental design and manipulation of Study 2a with a cross-sectional age comparison (i.e., young versus older adults), Study 3 provided insight into the effects of decision-making self-efficacy across age groups. In addition to extending the results of Study 2a to older adults, this study represents the first known attempt to systematically alter age differences in choice set size preferences.

Chapter Five discusses conclusions with respect to driving factors behind age differences in choice set size preferences, directions for future research, and implications for research on aging and decision-making as well as public policy.

CHAPTER TWO: CORRELATES OF CHOICE SET SIZE PREFERENCES IN A LIFE-SPAN SAMPLE

A large-scale survey (Study 1) was conducted to examine the age trajectory of choice set size preferences and provide a comprehensive assessment of the role of DMSE, maximizing, and motivational priorities in choice set size preferences across the adult life span. Additional theoretically implicated covariates were included to examine their relative association with choice set size preferences and DMSE, maximizing, and motivational priorities.

Participants completed an internet-based questionnaire containing novel measures of choice set size preferences, DMSE, motivational priorities (information-seeking vs. emotion-regulation), beliefs about choice, and preference clarity. In addition, participants completed existing measures of maximizing, need for cognition, personality traits, future time perspective, and cognitive and numerical abilities.

Conducting the survey via the internet afforded a larger and more diverse sample than could be obtained through traditional on-site testing (Mikels et al., 2009; Reed et al., 2008). Importantly, we also recruited a sample of in-person participants to anchor the internet-based data.

Participants were asked how many options they preferred in a wide variety of decision domains. To expand upon previous research on choice set size preferences (Reed et al., 2008; Rozin et al., 2006), the domains in the present study ranged from everyday choices among cellular phones and restaurants to consequential health-related decisions among physicians and prescription drug plans.

The following hypotheses were tested in Study 1:

H1: Choice set size preferences are negatively correlated with age.

H2: Choice set size preferences are positively correlated with decision-

making self-efficacy, maximizing, and information-seeking goals, and negatively correlated with emotion-regulatory goals.

H3: Decision-making self-efficacy, maximizing, and information-seeking goals are negatively associated with age, and emotion-regulatory goals are positively associated with age.

H4: Age differences in choice set size preferences are mediated by age differences in self-efficacy, maximizing, and motivational priorities.

Beyond testing these core hypotheses, Study 1 also provided an exploratory investigation of the role of the additional covariates listed above.

Method

Participants

Three hundred and thirty adults aged 18-90 (M = 47.5 years) participated in exchange for monetary compensation or course credit[2]. Of these, 194 participants (aged 19-87, 64% female) were recruited from across the U.S. and completed the survey remotely via the internet (presumably from their home computers). Because the remote participants completed the survey in an uncontrolled testing environment, I also recruited a comparison sample of 136 participants (aged 18-90, 71% female) from the Ithaca, N.Y. community, including 34 undergraduate students and 102 community-dwelling individuals. These participants completed the survey in a private testing room in the Healthy Aging Laboratory of Cornell University. Additional participant characteristics are presented in Table 1 below. As illustrated below, the remote and

[2] To safeguard against fraudulent or unreliable responses, participant data (n = 21) were excluded if they indicated an unusually brief completion time (i.e., less than 20 minutes) and/or numerous responses from the same computer (based on identical IP addresses). The sample characteristics reported above are for the final sample (N = 330).

on-site samples did not differ significantly in terms of age, sex, or racial/ethnic composition, although the remote sample reported relatively higher socioeconomic status and was better educated than the on-site sample.

Table 1. Participant Characteristics in Study 1

Measure	Overall (N = 330)	Remote Sample (N = 194)	On-Site Sample (N = 136)	*t*	X^2
Age (years), *M* (SD)	47.5 (21.4)	47.3 (18.4)	47.8 (24.9)	-.18	
Age range (years)	18-90	19-87	18-90		
Socioeconomic Status	3.1	3.2	2.9	2.39*	
Education (Years)	16.3	16.8	15.5	4.48***	
Sex (% female)	67.3%	63.9%	71.2%		4.53
Hispanic (%)	4.2%	4.1%	4.4%		.72
Race (%)					4.16
Caucasian	89.4%	89.7%	89.0%		
Asian or Pacific Islander	6.1%	7.2%	4.4%		
African American	2.4%	1.5%	3.6%		
Other	2.1%	1.6%	3.0%		

Note. Socioeconomic status was obtained via self-reports on a 5-point Likert-type scale (from 1 - Lower Income to 5 - Upper Income).
*$p < .05$, **$p < .01$

Measures

All participants completed a computerized survey containing a demographics form (including age, sex, education level, and socioeconomic status) and the following measures:

Choice Set Size Preferences. Adapted from the choice preference measure developed by Reed and colleagues (2008), this self-report measure asks participants

how many choices they would prefer when making decisions across a variety of domains. The choice domains are divided evenly between 6 everyday decisions (apartments, vacations, restaurants, cars, cellular phones, and jams) and 6 healthcare decisions (hospitals, health insurance plans, physicians, hearing aids, prescription drug plans, and nursing homes). Participants indicated the desired number of options in each domain using a forced-choice scale containing choice sets from 2 to 30 options (in increments of 4). The choice set size preferences measure showed high internal consistency (Cronbach's alpha = .93) and responses were averaged into a composite measure.

Self-Efficacy. Two separate measures were used to assess decision-making self-efficacy (DMSE). One measured DMSE across various components of decision-making (Component-Based DMSE), and the other measured decision-making self-efficacy across various choice domains (Domain-Based DMSE).

The Component-Based DMSE measure is a novel measure consisting of 12 items gauging confidence in one's ability to successfully complete various theoretically implicated components of decision-making competence (Bruine de Bruin et al., 2007; Finucane et al., 2002). As depicted in Appendix A, these items range from comprehension and memory of choice-related information to strategy selection (e.g., "When you are making decisions among different options, how confident are you that you can choose the most effective decision strategy?"). Participants respond to each statement using a 7-point Likert-type scale (from 1 - not at all confident to 7 - extremely confident). The Component-Based DMSE measure showed high internal consistency (Cronbach's alpha = .93) and responses were averaged into a composite measure.

The Domain-Based DMSE measure was adapted from the healthcare self-efficacy scale developed by Löckenhoff and Carstensen (2007). It assesses confidence

in one's ability to select the best alternative when making decisions across a variety of everyday and healthcare domains (see choice set size preferences measure for list of domains). Participants reported their self-efficacy for each domain on a 7-point Likert-type scale from 1 (not at all confident) to 7 (extremely confident). The Domain-DMSE measure demonstrated high internal consistency (Cronbach's alpha = .90) and responses were averaged into a composite measure.

In order to differentiate the role of decision-making self-efficacy from other types of self-efficacy, I also measured participants' memory self-efficacy using the Capacity subscale of the Metamemory in Adulthood Questionnaire (Dixon & Hultsch, 1983). The MIA-Capacity scale consists of 17 statements regarding one's ability to remember a variety of everyday information (e.g., "I am good at remembering things like recipes"). Responses are provided on a 5-point Likert-type scale (from 1 - agree strongly to 5 - disagree strongly). The MIA-Capacity scale showed acceptable internal consistency (Cronbach's alpha = .82).

Maximizing versus Satisficing. Participants completed the Maximization Scale (Schwartz et al., 2002), a self-report measure of the extent to which individuals seek the best possible alternative when making decisions (i.e., maximize) versus settle for options which are "good enough" (i.e., satisfice). The scale consists of 13 statements describing decision-making habits and values (e.g., "I never settle for second best"), to which participants respond using a 7-point Likert-type scale (from 1 - completely disagree to 7 - completely agree). Prior research indicated moderate test-retest reliability (*r*s > .7) for the Maximization Scale (Schwartz et al., 2002). The Maximization Scale showed modest internal consistency in the present study (Cronbach's alpha = .70).

Motivational Priorities. To test the extent to which choice set size preferences are associated with age differences in motivational priorities (i.e., a shift from

prioritizing information-seeking in youth to emotion-regulation in later life), I administered a novel measure of motivational priorities in decision-making (MP-DM; see Appendix B). The MP-DM scale was loosely adapted from a measure of social goals developed by Lang and Carstensen (2002). It consists of 10 items gauging the extent to which people are motivated to pursue emotion-regulatory goals (e.g., "When making decisions, how important is it for you to avoid feeling regret?") versus information-seeking goals (e.g., "When making decisions, how important is it for you to seek as much information as possible before choosing?"). Participants rate the importance of each goal using a 7-point Likert-type scale (from 1 - not at all important to 7 - very important). The emotion-regulatory items showed modest internal consistency (Cronbach's alpha = .75) and the information-seeking items showed acceptable internal consistency (Cronbach's alpha = .86). However, the information-seeking and emotion-regulatory goals subscales, which were designed to measure independent constructs, were interrelated (*Spearman's* $\rho = .50$, $p < .01$)[3].

Beliefs About Choice. To assess participants' beliefs regarding the potential costs and benefits of more versus less choice, I developed the novel Beliefs About Choice scale (BAC). As depicted in Appendix C, the BAC contains 8 statements regarding the consequences of choice with respect to affective and cognitive aspects of the decision process and outcome. Participants reported their level of agreement to each statement using a 7-point Likert-type scale (from 1 - strongly disagree to 7 - strongly agree). Responses to the BAC scale were coded such that higher scores indicate more positive beliefs about choice. The BAC scale showed acceptable internal consistency (Cronbach's alpha = .84) and responses were averaged into a composite measure. In

[3] Supplemental analyses using factor scores (from a forced two-factor solution with varimax rotation) in place of summary (average) scores for the information-seeking and emotion-regulation subscales yielded the same pattern of results. In addition, when motivational priorities were calculated in terms of a difference score (i.e., by subtracting information-seeking from emotion-regulation) they were also not related to choice set size preferences.

addition to the BAC items, I also administered a single-item measure of the extent to which individuals believe, consistent with rational choice models, that larger versus smaller choice sets are more likely to contain the optimal alternative (labeled below as "Rational Choice Belief"). Participants responded to this item using a 7-point Likert-type scale (from 1 – strongly disagree to 7 – strongly agree). This item was analyzed separately from the BAC (see below).

Preference Clarity. A novel measure of preference clarity was administered. For each domain listed in the choice set size preferences measure, participants were asked to report the 3 most important attributes (e.g., for decisions among restaurants: a relaxing atmosphere, fast service, and a wide variety of entrees). To measure the accessibility of these preferences, participants were then asked to rate how easy it was to think of these factors on a 7-point scale (1 - very difficult to 7 - very easy). The factor-listing and accessibility ratings were repeated for all 12 decision domains. Internal consistency for accessibility ratings was moderate (Cronbach's alpha = .86). Thus, all ratings were averaged into a composite measure of preference clarity.

Personality. Personality traits were measured via the 10-item version of the Big Five Inventory (Rammstedt & John, 2007), which is recommended as a brief measure of the five-factor model personality dimensions (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness). Each dimension is assessed by 2 statements regarding self-rated traits (e.g., "I see myself as someone who tends to be lazy"). Participants respond using a 5-point Likert-type agreement scale (from 1 - disagree strongly to 5 - agree strongly). The BFI-10 possesses a clear factor structure with good discriminant validity and test-retest stability, as well as strong convergent validity with respect to extended personality measures (Rammstedt & John, 2007). Correlation coefficients for pairs of items ranged from $r = .24$ (Openness) to $r = .53$ (Extraversion), all ps $< .01$.

Need for Cognition. Need for cognition was measured using the NFC subscale of the 10-item version of the Rational Experiential Inventory (Pacini & Epstein, 1999). The NFC subscale, which is directly adapted from the short-form NFC measure developed by Cacioppo, Petty, and Kao (1984), uses 5 statements to measure self-rated enjoyment and engagement in effortful deliberative processing (e.g., "I prefer to do something that challenges my thinking abilities rather than something that requires little thought."). Participants report their agreement to each statement on a 5-point Likert-type scale (1 - definitely false to 5 - definitely true). Psychometric analyses have established high internal validity for the NFC subscale (Pacini & Epstein, 1999). and it showed acceptable internal consistency in the present sample (Cronbach's alpha = .78).

Future Time Perspective. To measure future time perspective, I administered the FTP scale developed by Lang and Carstensen (2002). The FTP scale consists of 10 statements reflecting a limited time perspective (e.g., "I have the sense that time is running out") versus open-ended time perspective (e.g., "Most of my life still lies ahead of me"). Participants respond using a 7-point Likert-type scale (1 - very untrue to 7 - very true). The FTP scale showed high internal consistency (Cronbach's alpha = .91).

Short-term memory. I measured short-term memory using a computerized version of the forward subtest of the Digit Span test (Wechsler, 1997). In the Digit Span test, participants viewed a series of increasingly long number strings which they had to "repeat" by typing.

Numeracy was measured using the 11-item Numeracy Scale developed by Lipkus and colleagues (Lipkus, Samsa, & Rimer, 2001), which contains a series of questions for which the correct answer requires accurate interpretation of probabilistic information.

Vocabulary was measured using the subtest of the Shipley Vocabulary Test (Zachary, 1986), which asks participants to select synonyms (from a list of 4 options) for 25 terms of varying difficulty.

Procedure

After providing informed consent, participants completed a computerized survey containing the following measures in order: Demographics, choice set size preferences, domain DMSE, component DMSE, memory self-efficacy, motivational priorities, future time perspective, maximizing, need for cognition, personality, beliefs about choice, preference clarity, numeracy, vocabulary, and working memory. Completion of the entire survey took approximately 45-60 minutes.

Results

No significant differences were observed in the pattern of results between participants who completed the survey remotely versus on-site. Consequently, all reported analyses collapse both participant groups into a combined sample. In addition, no significant associations were observed between choice set size preferences and any of the demographic variables, so demographic variables will not be discussed further.

Exploratory data analyses indicated that many of the dependent measures, including choice set size preferences, were not normally distributed. Consequently, data were analyzed using non-parametric tests when appropriate.

Table 2 depicts the non-parametric correlations (*Spearman's* ρ) among age, choice set size preferences, the three proposed mediators, and additional covariates in Study 1.

My first hypothesis, that choice set size preferences would be negatively

correlated with age, was supported. As depicted in Figure 1 below, there was an inverse association between age and preferred choice set size (*Spearman's* ρ = -.25, p < .05). Subsequent regression analyses indicated that neither the quadratic nor cubic effects of age were significant. The negative correlation between age and choice set size preferences was significant for all domains except for jam varieties (*Spearman's* ρ = -.03, *n.s.*). Post-hoc analyses indicated that middle-aged participants desired significantly more choices among varieties of jam (M = 10.5, SD = 8.1) than older (M = 8.4, SD = 6.7) but not younger participants (M = 9.7, SD = 8.4). For all other domains, correlations between age and choice set size preferences ranged in size from ρ = -.12 (vacations) to ρ = -.33 (physicians) and were all significant (all ps < .05). Thus, the association between age and choice set size preferences appears to be linear and generalizable across domains.

My second hypothesis was that maximizing, DMSE, and information-seeking would be positively correlated with choice set size preferences. As depicted in Table 2, only maximizing was associated with choice set size preferences (*Spearman's* ρ = .11, p < .05). Choice set size preferences were also associated with the composite measure of beliefs about choice[4] (*Spearman's* ρ = .13, p < .05), future time perspective (*Spearman's* ρ = .17, p < .01), and vocabulary (*Spearman's* ρ = -.14, p < .01). Thus, participants who desired more versus less choice reported greater maximizing, held more positive beliefs about increased choice, and had more expansive future time perspectives and smaller vocabularies.

[4] Item-level analyses indicated that choice set size preferences were only correlated with items 3 ("more motivated") and 4 ("more confident").

Table 2. Intercorrelations (Spearman's ρ) among age and dependent measures in Study 1.

Variable	1	2	3	4	5	6	7
Core Variables							
1. Age	--						
2. Preferred Choice Set Size	-.29**	--					
3. Component-Based DMSE	.06	-.04	--				
4. Domain-Based DMSE	.11*	.00	.55**	--			
5. Maximization	-.47**	.11*	-.20**	-.10	--		
6. Emotion-Regulation Goals	-.21**	.03	.21**	.25**	.27**	--	
7. Information-Seeking Goals	.01	.05	.47**	.34**	.13*	.50**	--
Additional Covariates							
8. Memory Self-Efficacy	-.19**	.03	.42**	.30**	.01	.27**	.33**
9. Beliefs About Choice	.25**	.13*	.19**	.10	-.02	.01	.24**
10. Rational Choice Belief	-.09	.19**	.19**	.12*	.09	.13*	.20**
11. Preference Accessibility	.39**	-.04	.36**	.39**	-.27**	.01	.17**
12. Neuroticism	-.13*	.00	-.22**	-.12*	.19**	.21**	.07
13. Extraversion	.04	-.04	.09	.00	-.13*	-.06	.00
14. Openness	-.03	.03	.05	.10	-.02	.17**	.17**
15. Agreeableness	.06	.07	.11	.11*	-.18**	.00	.04
16. Conscientiousness	.16**	-.03	.23**	.08	-.18**	.08	.21**
17. Need for Cognition	.04	.03	.32**	.15**	-.14**	.05	.25**
18. Future Time Perspective	-.54**	.17**	.21**	.14**	.21**	.14**	.07
19. Digit Span	-.24**	.06	.11	-.02	.10	.06	.03
20. Numeracy	-.21**	.07	.04	-.05	.08	-.02	-.02
21. Vocabulary	.47**	-.14**	.10	.06	-.26**	-.12*	-.03

Note. DMSE = Decision-Making Self-Efficacy; $N = 330$.
**$p < .01$, *$p < .05$.

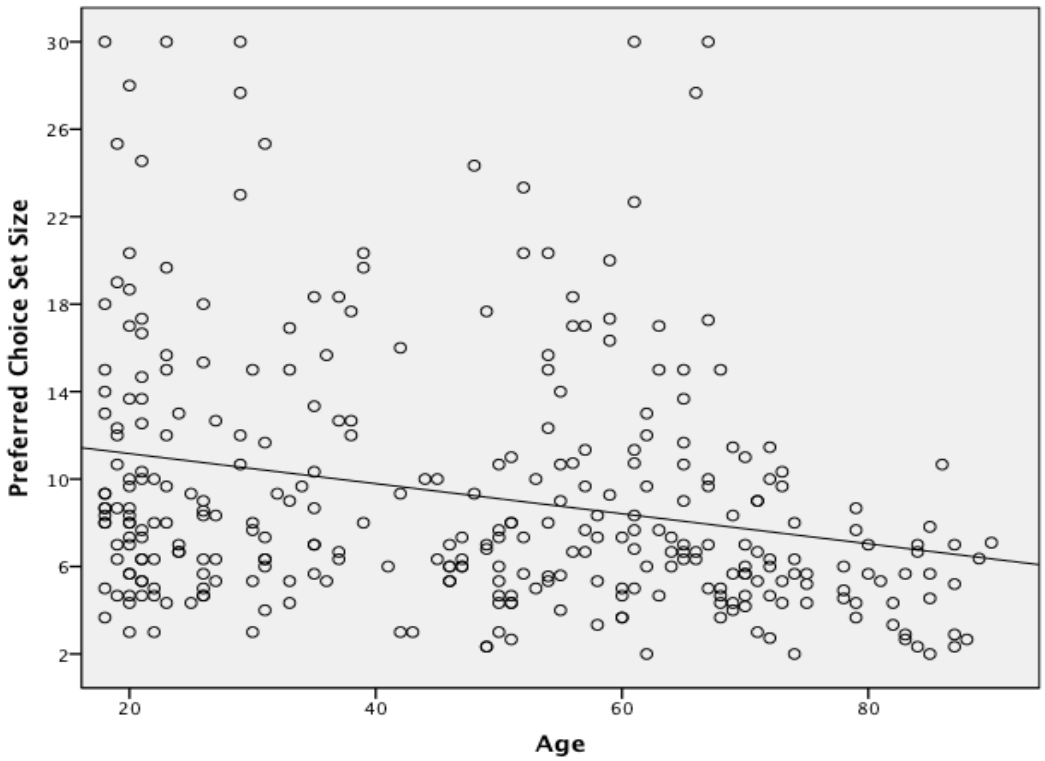

Figure 1. Scatterplot of preferred choice set size by age in Study 1.

Note. Fit line represents linear regression equation (R^2 = .064).

My third hypothesis was that age would be inversely associated with DMSE, maximizing, and information-seeking goals, and positively associated with emotion-regulation goals. As depicted in Table 2, age was indeed negatively correlated with maximizing (*Spearman's* ρ = -.47, p < .01). However, age was positively correlated with the domain-based measure of DMSE[5] (*Spearman's* ρ = .11, p < .05), negatively

[5] Item-level analyses indicated the age was positively correlated with self-efficacy for all health-related domains (*Spearman's* ρs > .13, ps < .05) with the following exceptions: Age was only marginally correlated with self-efficacy for nursing homes (*Spearman's* ρ = .10, p < .09) and was not significantly correlated with self-efficacy for hospitals (*Spearman's* ρ = .06, *n.s.*). Among the everyday domains, age was positively correlated with efficacy for varieties of jam (*Spearman's* ρ = .12, p < .05), negatively correlated with efficacy for cellular phones (*Spearman's* ρ = -.25, p < .001), and not significantly correlated with efficacy for any other domains.

correlated with emotion-regulation goals (*Spearman's* ρ = -.21, $p < .01$), and unrelated to information-seeking goals (*Spearman's* ρ = .01, *n.s.*). Thus, older versus younger adults reported less maximizing tendencies but had somewhat higher levels of domain DMSE and reported reduced emotion-regulatory motivations.

My fourth hypothesis was that the age differences in choice set size preferences would be mediated by age differences in self-efficacy, maximizing, and motivational priorities. To test this hypothesis, I conducted mediation analyses[6] (Baron & Kenny, 1986) using age as the initial variable (X), choice set size preferences as the outcome variable (Y) and self-efficacy, maximizing, and information-seeking goals as the mediating variables (M1, M2, and M3, respectively). In Step 1 of the analysis, the direct path (c) between age and choice set size preferences was significant (β = -.24, $p < .01$). In Step 2 of the analysis, however, the only proposed mediator which was significantly correlated with the initial variable of age was maximizing (β = -.46, $p < .001$), which rules out the possibility of the other variables serving as mediators. In Step 3 of the analysis, maximizing did not significantly predict choice set size preferences (β = .01, *n.s.*) when entered into a regression along with age, suggesting that maximizing did not mediate age differences in choice set size preferences. Thus, there was no support for any of the hypothesized mediators of age differences in choice set size preferences.

Only two variables, future time perspective and vocabulary, were significantly associated with both age and choice set size preferences in a manner that implicated them as a possible mediators. Consequently, additional mediation analyses (Baron & Kenny, 1986) were conducted in the same manner as described above. As in the previous analyses, age and choice set size were significantly and positively correlated

[6] Mediation analyses using a non-parametric bootstrapping approach (Preacher & Hayes, 2008) yielded similar patterns of results. For the sake of parsimony, I only report results for the Baron and Kenny (1986) analyses.

(β = -.24, p < .01) in Step 1. In Step 2 of the analyses, age was significantly and negatively correlated with future time perspective (β = -.52, p < .001) and positively correlated with vocabulary scores (β = .42, p < .001). In Step 3, vocabulary scores (β = -.14, p < .05) remained predictive of choice set size preferences, but future time perspective was no longer predictive (β = .01, *n.s.*), when age was included in the regression. However, age remained a significant predictor of choice set size preferences after including vocabulary and future time perspective in the regression equations (βs < -.19, ps < .005). Sobel tests (Sobel, 1982) confirmed that future time perspective did not mediate (z = -.10, *n.s.*), but vocabulary partially mediated age differences in choice set size preferences (z = -2.20, p < .05). However, vocabulary only accounted for 1.5% of variance in choice set size preferences above and beyond age, suggesting that it played a minimal role in age differences.

A number of secondary findings are noteworthy. First, the proposed mediators (self-efficacy, maximizing, and motivational priorities) were interrelated, though not in the expected manner. Both measures of decision-making self-efficacy were positively correlated with information-seeking and emotion-regulatory goals (*Spearman's* $\rho s \geq .21$, ps < .01). Maximizing was negatively correlated with component-based DMSE (*Spearman's* ρ = -.20, p < .05) and positively correlated with information-seeking goals (*Spearman's* ρ = .13, p < .05) and emotion-regulatory goals (*Spearman's* ρ = .27, p < .01).

The novel measures of decision-making self-efficacy demonstrated acceptable psychometric properties. For instance, both measures of self-efficacy (component-based and domain-based) were correlated with each other (*Spearman's* ρ = .55, p < .01) and with the measure of memory self-efficacy (*Spearman's* $\rho \geq .30$, ps < .01). As depicted in Table 2, the component-based DMSE measure also converged with measures of preference accessibility, need for cognition, and conscientiousness.

Additional psychometric properties of the motivational priorities measure, however, were problematic. As expected, the emotion-regulation goals subscale was positively correlated with future time perspective (*Spearman's* $\rho = .14$, $p < .05$). However, contrary to my expectations, the emotion-regulation and information-seeking subscales were interrelated, as previously discussed.

Further, age was associated with more positive beliefs about choice[7] (*Spearman's* $\rho = .25$, $p < .01$), higher preference accessibility[8] (*Spearman's* $\rho = .39$, $p < .01$), and decreased memory self-efficacy (*Spearman's* $\rho = -.19$, $p < .01$), though the latter two constructs were not significantly associated with choice set size preferences. Thus, older versus younger adults held more favorable views of larger choice sets and clearer decision-related preferences, despite reduced confidence in their memory capacities. Age was not associated with the "Rational Choice Belief" (i.e., that larger choice sets are more likely to contain optimal alternatives; *Spearman's* $\rho = -.09$, $p > .12$), although the belief was positively correlated with choice set size preferences (*Spearman's* $\rho = .19$, $p < .005$).

Finally, age differences in personality traits and cognition were consistent with prior research. Older versus younger participants reported reduced levels of neuroticism but increased agreeableness and conscientiousness, as depicted in Table 2. Age was also associated with decreased performance on the Digit Span and Numeracy tests, but these variables showed no significant associations with choice set size preferences.

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[7] Item-level analyses indicated significant positive correlations between age and responses to all items in the BAC measure except for Items 3 ("more motivated") and 8 ("more satisfied").

[8] Domain-level analyses indicated that preference accessibility was positively and significantly correlated with age for all domains (*Spearman's* $\rho s > .12$, $ps < .05$) with the exception of restaurants, for which the age-accessibility correlation was positive but only marginally significant (*Spearman's* $\rho = .10$, $p < .07$).

Discussion

As predicted, age was negatively associated with choice set size preferences for nearly all choice domains across the life-span sample, and maximizing was negatively associated with age and positively correlated with choice set size preferences. However, support for other hypotheses was mixed. In contrast to my predictions, domain-based DMSE was positively associated with age, and emotion-regulation goals were inversely related to age, contrary to socioemotional selectivity theory (Carstensen, 2006). Information-seeking goals were uncorrelated with age. Moreover, there was only limited evidence of the predicted relationships among DMSE, maximizing, motivational priorities, and choice set size preferences. Neither the proposed mediators nor any of the other variables included in the study could fully account for age differences in choice set size preferences. Although vocabulary scores emerged as a partial mediator, they only accounted for an insignificant portion of the variance in choice set size preferences.

There are several potential interpretations for the lack of significant mediation results in the present study. First, it may be the case that the driving factors behind choice set size preferences are not accessible to conscious thought or insight, and therefore ill-suited to measurement via self-report. This interpretation is buttressed by mounting evidence that unconscious, automatic, and/or intuitive processes play a significant role in decision-making (Simonson, 2005). Future research needs to examine the role of such factors in preferences for choice set sizes. Alternatively, it is possible that cohort effects—as opposed to age-related changes—contributed to the observed age differences in choice set size preferences. Because the proliferation of choice is a relatively recent historical phenomenon (Schwartz, 2004), it is plausible that older adults, relative to younger adults, may be more accustomed to limited choice sets.

Despite the lack of support for the hypothesized mediators, the present results are useful in a number of ways. For one, they represent the first systematic, life-span examination of age differences in choice set size preferences across a variety of domains. Previous studies in this area only compared choice set size preferences at the extreme ends of the adult life span (Reed et al., 2008), or were restricted to a single choice domain (Rozin et al., 2006). By contrast, the present study includes a true life-span sample and a wide variety of choice domains. Results suggest that choice set size preferences decrease in a gradual, linear manner over the course of adulthood, and that this trend extends to many choice domains. In addition, the present study provides novel evidence of previously unexamined aspects of age differences in decision making: Specifically, older adults reported more positive beliefs of the consequences of large choice sets and easier access to their decision preferences.

Consistent with previous research, the present results suggest that maximizers prefer more choice relative to satisficers (Dar-Nimrod et al., 2009) and that older adults are less likely to maximize than younger adults (Tanius et al., 2009). However, maximizing was not found to mediate the relationship between age and choice set size preferences. One possible explanation for the lack of mediation is the small effect size for the relationship between maximizing and choice set size preferences (*Spearman's* $\rho = .11$, $p < .05$). Because the present study elicited choice set size preferences in a hypothetical and relatively abstract manner—one that provided no incentive to maximizers for selecting the largest choice set—the effect of maximizing may have been diluted. Thus, research using behavioral measures of choice set size preferences in decision contexts with real consequences may be more likely to capture the hypothesized mediation of age differences.

In contrast to previous research, the present results indicated that information-seeking goals were unrelated to chronological age, and emotion-regulatory goals were

inversely associated with age. Both results represent failures to replicate findings by Lang and Carstensen (2002), who found that when adults of different ages are asked to rank the importance of various social motivations (i.e., via a card-sort task), older adults prioritize emotion regulatory goals (e.g., controlling one's feelings) versus information-related goals (e.g., being knowledgeable) to a greater extent than younger adults. Lang and Carstensen also found that the age differences in goal priorities were mediated by future time perspective. By contrast, in the present study self-reported motivational priorities in the context of decision making (emotion regulation versus information-seeking) were not significantly related to future time perspective. The most likely explanation for this finding is that the novel measure used in the present study did not accurately measure the construct of emotional versus information goals with respect to decision making. This interpretation is further supported by the significant and counter-intuitive correlation between the emotion-regulation and information-seeking subscales. Future studies should incorporate measure of goal priorities with sound psychometric properties.

Although my hypotheses focused on factors that might *limit* choice set size preferences with age, the present findings suggest one factor that should *promote* the desire for larger choice sets with age: Older adults, relative to younger adults, reported more positive views of the consequences of choice. However, although positive views of choice were associated with increased choice set size preferences in the sample as a whole, older adults nonetheless desired less choice than younger adults. In other words, older participants wanted fewer options *despite* harboring beliefs that more options are better. The most likely explanation for this apparent paradox stems from the item-level analyses discussed in Footnotes 3 and 7 above: Choice set size preferences were only associated with two of the eight items in the BAC, and of these, only one was significantly associated with age.

These results are also consistent with the notion that older versus younger adults harbor divergent beliefs about what constitutes "more" choice in decision making. For instance, older adults may have reported relatively more positive beliefs about choice because they were considering differences between relatively small choice sets (e.g., 2 versus 6 options), whereas younger adults may have reported less positive views because they were considering relatively larger choice sets (e.g., 10 versus 20 options). If conceptions of increased choice indeed vary with age, future studies should measure beliefs about choice while explicitly defining increased choice (e.g., choosing among 6 versus 24 options).

It should be acknowledged that the present study found a small effect size for the relationship between age and choice set size preferences (*Spearman's* $\rho = -.29$, $p < .01$), whereas previous studies reported medium effect sizes (Reed et al., 2008; Rozin et al., 2006). The discrepancy in effect sizes may be due to the use of extreme age groups (Reed et al., 2008) or response formats (Rozin et al., 2006) in previous research. Alternatively, the use of a partially internet-based sample in the present study may have introduced additional noise to the data set, given the uncontrolled nature of remote testing environments. Because age differences observed in the present data (i.e., with respect to FTP, maximizing, personality, and cognitive abilities) are consistent with previous research, the explanation of low data quality is unlikely. Nonetheless, replicating the findings in fully controlled testing environments is recommended.

Overall, the results of this study suggest that the factors that drive choice set size preferences are somewhat elusive. Because correlates of choice set size preferences are few in number and weak in effect size, using a correlational approach may not be the ideal means of investigating age effects. At the same time, while the results of Study 1 suggest that self-efficacy and motivational priorities are uncorrelated with

choice set size preferences at the level of self-reports, they do not speak to the question of causality—nor do they necessarily extend to behavioral measures of choice set size preferences. In the following chapter, I discuss a series of laboratory-based experiments designed to address these limitations and provide additional insight into the mechanisms underlying choice set size preferences.

CHAPTER THREE: POTENTIAL MECHANISMS OF CHOICE SET SIZE PREFERENCES

Whereas Study 1 used a correlational approach to examine the relationship between choice set size preferences and DMSE, maximizing, and motivational priorities, the studies reported in this chapter (Studies 2a-2c) used experimental manipulations to isolate the influence of each factor on choice set size preferences. For this purpose, I developed novel experimental manipulations of DMSE (Study 2a) and maximizing (Study 2b), and utilized an established manipulation of motivational priorities (Study 2c). Moreover, instead of relying on self-report measures of choice set size preferences, Studies 2a-2c implemented an incentive-compatible behavioral decision task (i.e., involving real outcomes), which also allowed for the assessment of information seeking in addition to choice set size preferences. Finally, to minimize the effects of age-related confounds, Studies 2a-2c focused on a single age group, namely younger adults.

In Studies 2a-2c, undergraduate students made decisions among photo printers with the expectation that they would be entered into a lottery for which the winner would receive the printer of his or her choice. This decision domain was selected because pilot testing suggested that it was moderately familiar to undergraduates and few students already owned photo printers. Prior to making their decision, participants were exposed to experimental manipulations of decision-making self-efficacy (high versus low; Study 2a), maximizing versus satisficing (Study 2b), or motivational priorities (information-seeking versus emotion-regulation; Study 2c). It was predicted that choice set size preferences and information seeking would be increased by experimental inductions of high (versus low) self-efficacy, maximizing (versus satisficing), and information-seeking goals (versus emotion-regulatory goals).

Study 2a: Decision-making self-efficacy and choice set size preferences

Study 2a was designed to isolate the influence of decision-making self-efficacy on choice set size preferences and information seeking. Although DMSE was not related to choice set size preferences in Study 1, its effects may have been obscured by the self-report method and/or correlational design. In Study 2a, participants were given false feedback to elevate or suppress their DMSE levels prior to making a decision among photo printers. Based on the tenets of self-efficacy theory and prior research on decision-making self-efficacy (Bandura & Wood, 1989; Tabernero & Wood, 2009), I hypothesized that individuals whose self-efficacy levels were experimentally elevated would desire more choice and seek more information relative to those individuals whose efficacy levels were reduced. I also administered background measures related to decision making, including maximizing (Schwartz et al., 2002) and personality traits (Costa & McCrae, 1992). These served to justify the false-feedback manipulation to participants and were included as covariates in data analyses.

Method

Participants

Sixty-five undergraduate students (74% female, aged 18-26, $M = 19.98$ years) participated in exchange for course credit. Eleven participants were excluded from data analyses because they failed to comply with instructions and/or expressed suspicion regarding the experimental manipulation upon debriefing (final $N = 54$)[9].

Measures

As part of the experimental manipulation, all participants completed a battery of background measures under the premise that their responses to the measures would

[9] Exclusion of these participants did not significantly influence the pattern of reported results.

help to determine how easy or difficult the subsequent decision task would be. These measures included the following:

To measure self-efficacy, maximizing, and motivational priorities in decision making, I administered the *Component-Based DMSE, Maximization* (Schwartz et al., 2002), and *Motivational Priorities in Decision-Making* scales, respectively (see Study 1 for details).

To measure personality traits, I administered the *NEO Five-Factor Inventory* (Costa & McCrae, 1992), which assesses neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. The NEO-FFI contains 60 items divided evenly among the 5 personality factors, possesses a validated factor structure, and is recommended for broad measurement of personality factors (McCrae & Costa, 2007).

Self-Efficacy Manipulation Check. Consistent with guidelines for assessing self-efficacy recommended by Bandura (2006), participants indicated how confident they were in their ability to select the best possible photo printer on a scale from 0% (not at all confident) to 100% (very confident). This measure, used as a manipulation check, was administered at two separate times during the experiment (see procedure for details).

Materials

Information Sheet. Prior to making the decision, each participant was given an information sheet providing details about the decision attributes. This helped to address any interindividual differences in background knowledge of photo printers, and ensured that all participants were able to make an informed decision among the printers. The information sheet was modeled after information provided by consumer recommendation sources (e.g., Consumer Reports and Amazon.com) and contained

explanations for each of the decision attributes. For instance, the explanation for the feed capacity attribute contained the following information: "The feed capacity is the maximum number of sheets of paper that can fit in the printer. The higher the feed capacity, the less often the printer paper will need to be refilled."

Information Grid. All participants completed a decision among 20 photo printers using a standard computerized information grid, presented via E-Prime 2.0 experimental software. The information grid contained real printer model names and information (retrieved from retailers' and manufacturers' websites) for the following six attributes: Black print resolution (DPI), color print resolution (DPI), feed capacity (i.e., maximum number of sheets of paper), maximum media size, memory card reader, and print noise level (dBA)[10]. Attributes were selected based on information commonly provided by consumer electronics websites. Pilot testing with 49 undergraduate students confirmed that the attributes were judged as moderately important (memory card reader; $M = 3.5$, $SD = 2.2$) to very important (color print resolution; $M = 5.8$, $SD = 1.1$) on a 7-point Likert-type scale (1 – not at all important to 7 – extremely important). As depicted in Figure 3, each piece of information was contained in a separate cell within the grid, and all information was initially hidden from participants, who were instructed to use the computer mouse to click on a cell to reveal the corresponding information. Each piece of information remained visible until the participant clicked on another cell, at which point the initial information would disappear. Thus, only one piece of information was visible at any time, though participants were allowed to revisit any cell. Participants were allowed to view as

[10] I deliberately chose to omit pricing information from the grid so that participants did not simply select the most expensive printer. For some printers it was not possible to obtain full information for all six attributes--in these cases the missing attribute was calculated as the mean attribute value for all other printers in the information grid.

much information as they desired, and were given unlimited time to search for information within the grid prior to selecting a printer.

Procedure

Participants were randomly assigned to one of three conditions: High self-efficacy, low self-efficacy, and control. At the onset of the experiment, all participants were informed that they would be making a decision among consumer photo printers. Additionally, they were instructed to treat this decision as real because one participant would be randomly selected via lottery to receive the printer of his or her choice at the end of the experiment. Prior to the decision, they were asked to complete the background measures described above in the following order: Component-Based DMSE, MP-DM, Maximization Scale (Schwartz et al., 2002), and NEO-FFI (Costa & McCrae, 1992). Participants were informed that their responses would provide an indication of their ability to make the ensuing decision[11].

[11]A pilot study (N = 47) using a similar DMSE manipulation without the false feedback component proved unsuccessful. In the pilot study, participants were simply told that the decision task would be either easy (high DMSE) or difficult (low DMSE). Unlike in Study 2a, this information was not presented as based on personal responses, and may not have been sufficiently salient or believable. Consequently, the false feedback component was added to the present study to increase the effect of the manipulation.

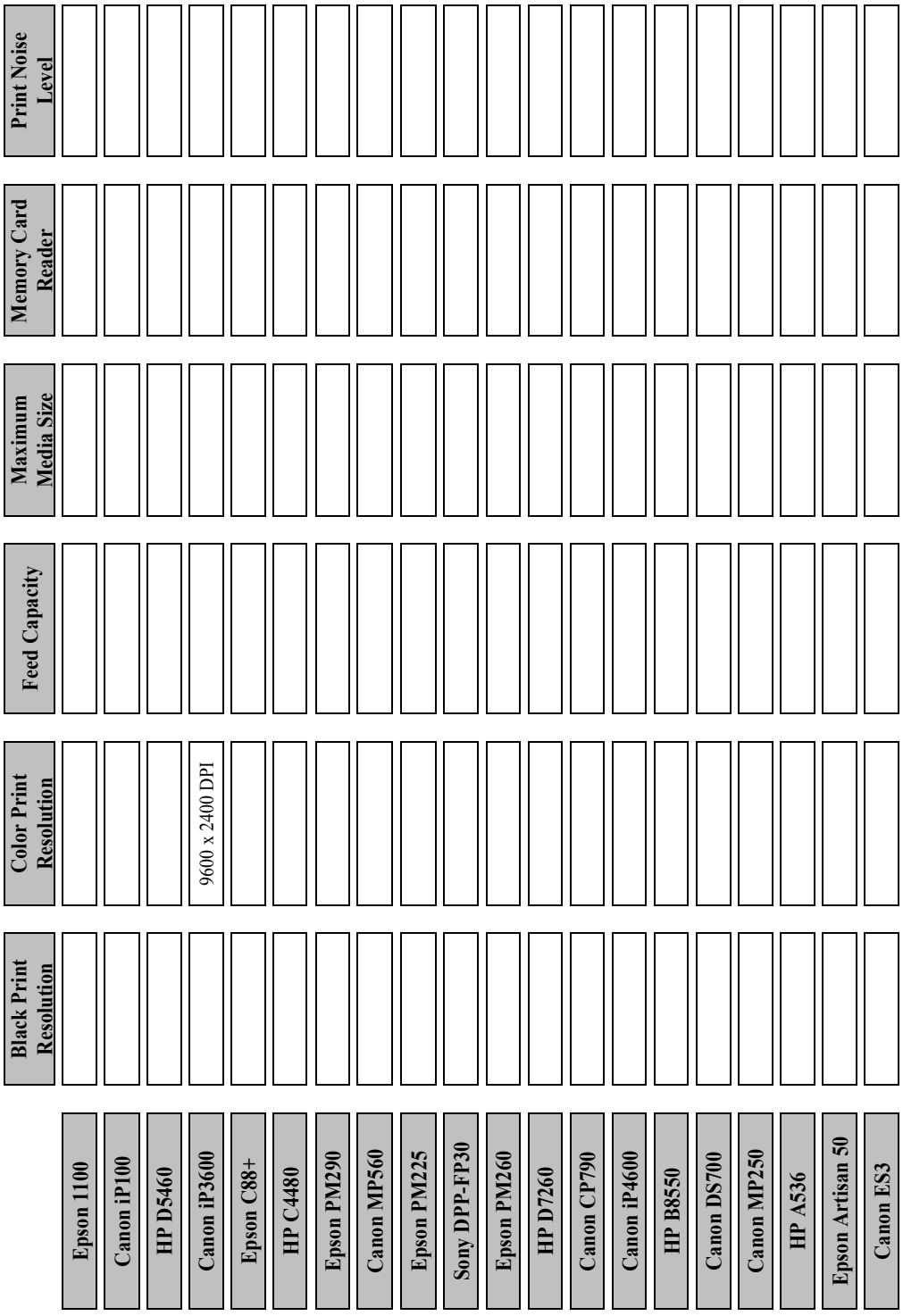

Figure 2. Information grid used in Studies 2a-2c.
Grid depicts open cell corresponding to Color Print Resolution for Canon iP3600 printer. Only one cell was visible at a time.

Upon completion of the background measures, participants in the experimental conditions were presented with a screen stating that that the computer was currently analyzing their responses to the background measure. This screen, which lasted several seconds, was included to add legitimacy to the ensuing false feedback self-efficacy manipulation. Participants in the experimental conditions were then informed that, based on their responses to the measures, the decision would be easy (high self-efficacy condition) or difficult (low self-efficacy condition) for them to make. In reality, this feedback was unrelated to the background variables, and was simply designed to alter confidence levels, based on a similar manipulation of memory self-efficacy developed by Gardiner and colleagues (1997). Participants in the control condition were given no such feedback. All participants then completed the first manipulation check (i.e., self-reported decision-specific DMSE), after which they were asked to select the number of photo printers they wished to choose from, ranging from 4 to 20 options in increments of 4 (i.e., 4, 8, 12, 16, or 20). Participants were then provided with instructions regarding the decision task, including details on how to navigate the information grid. Immediately prior to starting the decision task, participants in the experimental conditions were reminded of their alleged ability to make the decision (participants in the control condition received no such reminder), and all participants completed a second manipulation check. All participants, independent of their reported choice set size preferences, then completed the decision task using the 20-option information grid, and indicated their desired printer. We opted against adjusting the size of the information grid to participants' choice set size preferences because this would have confounded measures of set size preferences and information search. After participants made their decisions, they were checked for suspicion and debriefed.

Participants completed all study components using a desktop computer running E-Prime 2.0 experimental software. The entire experimental session lasted approximately 30 minutes. After data collection was completed for Studies 2a-2c, one participant was randomly selected and received the printer of her choice.

Results

In preliminary analyses, no gender effects were observed, thus gender will not be discussed further. To assess the influence of the self-efficacy manipulation on the dependent measures, I first conducted a multivariate analysis of variance (MANOVA) with condition (low efficacy, high efficacy, control) as the independent variable and self-efficacy (manipulation checks 1 and 2), preferred choice set size, and total information viewed as the dependent variables. The overall effect of condition across the dependent measures was significant, $F(8, 98) = 2.55$, $p < .05$, $\eta^2_p = .17$. Results for each dependent measure are reported below (see also Table 3).

Manipulation Checks. Self-efficacy was measured at two separate times prior to the decision task to ensure that the manipulations were effective. As illustrated in Table 3, participants assigned to the low-efficacy condition reported significantly lower levels of efficacy than the high-efficacy or control condition participants at both time points. Participants in the high-efficacy and control conditions reported equally high efficacy levels at both time points.

Table 3. Dependent measures by condition in Study 2a.

	Condition				
	Low Efficacy	High Efficacy	Control	ANOVA	
Variable	*M (SD)*	*M (SD)*	*M (SD)*	*F*	η^2_p
Self-Efficacy 1	62.2[a] (15.5)	75.1[b] (14.4)	78.0[b] (10.5)	*6.86***	.21
Self-Efficacy 2	68.2[a] (14.9)	78.1[b] (12.1)	79.5[b] (11.9)	4.00*	.14
Preferred Choice Set Size	8.2[a] (3.8)	13.8[b] (5.5)	13.8[b] (6.3)	6.57**	.21
Information Viewed	125.4[a] (77.6)	195.3[b] (105.8)	183.9[ab] (92.6)	2.95[t]	.10

Note. Different superscript letters indicate significantly different ($p < .05$) means within rows. n = 18 for each condition.
[t]$p < .1$, *$p < .05$, **$p < .005$.

Choice Set Size Preferences and Information Seeking. As predicted, participants in the low-efficacy condition preferred significantly fewer options than those in the control or high-efficacy conditions (see Table 3). The other two conditions preferred equivalent amounts of choice. Also consistent with my hypothesis, participants in the low-efficacy condition viewed significantly fewer pieces of information within the decision grid than participants in high efficacy condition, and marginally less information ($p = .06$) than participants in the control condition (see Table 3).

*Covariate Analyses***.** To control for the effects of component-based DMSE, maximizing, motivational priorities, and personality factors on the dependent measures, I conducted a Multivariate Analysis of Covariance (MANCOVA) using the background measures as covariates. Inclusion of these covariates did not significantly alter the MANOVA results reported in Table 3, and there were no significant effects of the covariates in the MANCOVA.

Discussion

As predicted, participants whose self-efficacy levels were experimentally reduced desired fewer options and viewed less information relative to individuals whose efficacy levels were enhanced or unaltered. These results suggest that self-efficacy influences people's motivation to seek complex decision tasks as well as the thoroughness of their information search patterns.

Contrary to my predictions, however, no significant differences were observed in any dependent measures between the high-efficacy and control conditions. This may reflect high default confidence levels among college students with respect to making decisions in the target domain (photo printers). Alternatively, it may be the case that the high efficacy induction was consistent with participants' default expectations regarding the task difficulty, and thus had little effect on their choice set size preferences and decision process. Future studies incorporating more challenging decision domains and/or participants with lower baseline self-efficacy might avoid these limitations.

Importantly, it should be noted that, due to random assignment, there is no reason to assume that participants in the experimental conditions differed in their actual decision-making abilities. This perspective is supported by the finding that including covariates in the analyses did not significantly alter the pattern of results. Thus, differences in decision-making across conditions appear to be the product of efficacy manipulations alone.

Study 2b: Maximizing and choice set size preferences

Study 2b was conducted to examine the extent to which maximizing directly influences choice set size preferences. The results of Study 1 indicated that

maximizing is correlated with choice set size preferences at the inter-individual level, as previously demonstrated by Dar-Nimrod and colleagues (2009). However, no prior study has examined this relationship using experimental inductions of maximizing versus satisficing. In Study 2b, participants received instructional manipulations designed to induce either maximizing or satisficing. After this manipulation, participants completed the same decision among photo printers used in Study 2a. I predicted that participants who were induced to maximize would desire more choice and seek more information than participants who were induced to satisfice.

Method

Participants

Fifty-one undergraduate students (58.8% female, aged 18-24, $M = 20.0$ years) were recruited to participate in this study in exchange for course credit. Seven participants from the experimental conditions were excluded from the data analyses because they failed to affirm the instructional manipulations (final N = 44).

Measures and Procedure

Participants in Study 2b completed the exact same background measures and experimental protocol used in Study 2a with the following exceptions: Instead of receiving false feedback regarding their ability to complete the decision task, participants in the experimental conditions were asked to affirm a set of instructions designed to induce either maximizing or satisficing.[12] Also, the manipulation checks

[12] The affirmation-based induction was used because a previous attempt to induce maximizing versus satisficing was unsuccessful in a pilot sample (N = 52). In the pilot study, participants in the maximizing condition were told that there was a high degree of variability between the options, and that they should consequently attempt to select the best possible printer. By contrast, participants in the satisficing condition were told that the options were relatively equivalent, and that they should consequently try to choose one that was simply "good enough." This pilot study found no differences between the experimental conditions for any of the dependent measures.

for the self-efficacy manipulation were replaced with manipulation checks for maximizing.

After completing the set of background questionnaires (see Study 2a for details), participants assigned to the maximizing condition were instructed to try to choose the "best possible" printer, while participants assigned to the satisficing condition were instructed to choose a printer that was simply "good enough" for them. Immediately after receiving the instructional manipulation, participants in the maximizing and satisficing conditions were then asked to affirm their intentions to maximize or satisfice, respectively, on a 7-point Likert-type scale (1 - Strongly Disagree to 7 - Strongly Agree). Participants whose responses on the scale were 4 or below (indicating a lack of agreement) were excluded from data analyses (see below).

Participants then completed the same decision task used in Study 2a (excluding self-efficacy ratings). After completing the decision task, participants reported the extent to which they maximized versus satisficed using a 7-point Likert-type scale (from 1 - *I tried to select an option that was simply 'good enough'* to 7 - *I tried to select the best possible option)*. After completing this manipulation check, participants were debriefed and thanked for participating.

Results

To investigate the effect of the maximizing manipulation on the dependent measures, I first conducted a multivariate analysis of variance (MANOVA) with condition (maximizing, satisficing, control) as the independent variable and self-reported maximizing, preferred choice set, and total information viewed as the dependent variables. The overall effect of condition across the dependent measures was not significant, $F(6, 80) = .273$, *n.s.*

Table 4. Dependent measures by condition in Study 2b.

	Condition			ANOVA	
	Satisficing (n = 12)	Maximizing (n = 15)	Control (n = 17)		
Variable	*M (SD)*	*M (SD)*	*M (SD)*	*F*	η^2_p
Preferred Choice Set Size	10.3 (3.6)	11.2 (5.9)	11.8 (5.9)	.25	.01
Information Viewed	192.5 (189.2)	119.9 (77.5)	169.8 (91.5)	1.29	.06
Reported Maximizing	4.9[a] (1.8)	5.9[b] (1.0)	5.9[b] (1.0)	2.97[t]	.13

Note. Within rows, different superscript letters indicate significantly different means ($p < .05$). Participants reported maximizing following completion of the decision task.
[t]$p < .1$, *$p < .05$, **$p < .005$.

As depicted in Table 4, participants in the satisficing condition reported marginally less maximizing (i.e., greater satisficing) relative to participants in the maximizing and control conditions. Contrary to my hypotheses, there were no significant differences in choice set size preferences or information seeking among experimental conditions. Including the covariate measures in a MANCOVA did not significantly alter the pattern of results reported in Table 4 below, and there were no significant effects of the covariates on choice set size preferences or information seeking.

Discussion

Results of Study 2b did not support my hypothesis that experimentally induced maximizing would increase preferences for choice and information seeking relative to inductions of satisficing. There were no significant differences among conditions for either choice set size preferences or information seeking. If anything, participants who

were instructed to satisfice actually viewed *more* information (though not significantly so) than those who were told to maximize. Furthermore, covariate analyses indicated that self-reported habitual maximizing, assessed prior to the decision task, was not significantly associated with either behavioral measure of decision making (i.e., choice set size preferences or information seeking).

These null results are surprising in light of evidence from Study 1 and earlier research by Dar-Nimrod and colleagues (2009) that maximizing is correlated with preferences for larger choice sets. However, those studies examined maximizing from an individual differences perspective and did not attempt to manipulate the construct. Given that maximizing is typically conceptualized as a relatively stable habitual tendency, as opposed to a situation-dependent factor (Dar-Nimrod et al., 2009), it may be resistant to experimental manipulations. Results of Study 2b, combined with results from a previous pilot study (see Footnote 12), support this interpretation. On the other hand, covariate analyses in Study 2b did not find evidence linking inter-individual differences in maximizing to choice set size preferences, contrary to the findings of Study 1. These inconsistent results raise the possibility that the relationship between maximizing and choice set size preferences may depend on the specific decision context.

Although the results of Study 2b are equivocal with respect to the relationship between maximizing and choice set size preferences, they are relatively clear with respect to the overarching research question: Maximizing is not a promising candidate mechanism for experimentally altering age differences in choice set size preferences or information seeking.

Study 2c: Motivational priorities and choice set size preferences

Study 2c was conducted to test the causal link between motivational priorities

(i.e., regulating emotion versus seeking information) and choice set size preferences. Participants completed the exact same decision as in Studies 2a and 2b; however, in Study 2c they received instructional manipulations designed to induce the pursuit of either information-seeking or emotion-regulation goals. It was hypothesized that participants who were induced to pursue information-seeking goals would desire more choice and seek more information than individuals who were imbued with emotion-regulation goals.

Participants

Twenty undergraduate students (50% female, aged 19-24, $M = 20.2$ years) were recruited to participate in this study in exchange for course credit.

Measures and Procedure

Study 2c was identical to Studies 2a and 2b except for the following differences: After completing the background (covariate) measures and being informed that they would be making a decision among photo printers, participants received instructions designed to alter their motivational priorities during the decision task. Specifically, participants were randomly assigned to receive instructions designed to elicit either emotion-regulation goals (i.e., emotion-focus condition) or information-seeking goals (i.e., information-focus condition) Adapting instructions developed by Löckenhoff and Carstensen (2007), participants in the emotion-focus condition were instructed to focus on their feelings throughout the task, while participants in the information-focus condition were instructed to focus on the specific facts and details. Participants in the control condition received no such instructions. All participants then completed the same decision task as in Study 2b. For participants in the experimental conditions, the instructional manipulations were repeated after 10

pieces of information were viewed in the decision grid. Finally, as a manipulation check, participants were asked to report how much they focused on their "feelings about the options" (emotion focus) and the "details of the options" (information focus) on a 7-point Likert-type scale (1 - not at all to 7 - very much).

Results

Contrary to my hypothesis, participants who were induced to focus on their emotions desired *more* choice relative to those who were instructed to focus on the available information, $t(18) = 2.36$, $p < .05$ (see Table 5 below). No significant differences emerged between the two experimental conditions on any other dependent measures, including the information-focus versus emotion-focus manipulation checks. Including the covariates in the analyses did not alter the pattern of results depicted in Table 5 with the following exception: Post-hoc tests indicated that participants in the emotion-focus condition reported marginally greater emotion focus (M = 5.3, SE = .63) than those in the information-focus condition (M = 3.3, SE = .63), $p < .10$. None of the covariates significantly predicted choice set size preferences or information seeking in the MANCOVA.

Table 5. Dependent measures by condition in Study 2c.

	Condition			
	Emotion Focus (n = 10)	Information Focus (n = 10)		
Variable	*M (SD)*	*M (SD)*	*t*	*d*
Preferred Choice Set Size	14.0 (6.6)	8.0 (4.6)	-2.36*	1.05
Information Viewed	103.6 (36.7)	106.7 (72.5)	.12	.05
Feeling Focus	4.4 (2.3)	4.2 (1.8)	-.22	.10
Detail Focus	5.6 (1.4)	5.3 (1.3)	-.50	.22

Note. Effect size shown is Cohen's *d*.
*$p < .05$.

Discussion

Contrary to my hypothesis, participants who were instructed to focus on their emotions desired significantly *more* choice than those who were instructed to focus on the available information. However, the two groups did not differ on any other dependent measures. These counter-intuitive results may reflect different patterns of participant reasoning than originally anticipated. For instance, participants in the emotion-focus condition may have held optimistic views of large choice sets and envisioned more positive emotional outcomes for the corresponding decisions. By contrast, participants in the information-focus condition may have focused on the possibility of information overload when considering the larger choice sets and consequently avoided them.

Alternatively, these findings may result from a manipulation that did not work as intended, as indicated by the self-report manipulation check data. Even after controlling for the covariates, the emotion-focus manipulation check was only marginally different between the two experimental conditions, and the information-focus manipulation check did not differ at all across conditions. Thus, it remains unclear whether the manipulation used in this study altered participants' goals, construal of the decision task, or something else entirely. Because the manipulation check did not differ between conditions, we cannot draw conclusions regarding the mechanisms behind the observed differences in choice set size preferences across conditions.

Another important limitation of the present study is the small sample size (N = 20). Because of the small number of participants per condition, it is possible that the present results are due to unbalanced assignment to condition, i.e., participants who

habitually desire more choice may have been disproportionately assigned to the emotion-focus condition.

Irrespective of the mechanism behind these puzzling results, it should be acknowledged that they contradict predictions based on socioemotional selectivity theory. That is, the finding that prioritizing emotional goals leads to an *increased* desire for choice is difficult to reconcile with mounting evidence of age-related shifts toward prioritizing emotional over informational goals in decision-making (Mather, 2006) and preferring smaller versus larger choice sets (Reed et al., 2008). Consequently, in light of the present results, it appears unlikely that manipulating motivational priorities in the present manner across age groups would alter age differences in choice set size preferences or information seeking in the hypothesized manner.

General Discussion for Studies 2a-2c

Results from Studies 2a-2c provide only limited support for the hypothesized influences on choice set size preferences in younger adults. As predicted, manipulations of decision-making self-efficacy in Study 2a significantly affected how much choice participants desired *and* how much information they viewed while making the subsequent decision. In contrast, experimental inductions of maximizing (versus satisficing) in Study 2b did not influence choice set size preferences or information search. Manipulating motivational priorities in Study 2c resulted in differential preferences for choice set sizes, but equivalent information seeking. However, the effects of the experimental manipulation in Study 2c directly contradicted my hypothesis that participants in the emotion-focus condition would desire more choice than those in the information-focus condition. Not only did most of the experimental manipulations not work as expected, but covariate analyses indicated

that inter-individual differences in self-efficacy, maximizing, and motivational priorities were not significantly associated with choice set size preferences in Studies 2a-2c.

In support of the notion that choice set size preferences and information seeking tendencies have common underlying mechanisms, significant correlations were observed between choice set size preferences and information viewed (*Spearman's* $\rho = .24$, $p < .001$) when collapsing across Studies 2a-2c. However, given evidence from Studies 2b and 2c that manipulations can differentially affect choice set size preferences versus information search, it is likely that any potential linkages between the two aspects of decision-making are only modest in size.

Studies 2a-2c possess a number of shared methodological limitations that should be acknowledged. First, the samples in all three studies consisted entirely of undergraduate students, and results may not generalize to other populations, such as older age groups or individuals with more diverse educational backgrounds. Replicating these findings across demographically varied and nationally representative samples is recommended for future research. Second, the studies only examined choice set size preferences for a single consumer decision (i.e., photo printers). This domain was specifically chosen because pilot testing indicated that participants had minimal experience in that choice domain. Thus, it is unclear whether the same pattern of results would extend to other choice domains, including more consequential and/or familiar decisions. Replicating the studies across multiple choice domains is crucial before drawing firm conclusions with respect to the influence of maximizing, motivational priorities, and decision-making self-efficacy on choice set size preferences. In addition, all three studies used a computerized decision grid that artificially constrained access to information one piece at a time. This approach has been widely used in previous research (for a review, see Payne, Bettman, & Johnson,

1993), including multiple studies with age comparisons (for a review, see Mata & Nunes, 2010). Nonetheless, it remains unclear whether results of Studies 2a-2c would generalize to alternative decision paradigms (e.g., in which multiple pieces of information were viewable at one time).

In sum, the only construct that influenced choice set size preferences in the expected direction was decision-making self-efficacy. Consequently, of the three factors explored in Studies 2a-2c—DMSE, maximizing, and motivational priorities—DMSE is the most plausible candidate for experimentally altering choice set size preferences across age groups. In the following chapter I report a study that examined the influence of experimental manipulations of DMSE on age differences in choice set size preferences.

CHAPTER FOUR: EFFECTS OF DECISION-MAKING SELF-EFFICACY ON CHOICE SET SIZE PREFERENCES ACROSS THE ADULT LIFE SPAN

As the 'capstone' study of this line of research, Study 3 was designed to synthesize the developmental perspective of Study 1 with the experimental approach of Studies 2a-2c. The goal of Study 3 was to investigate how older and young adults' choice set size preferences shift when their DMSE is manipulated. As previously stated, results of Studies 2a-2c suggested DMSE as the most promising candidate for manipulating age differences in choice set size preferences. Thus, Study 3 incorporated the same experimental manipulation as Study 2a, but extended it to a different choice domain.

As in Study 2a, participants completed a computerized consumer decision task after receiving instructions designed to increase or decrease their levels of DMSE. However, instead of making realistic decisions among photo printers, participants in Study 3 made hypothetical choices among cars, a domain which has been successfully used in previous studies examining age differences in decision-making (Johnson, 1990; Mather, Knight, & McCaffrey, 2005).

I hypothesized that (1) older adults would prefer fewer options and seek less information than younger adults and (2) age differences in choice set size preferences and information seeking would be mitigated by increasing older adults' DMSE or decreasing younger adults' DMSE.

Participants

One hundred and twenty adults aged 18-90 (M = 46.2 years, SD = 26.0 years; 70% female) participated in Study 3. As depicted in Table 3 below, the sample consisted of sixty-five younger adults (aged 18-37) and fifty-five older adults (aged 60-89). Eighty-five participants were recruited from the Ithaca, N.Y. community to

participate in exchange for monetary compensation. Thirty-five younger participants were recruited from the undergraduate student population of Cornell University to participate in exchange for course credit. All participants in Study 3 also completed Study 1 in a combined testing session. Eight participants were excluded from data analyses because of computer malfunctions and one was excluded because of suspicion over the false feedback manipulation (final N = 111).

Table 6. Participant characteristics in Study 3.

Measure	Younger Adults (n = 65)	Older Adults (n = 55)	t	X^2
Age (years), *M* (SD)	23.7 (6.5)	73.5 (8.8)	-35.26**	
Age range (years)	18-37	60-90		
Socioeconomic Status	3.1	2.92	.67	
Education (Years)	14.6	16.2	-3.17**	
Sex (% female)	67.7%	72.7%		1.18
Hispanic (%)	7.7%	1.8%		2.63
Race (%)				9.94
Caucasian	81.5%	90.9%		
Asian or Pacific Islander	7.7%	1.8%		
African American	6.2%	1.8%		
Other	4.6%	3.6%		

Note. Socioeconomic status measured via self-reports on 5-point Likert-type scale (from 1 - Lower Income to 5 - Upper Income).
**$p < .005$, *$p < .05$.

Measures and Procedure

Study 3 was identical to Studies 2a-2c except for the following differences: Prior to the decision task portion of the study, all participants completed the computerized questionnaire from Study 1, in place of the background questionnaire administered at the start of Studies 2a-2c. This served to enhance the plausibility of the false feedback manipulation. Next, participants were informed that they would be making a hypothetical decision among cars. Participants in the experimental

conditions (high- and low-efficacy) then viewed a computerized message that informed them that the computer was analyzing their responses to the previous questionnaires to determine how easy or difficult the ensuing decision would be. These participants then received the same false feedback manipulations of self-efficacy as in Study 2a, while participants in the control condition received no such feedback. As in Study 2a, participants then rated their DMSE and indicated their preferred choice set size.

Next, participants completed a computerized decision task modeled after the decision task used in Studies 2a-2c, with the following exceptions: Instead of choosing among photo printers, participants selected among "hypothetical" cars labeled with names of rare birds (e.g., "Pipit," "Turaco," and "Xenops"). In reality these cars represented the 20 most common mid-sized sedans sold in the U.S. The cars were defined by the following six attributes: gas mileage, horsepower, turning radius, safety rating, comfort, and dependability. Attribute information was gathered from the car comparison website Edmunds.com, the National Highway Traffic Safety Administration website, and the JD Power and Associates website. The information sheet provided to participants was modeled after the one used in Studies 2a-2c. For instance, safety rating was defined as follows:

> "The safety rating refers to the amount of protection provided by the car to its passengers during a crash. These ratings are provided by the National Highway Traffic Safety Administration, which tests all vehicles in terms of their crash safety and rates them from 1 (Worst) to 5 (Best)."

Other than the choice domain and attributes, the decision task in Study 3 was identical to that used in Study 2a. After participants completed the decision task, they were debriefed and thanked for their participation.

Results

Hypotheses were tested using a two-way multivariate analysis of variance (MANOVA), with age group (younger vs. older) and condition (high efficacy vs. low efficacy vs. control) as independent variables and reported self-efficacy, choice set size preferences, and information viewed as the dependent variables. Results are depicted in Table 7 below.

The main effect of age in the MANOVA was significant, $F(4, 100) = 6.94$, $p < .001$, $\eta^2_p = .22$. Subsequent univariate analyses of variance (ANOVA) indicated that the main effect of age was significant for choice set size preferences, $F(1, 103) = 10.51$, $p < .005$, $\eta^2_p = .09$, and for information seeking $F(1, 103) = 9.53$, $p < .005$, $\eta^2_p = .09$. Consistent with my hypotheses, older adults desired fewer choices ($M = 6.9$, $SD = 4.3$) than younger adults ($M = 10.0$, $SD = 5.5$), and also viewed less information ($M = 97.0$, $SD = 75.9$) than younger adults ($M = 160.4$, $SD = 126.3$).

The main effect of condition in the MANOVA was significant, $F(8, 202) = 2.27$, $p < .05$, $\eta^2_p = .08$, however, the age by condition interaction was not significant, $F(8, 202) = .85$, *n.s.*, $\eta^2_p = .04$. As depicted in Table 7, the main effect of condition was significant for information search, such that participants in the control condition sought significantly more information than those in the experimental conditions. Also, there was a marginally significant condition effect for reported self-efficacy at Time 2. While younger adults' self-efficacy did not differ across conditions, older adults' self-efficacy at Time 2 was significantly lower in the low-efficacy versus high-efficacy condition ($p < .05$) and marginally lower in the low-efficacy versus control condition ($p < .06$).

*Table 7. Dependent measures by age group and condition for Study 3. Pref. Choice = Preferred choice set size; Info. Viewed = Information viewed. Standard deviations in parentheses. Within conditions and rows, different letters indicate significantly different means. **p < .005, *p < .05.*

	Condition/Age Group									ANOVA Results					
	High Efficacy			Low Efficacy			Control			Age		Condition		Age x Condition	
Variable	Younger (n=20)	Older (n=18)	Total (n=38)	Younger (n=21)	Older (n=16)	Total (n=37)	Younger (n=19)	Older (n=15)	Total (n=34)	F	η^2_p	F	η^2_p	F	η^2_p
Self-Efficacy 1	75.3 (18.1)	79.2 (18.5)	77.1 (18.1)	72.4 (20.4)	68.4 (30.4)	70.7 (24.9)	72.4 (19.2)	77.6 (19.7)	74.7 (19.3)	0.18	.00	0.98	0.02	0.49	0.02
Self-Efficacy 2	73.8 (17.8)	78.3 (22.2)	75.9 (19.9)	70.7 (20.3)	58.4 (29.0)	65.4 (24.8)	72.6 (18.2)	75.3 (19.5)	73.8 (18.6)	0.17	.00	3.00^{t}	0.06	1.72	0.01
Pref. Choice	9.2 (5.8)	8.0 (5.1)	8.6 (5.5)	9.7^{a} (5.3)	5.5^{b} (2.9)	7.9 (4.9)	11.2^{a} (5.4)	7.2^{b} (4.3)	9.4 (5.3)	10.51^{**}	.09	0.89	0.02	1.03	0.01
Info. Viewed	128.1 (91.9)	90.7 (66.1)	110.3 (81.9)	148.0^{a} (124.3)	73.9^{b} (59.2)	115.9 (106.9)	205.1^{a} (150.8)	129.3^{b} (94.6)	171.6 (132.9)	9.53^{**}	.09	3.43^{*}	0.06	0.39	0.03

Because the efficacy manipulation was only successful for the older but not for the younger group, I conducted post-hoc analyses that selectively examined condition effects among older adults. Results indicated that older adults in the low-efficacy condition preferred marginally fewer options than those in the high-efficacy condition ($p < .10$), and viewed significantly less information than those in the control condition ($p < .05$). No other comparisons reached significance.

Consistent with the results of Studies 2a-2c, choice set size preferences and information search were significantly correlated across participants (*Spearman's* $\rho = .28$, $p < .005$).

Inclusion of covariates (component-based DMSE, maximizing, emotion-regulation and information-seeking goals, digit-span, vocabulary, and numeracy) did not significantly alter the MANOVA results, and none of the covariates was significantly associated with choice set size preferences or information-seeking.

Discussion

Consistent with my first hypothesis, older adults desired fewer options and viewed less information than younger adults. However, my hypothesis that experimentally manipulating decision-making self-efficacy would alter age differences in choice set size preferences was not supported: There was no significant age by condition interaction for choice set size preferences or information seeking.

Moreover, the self-efficacy manipulation was largely ineffective, as evidenced by the manipulation check data. Younger adults' reported efficacy and decision making did not vary across conditions, and among older adults only the low-efficacy manipulation altered their DMSE and only for one of the two manipulation checks. The lack of an effective DMSE manipulation is important to note because it represents the most plausible and parsimonious explanation for the failure to support my

hypotheses with respect to choice set size preferences and information seeking.

The relative lack of effects of the DMSE manipulation is especially surprising given the results of Study 2a, in which choice set size preferences and information search were significantly altered in younger adults using virtually the same manipulation as the present study. On one hand, the relative lack of effects in the present study may reflect subtle differences in experimental designs between Studies 2a and 3. For instance, participants in Study 2a were told prior to completing background measures that they would help determine the task difficulty. By contrast, participants in Study 3 were only informed of the diagnostic value of the background measures after completing them. Consequently, the efficacy induction in Study 3 may not have been as believable as that in Study 2a. On the other hand, it may be the case that the younger adults were more skeptical of the false feedback than the older adults. In addition, Study 2a used a realistic decision whereas the decision in Study 3 was hypothetical, and the domains differed between the two studies as well (i.e., photo printers in Study 2a versus cars in Study 3). Thus, there are many potential explanations for the discrepant findings between Study 2a and Study 3. Either way, these findings highlight the importance of developing robust manipulations of DMSE in future research.

It should also be acknowledged that the decision task used in Study 3 placed considerable demands on working memory that may have influenced information-seeking behavior. Because participants were only allowed to view one piece of information at a time, the extent to which they sought information was likely constrained by their ability and/or motivation to process and evaluate multiple attributes at once. It remains unclear, therefore, whether the observed age differences would extend to decisions that do not place demands on working memory capacity (e.g., in which all information is visible at once).

One unexpected finding deserves additional discussion: Participants in the control conditions viewed significantly more information than those in the experimental conditions. This may reflect a byproduct of participant skepticism over the false feedback in the experimental conditions—that is, participants in the high- and low-efficacy conditions may have invested less effort in making their decisions (i.e., sought less information) as a reaction to suspicions about the validity of the feedback. This finding, in addition to the results discussed above, reinforces the need for a more effective manipulation of DMSE.

In sum, results of the present study suggest that the effects of DMSE on choice set size preferences are limited to low-efficacy inductions, disproportionately influence older versus younger adults, and are inconsistent with correlational evidence from Study 1. Although the results of Study 3 did not support my hypotheses, they nonetheless hint at the possibility that age differences in preferences for choice and information seeking might be altered by using improved DMSE inductions.

CHAPTER FIVE: GENERAL DISCUSSION

The overarching goal of the present studies was to investigate the driving factors behind age differences in choice set size preferences. On the one hand, the studies were successful in replicating previously observed age differences across domains and measures: Older adults preferred fewer options than younger adults, whether choice set size preferences were assessed via self-report measures across multiple decision domains (Study 1) or via behavioral measures for a single decision domain (Study 3). In addition, results of Study 1 demonstrate a linear relationship between age and choice set size preferences, as previously reported by Rozin and colleagues (2006). Thus, the present research provides valuable replication and extension of previous research findings on age differences in choice set size preferences.

In contrast to the clear evidence of age differences in choice set size preferences, the underlying mechanisms remain opaque. The three studies provide only mixed—if not contradictory—evidence for the hypothesized roles of decision-making self-efficacy, maximizing, and motivational priorities in choice set size preferences. Study 1, which incorporated a survey format, suggested that, of the three potential mediators, only maximizing was related to choice set size preferences—and only weakly so. In turn, results of Study 2a suggest that younger adults prefer more choice when they are induced to feel higher DMSE (consistent with my hypothesis) or pursue emotion-regulatory goals (counter to my hypothesis), respectively. By contrast, experimental manipulations of maximizing versus satisficing had no effect on choice set size preferences in Study 2b. Finally, Study 3 failed to provide clear evidence that age differences in choice set size preferences can be altered via manipulations of DMSE. I will now discuss the specific implications of these results and future research directions in more detail.

Self-efficacy and Choice Set Size Preferences. Results of Studies 1, 2a, and 3 add

to the limited research on the role of self-efficacy in decision making. Whereas prior research found that high DMSE was associated with a preference for more complex decisions (Tabernero & Wood, 2009), Study 2a extended these findings to preferences for increased choice. In addition, prior studies demonstrated associations between higher DMSE and preferences for complex versus simple decisions (Tabernero & Wood, 2009) and increased information seeking (Seijts et al., 2004). Study 2a replicates these effects in the context of a single study using an experimental design and an incentive-compatible choice task, and suggests that the effects of DMSE may extend to decisions with real consequences as opposed to purely hypothetical laboratory tasks. Study 3 is also the first known study to implement an experimental approach to investigating the role of DMSE in decision-making across age groups. Experimental designs are crucial to addressing the potential influence of age-related confounds.

Results from Study 2a (and to a lesser extent Study 3) are all the more surprising in that the correlational data collected in Study 1 suggest that DMSE is not significantly associated with choice set size preferences. These discrepant results may stem from any number of significant methodological differences between the studies. For example, reliance on self-report versus behavioral measures of choice set size preferences (Study 1 vs. Studies 2a & 3), hypothetical versus incentive-compatible choices (Studies 1 & 3 vs. Study 2a), and natural variations in DMSE versus experimental manipulations (Study 1 vs. Studies 2a & 3) may all have contributed to the inconsistent pattern of results. These findings reinforce the importance of using converging methodological approaches in future research in this area.

As previously discussed, the one-sided effects of DMSE manipulations observed in the present studies (i.e., lowering DMSE but not increasing it) highlight the need for robust manipulations to study this construct in relation to decision-making tendencies.

Crucially, because decision-making self-efficacy, like other self-efficacy judgments, represents a characteristic of the person instead of the task per se (Bandura, 1997), the limitations of the present manipulations may stem from their emphasis on task characteristics (i.e., manipulating perceived abilities to perform a specific task) and their use of false feedback. Alternative, person-based approaches which alter peoples' confidence in their abilities in a manner that is more independent of the target decision task—for instance via training across a variety of decision tasks—may prove more effective.

Maximizing and choice set size preferences. Consistent with my hypothesis, maximizing was correlated with choice set size preferences in Study 1. However, experimental manipulations of maximizing versus satisficing had no significant effects on choice set size preferences or information-seeking in Study 2b. At first glance, the lack of experimental effects of maximizing on choice set size preferences observed in Study 2b appears to contradict the findings of Study 1 and earlier research by Dar-Nimrod and colleagues (2009). However, this discrepancy can be explained in several ways. First, as illustrated by the results of Study 2b (and the accompanying pilot study), maximizing may be a relatively stable trait that is resistant to manipulation. Quasi-experimental designs, as used by Dar-Nimrod and colleagues (2009) may therefore be superior to experimental manipulations when examining the role of maximizing in decision making. Alternatively, it may be the case that the effects of maximizing on choice set size preferences are best captured in real-world contexts (e.g., Dar-Nimrod et al., 2009). Thus, the hypothetical context (Study 1) and incentive-compatible but laboratory-based context (Study 1b) in which choice set size preferences were measured, may not be ideal for assessing the role of maximizing.

Motivational priorities and choice set size preferences. Neither Study 1 nor Study 2c supported the hypothesized role of motivational priorities in choice set size

preferences. Study 1 found no correlation between self-report measures of choice set size preferences and emotion-regulation versus information-seeking goals. In part, this may be due to limitations in the novel and unvalidated measure of goal priorities employed in this study. Study 2c suggested counterintuitive effects of motivational manipulations: Participants who were encouraged to pursue emotion-regulatory goals desired *more* choice than those who were instructed to pursue information-seeking goals. On one hand, these results may be the product of a relatively small sample size (n = 10 per condition), which renders any conclusions drawn from the data tentative at best.

On the other hand, if we assume that the findings represent actual effects (and not random noise), several substantive explanations can be offered. As previously discussed, there are multiple pathways by which emotion influences decision making and, depending on which aspect of emotion participants were focused on, the manipulations of motivational priorities may have had different effects on decision behavior. On the one hand, participants may have focused on their emotional states during the experiment. If they were in relatively positive moods, these participants would have desired larger choice sets because positive affect increases variety-seeking (e.g., Kahn & Isen, 1993). On the other hand, participants may have focused on affective appraisals of the choice sets. For instance, if participants in this study (undergraduate students) held relatively positive views of the consequences of choice, and they may have selectively focused on the expected benefits (e.g., with respect to satisfaction) of larger choice sets when they were instructed to focus on their feelings. Future research might benefit from systematically varying which aspect of emotion individuals focus on (e.g., emotional states versus appraisals) and assessing the impact on choice set size preferences and decision making.

Mental representations of choice sets

Another important issue for future research concerns the mental representations of choice sets and decisions. That is, how were people conceptualizing the consequences of differently sized choice sets? As implied by the conceptual framework of the present research, there are several possibilities: First, participants may have been assessing the extent to which different choice sets would tax their ability to make effective decisions, consistent with a self-efficacy perspective. Alternatively, they may have pondered which choice set would best enable them to achieve their goals, whether those involved selecting the best possible alternative (i.e., maximizing) versus one that was simply good enough (i.e., satisficing), or seeking information versus regulating their emotions.

It is difficult to directly address the question of mental representations about choice sets because of the quasi-inferential approach used in the present studies. For instance, in the laboratory-based studies (2a-3) I manipulated participants' efficacy (Studies 2a & 3), decision strategies (Study 2b), or goals (Study 2c) and assumed that any ensuing differences in decision behavior across experimental conditions reflected conscious, deliberate responses to these manipulations. However, participants' thought processes at the time of selecting a choice set were not directly or explicitly assessed. Because representations of choice sets and the decision task may vary depending on age and other individual difference characteristics, it may be valuable to directly measure these representations. Future studies incorporating a real-time thought-listing component might shed more light on what is actually going through older versus younger adults' minds when they select among choice sets of varying size.

Covariates of Choice Set Size Preferences

Across all of the laboratory studies, individual difference measures of self-efficacy, maximizing, and motivational priorities had no effects on choice set size preferences or information seeking. That background DMSE did not affect either aspect of decision-making may have been due to a lack of specificity. Theoretically self-efficacy is thought to vary across situations even within a given domain of functioning (Bandura, 1997). Thus, participants' generalized confidence in their decision-making abilities may not have affected the specific requirements of the computerized decision task used in Studies 2a-3.

The non-significant effect of background maximizing and motivational priorities may reflect the fact that the computerized decision tasks used in Studies 2a-2c and 3 were not affectively salient. Implementing a more vivid decision task, such as by conducting this research in a real-world setting, would address these limitations. Alternatively, the role of motivational priorities may have been obscured by the fact that the novel measure of information-seeking versus emotion-regulation goals was not psychometrically sound. The lack of divergent validity between the two subscales is particularly problematic, given that socioemotional selectivity theory (Carstensen, 2006) posits an orthogonal (and often oppositional) relationship between the two goal categories. Revising this measure to gauge prioritizing one goal *instead* of the other, such as by placing each goal type at opposite ends of a scale, should yield more psychometrically sound data.

Finally, it should be noted that neither short-term memory nor numeracy influenced choice set size preferences in Studies 1 or 3, which argues against interpreting age differences in choice set size preferences as a product of cognitive decline. That is, it appears that older adults do not simply prefer fewer options because of deficits in cognitive abilities. However, future studies might test the role of

cognition more thoroughly by including a wider variety of cognitive measures, including tests of working memory capacity or information processing speed, that have been related to age differences in decision-making (e.g., Finucane & Gullion, 2010).

Implications for future research

Results from the present studies have direct implications for theoretical and empirical approaches to the study of choice set size preferences. First, the combined results suggest that choice set size preferences have multiple, if weak, underlying influences. Some of these factors, such as maximizing, expansive future time perspectives, and positive beliefs about choice, may promote desires for increased choice. For instance, people who held more positive beliefs about the consequences of increased choice also preferred more options compared to people whose views of choice were relatively more negative. On the other hand, factors such as crystallized intelligence (i.e., vocabulary) may act to inhibit preferences for greater choice. However, many factors, such as motivational priorities and short-term memory, were unrelated or inconsistently related to choice set size preferences, despite prior theoretical or empirical support for their role.

Given how few variables were significantly correlated with choice set size preferences in Study 1, it is likely that the latter construct is influenced by factors which were not considered in this research. Future research might benefit from using an even broader approach than that of Study 1 to examine a variety of influences on choice set size preferences across age groups. These factors might include decision-related counterfactual thinking and regret, which appear to decline with age (e.g., Tanius et al., 2009) and are associated with maximizing tendencies across age groups (e.g., Schwartz et al., 2002). Alternatively, it may be useful to consider decision-

related factors that are not necessarily salient to conscious thought. For instance, incidental mood may contribute to age differences in choice set size preferences given evidence that emotional states influence the process and outcome of decision making (for a discussion, see Peters, Hess, Västfjäll, & Auman, 2007) and that older adults experience a greater ratio of positive versus negative emotions in daily life (e.g., Carstensen et al., 2010). Further, the relative lack of consistency between self-report versus behavioral measures and correlational versus experimental findings highlight the importance of converging methodological approaches to studying choice set size preferences, and decision making in general.

One plausible interpretation of the present results is that age differences in choice set size preferences are the product of cohort effects. As previously discussed in Chapter Two, older adults' formative years are likely to have occurred before the proliferation of choice, whereas today's younger adults live in an era of unprecedented choice in almost every domain imaginable (Iyengar, 2010; Schwartz, 2004). Thus, older adults may desire fewer options than younger adults because they are relatively more accustomed to limited choice in decision environments. Future research could rule out this interpretation by adopting longitudinal, as opposed to cross-sectional, designs. Although this may seem, at first glance, a defeatist acknowledgment that research on the developmental mechanisms underlying age differences in choice set size preferences is futile, this is by no means the case. In fact, regardless of whether older adults prefer fewer options than younger adults for developmental versus historical reasons, developing means of altering choice set size preferences among older adults remains a worthy goal because of the potential to optimize decision outcomes, as discussed below.

Implications for real-life outcomes

Results of the present study have implications for public policy involving age differences in decision making. Research evidence suggests that people may avoid consequential decisions such as choosing 401k investments or Medicare Part D prescription drug plans because there are too many options (Boatwright & Nunes, 2001; Reed et al., 2008; Tanius et al., 2009). Although effects of DMSE manipulations among older adults in Study 3 were largely non-significant, the pattern of observed means suggests that it may be possible for robust DMSE manipulations to alter age differences in choice set size preferences in a laboratory setting. Perhaps, then, real-world interventions based on DMSE can be developed to encourage older adults to embrace larger choice sets and remain active and involved in decision making. For instance, assuring older adults that they can successfully manage the daunting task of choosing a prescription drug insurance plan among the dozens of options in Medicare Part D may reduce the number of seniors who fail to enroll in any plan (Reed et al., 2008). Future investigations of the link between self-efficacy and decision-making in real-life decision contexts such as health insurance and retirement plans could help to develop means of identifying and assisting individuals who suffer financial consequences from avoiding such decisions.

Conclusion

Combined results of the three studies presented here present an empirical puzzle: Age differences and intra-individual variability in choice set size preferences are easy to identify, yet difficult to explain. What few factors that appear to influence choice set size preferences are neither robust nor consistent, and effects observed using one methodological approach may not replicate in another. Moreover, the lack of observed mediation effects underscores the possibility that age differences in choice set size

preferences are merely the result of cohort effects. In spite of these ambiguous results, however, one thing is clear: Though age differences in choice set size preferences cannot be *explained* by any of the hypothesized factors, the present results do not rule out the possibility that age differences may be amenable to alteration via decision-making self-efficacy manipulations. Thus, in attempting to answer the question of why older adults want less choice than younger adults, the present research provides tentative answers to the corollary question of how to modify the age gap in choice set size preferences. The answer to the original question, however, remains elusive.

APPENDICES

Appendix A. Component Decision-Making Self-Efficacy Measure

Instructions: For this questionnaire we are interested in how you feel about your ability to successfully complete different aspects of everyday decision-making. For each aspect of everyday decision-making listed below, please indicate how confident you are using the scale provided.

When you are making decisions among different options, how confident are you that you can…	Rating							
	not at all confident	1	2	3	4	5	6	7 very confident
...fully understand information about different options.		1	2	3	4	5	6	7
...prevent yourself from making impulsive decisions.		1	2	3	4	5	6	7
...accurately judge your decision-making abilities.		1	2	3	4	5	6	7
...choose an option that makes you satisfied.		1	2	3	4	5	6	7
...make choices that reflect your beliefs and values.		1	2	3	4	5	6	7
...compare and contrast the information about various options.		1	2	3	4	5	6	7
...choose the most effective decision strategy.		1	2	3	4	5	6	7
...choose the best possible option.		1	2	3	4	5	6	7
...accurately remember information about different options.		1	2	3	4	5	6	7
...think rationally about the different options.		1	2	3	4	5	6	7
...effectively use different decision strategies.		1	2	3	4	5	6	7
...be consistent in your preferences.		1	2	3	4	5	6	7

Appendix B. Motivational Priorities in Decision-Making (MP-DM) Measure

Instructions: For this questionnaire we are interested in what motivates you when you are making everyday decisions. Please think about the decisions you make in your everyday life. While keeping these decisions in mind, please indicate how important each of the factors listed below are to you.

When you are making decisions, how it important is it for you to...	Rating							
	not at all important	1	2	3	4	5	6	7 very important
1) ...be as satisfied as possible with your decisions.	1	2	3	4	5	6	7	
2) ...seek as much information as possible before choosing.	1	2	3	4	5	6	7	
3) ...avoid feeling frustrated.	1	2	3	4	5	6	7	
4) ...think long and hard about the available information.	1	2	3	4	5	6	7	
5) ...focus on your feelings to guide your decisions.	1	2	3	4	5	6	7	
6) ...learn more about the different choice options.	1	2	3	4	5	6	7	
7) ...avoid decisions that may leave you in a bad mood.	1	2	3	4	5	6	7	
8) ...appreciate the full complexity of the available information.	1	2	3	4	5	6	7	
9) ...avoid feeling regret about your decisions.	1	2	3	4	5	6	7	
10) ...focus on the available information to guide your decisions.	1	2	3	4	5	6	7	

Note. Odd-numbered items correspond to emotion-regulation subscale; even-numbered items correspond to information-seeking subscale.

Appendix C. Beliefs About Choice (BAC) Measure

Instructions: People make many decisions in their everyday lives. For some everyday decisions, there are many options to choose from, while for other decisions there are only a few options. In this questionnaire we are interested in what you think are the consequences of having more versus fewer options when you make decisions. For each statement below, please indicate how much you agree or disagree using the scale provided.

In general, having more versus fewer options means that...	Rating							
	strongly disagree	1	2	3	4	5	6	7 strongly agree
1) ...I will be able to think more clearly and easily about the decision.		1	2	3	4	5	6	7
2) ...I will make an objectively worse decision. (R)		1	2	3	4	5	6	7
3) ...I will be more motivated to choose one of the options.		1	2	3	4	5	6	7
4) ...I will be more confident in my decision.		1	2	3	4	5	6	7
5) ...I will feel more regret about my decision. (R)		1	2	3	4	5	6	7
6) ...I will feel more frustrated while making a decision. (R)		1	2	3	4	5	6	7
7) ...I will have to spend more effort making a decision. (R)		1	2	3	4	5	6	7
8) ...I will be more satisfied with my decision.		1	2	3	4	5	6	7

Note. Reverse-coded items designated with (R).

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