

POSITIVE AFFECT PROVIDES FUNCTIONAL BENEFITS IN INTERTEMPORAL
DECISION MAKING BY ENHANCING COGNITIVE FLEXIBILITY

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Intertemporal decision making has important implications for consumer welfare and well-being, since poor decisions can lead to problems of self-control, excessive consumer debt, or other forms of financial distress. Prior research suggests that directly changing an individual's cognitive mindset can influence their intertemporal decision making. Drawing on prior research suggesting that positive affect increases cognitive flexibility, in this research I suggest that mild positive affect can change an individual's way of thinking to that of an open and flexible mindset. More specifically, I propose that positive affect facilitates elaborate thoughtful processing of intertemporal options and appraisal of the decision situation in a more integrative and flexible manner, and thus it provides functional benefits in consumers' intertemporal decision making.

In that theme, I examine three specific issues in individual papers. First, Chapter 2 examines the influence of positive affect on consumers' intertemporal preferences and the underlying processes. I demonstrate that, under positive affect, consumers are more willing to wait for sufficiently large delayed rewards and less likely to discount the value of rewards over waiting time. Chapter 3 considers the interaction of positive affect and cognitive mindset in forming intertemporal preferences, both of which have been shown to influence intertemporal preferences independently. The results in Chapter 3 suggest that positive affect can enable people to hold back from the maladaptive influence of low-level mindset in intertemporal choice situations. Finally, Chapter 4 investigates the influence of positive affect on consumers' budget estimation for the near and the distant future. I show that positive affect can reduce

budgeting bias by helping people think of budget estimates in a more decomposed, concrete way with an integrative perspective. The findings further suggest that the cognitive flexibility facilitated by positive affect promotes thinking in a broader perspective, but it does not lead to cursory or careless decision making. Together, this research offers important implications not only for consumers, but also for managers and public policy practitioners who want to create positive behavioral change among consumers.

BIOGRAPHICAL SKETCH

Jin Seok Pyone was born in Korea. She studied English Language and Literature at Ewha Womans University. After getting her B.A., she worked for Kookmin bank in Seoul, Korea, for about four years. Then, she took two years off from work and moved to Champaign in Illinois to explore a new world and pursue her M.S. in Advertising at the University of Illinois at Urbana-Champaign. After getting her M.S., she debated a bit whether to go back to work or to pursue her Ph.D. in the States. She chose to study more, and since then she has stayed in Ithaca, studying positive affect at Cornell University.

To my mom and dad who gave me unconditional love and support
and to Alice who taught me so much about rigorous scientific research

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I am deeply grateful to all of my committee members. First of all, I wish to thank Professor Doug Stayman, who kindly stepped in to co-chair my committee and finalize my degree after Alice's passing. Although he was extremely busy with his job, he willingly took on the responsibility of being my new chair. I really appreciate his help. I would also like to thank my two other wonderful committee members, Professors David Dunning and Dan Benjamin, for their ongoing guidance and warm support. Professor Dunning was willing to spare his precious time for me to discuss my situation and concerns when I had no one to turn to when Alice passed away. It helped me so much as I went through difficult times. Professor Benjamin is one of the nicest people that I have met at Cornell. Although he was on leave during the last year of my PhD, he always responded very quickly to the questions that I would email to him, and was always willing to offer me help. Both Dan and David are incredibly intelligent and also kind-hearted. I feel so lucky to have met them at Cornell, and to have had them on my committee. I am also grateful to other Johnson faculty members, including Professors Julia D'Souza, Vithala Rao, Young-Hoon Park, Sachin Gupta, Manoj Thomas, and Eugenia Wu, who shared my sadness and supported me in the absence of Alice.

Pursuing a PhD is naturally a selfish but lonely process, for which I had to give up many things in life. However, one thing that made it worthwhile is that I made some good, genuinely nice friends here. I was always so serious and focused on my research, which made me spare very little time for my friends. In spite of that, they always cheered me up and supported me no matter what. When I was angry, they were also angry for me. When I was bored, they were willing to do something fun with me. When I felt bad, they said nice things to me so that I could feel better. I thank my PhD cohorts at Johnson School and Cornell for their friendship, and especially thank Kristi and Mike for hanging out with me, laughing at my silly jokes, and liking me as I am. They all made this long PhD journey less boring and less lonely.

Lastly, I would like to express my deepest gratitude to Alice, who shared her profound

knowledge and wisdom with me throughout my years in graduate school. There are a few things that I really miss and respect about Alice. First, she was by far the most knowledgeable person that I have ever met. She was like a walking dictionary: if you asked any questions on any prior research, she always had an answer for you. Not only that, she would give you the very best, well-organized answer. It is amazing how much she knew, and further she enjoyed sharing her knowledge with people. I really miss the intellectual and fun meetings with her. Also, she was intrinsically interested in learning new things and finding truth in rigorous research. She didn't work in pursuit of more publications or more fame. She deeply cared about advancing knowledge in the field. I see that it is becoming more and more rare to find these kinds of true scholars. I remember that, although she was very ill, she came to work until the very last moment as long as she had a little bit of energy. Observing her really inspired me. She didn't compromise the quality of her work whatsoever. She was very strict in terms of the way we conducted research and it often demanded substantial time and effort to complete a project, which gave me little time for fun outside of school. But in retrospect, I've learned so much from the experience, and my PhD years might be the only time that I could afford such slow, hands-on learning. I believe that the experience will be a valuable asset for my academic career. One thing that I am really thankful for her is that she had great faith in me (probably more than myself) and told me that I have unlimited potential. That was the best compliment that I have ever received, and I hope that someday I can meet her expectations. I regret that I didn't have a chance to deliver my heartfelt gratefulness and respect to Alice properly when she was alive. Hopefully, I can repay her by continuing rigorous research without forgetting how much I enjoy it, like she did.

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CHAPTER 1

INTRODUCTION AND REVIEW ON POSITIVE AFFECT AND COGNITIVE FLEXIBILITY

In the field of marketing and consumer behavior, much of the prior research is devoted to understanding consumers' preferences and choices, as well as how they make decisions. This research examines when and why consumers choose certain products over others, and how to change their preferences and choices. Oftentimes, the research focuses on the problematic side of consumer behavior; identifying various biases that consumers show in decision making, or things that trigger suboptimal behavior like impulsive decision making or loss of self-control. Although this research deepens our understanding of consumer behavior, it does not say much about how to change consumers' behavior in a more constructive way for their own good. While many of marketing studies offer suggestions for changing consumers' behavior, they seem to be primarily concerned with managerial implications: changing consumers' preferences and choices in order to help managers promote their products more successfully.

In recent years, however, there has been increasing interest in consumer welfare and well-being among researchers in marketing as well as in other disciplines. To address the growing interest in improving the quality of life of the general public, now seems to be the time to extend the focus of marketing research beyond simply understanding consumers' behavior to changing it in a more adaptive and beneficial way. In this dissertation research, I take a functional approach and examine ways to improve the quality of consumers' decisions, particularly in the domain of intertemporal decision making.

Intertemporal decision making concerns making a choice between options offered at different points in time, or making decisions for now and later. It affects consumer welfare since poor decisions can lead to overspending, excessive consumer debt, and other problems of self-control and financial distress. Thus, intertemporal decision making has significant real life implications, and has been of great interest to researchers across many fields including marketing, psychology and economics. So far, this research has primarily focused on identifying people's inconsistent preferences over time, or their inconsistent discounting of future rewards over time (e.g., Frederick, Loewenstein, and O'Donoghue 2002; Laibson 1997; O'Donoghue and Rabin 1999), which has been generally addressed in the context of self-control problems (i.e., impatience or impulsivity).

Recently, researchers have started to examine ways to shift these intertemporal preferences, and suggest that changing the way people think about the situation (cognitive mindset) can influence their intertemporal preferences (Fujita et al. 2006; Malkoc, Zaiberman, and Bettman 2007). This approach is compatible with the research by Walter Mischel and colleagues on self-control in a broader context. Their research shows that the way people construe a target stimulus or situation greatly influences their ability to delay gratification. Furthermore, they show that the ability to delay gratification in early childhood is associated with positive life outcomes in later years (e.g., Mischel 1973, 1974; Mischel and Baker 1975; Mischel, Shoda, and Rodriguez 1989). In short, an individual's way of thinking or cognitive processing has been shown to play a key role in determining their intertemporal choices.

Prior research proposed directly manipulating an individual's way of thinking as a means to improve intertemporal decision making (Fujita et al. 2006). However, in this research I propose that positive affect can naturally change people's way of thinking, thereby improving consumers' intertemporal decision making. To the best of my knowledge, this is a novel

approach because, in the prior decision making literature, affect (or feelings) tend to be viewed as separate from cognition (e.g., Abelson 1963), often referring to things that trigger “hot” responding (impulsive or careless decision making), which doesn’t involve much deliberative thought (e.g., Loewenstein 1996; Metcalfe and Mischel 1999). However, this reasoning is built on a narrow view on affect, and the role of subtle positive feelings occurring in everyday life warrants more investigation.

MILD POSITIVE AFFECT AS A DETERMINANT OF AN OPEN AND FLEXIBLE MINDSET

Although people often experience mild positive affect every day from little things in life, its impact is often unnoticed and taken for granted compared to that of highly arousing intense emotions. Further, the influence of positive affect is often assumed to be simple and unidirectional in a general, global sense (e.g., seeing the world through rose-colored glasses, or leading to superficial, shallow processing).

However, decades of research on affect demonstrates that everyday positive affect has a dynamic influence on people’s judgments and behavior across a variety of contexts, and its effects are more multifaceted than they initially seem. Research suggests that this is because positive affect improves cognitive processing and fosters flexibility (e.g., Baumann and Kuhl 2005; Isen 2002, 2003, 2007; Isen et al. 1985; Murray et al. 1990). Specifically, it suggests that when people experience happy feelings, dopamine is released in the frontal regions of the brain (e.g., the anterior cingulated region) that are rich in dopamine receptors. These areas of the brain are responsible for complex thinking and working memory, which involves maintaining multiple ideas in mind and switching perspectives purposively (dopamine hypothesis; Ashby, Isen, and Turken 1999; Isen 2009; Subramaniam et al. 2009). Thus, the research suggests that

positive affect facilitates cognitive processing by activating those brain areas, especially when multiple options need to be considered or weighted against one another (see Isen 2007 for a discussion).

The improved cognitive flexibility fostered by positive affect has been demonstrated extensively in a series of cognitive tasks and social behavior, such as categorization (Isen and Daubman 1984), word associations (Isen et al. 1985), creative problem solving (Isen, Daubman, and Nowicki 1987), variety seeking (Kahn and Isen 1993), coping (Aspinwall 2005; Aspinwall and McNamara 2005; Folkman and Moskowitz 2000), self-control (Erez and Isen 2002; Isen 2000, 2007; Isen and Reeve 2005), helping behavior (Isen 1970; Isen and Levin 1972; Isen, Clark, and Schwartz 1976; Isen, Horn, and Rosenhan 1973; Levin and Isen 1975), and intergroup relations (Dovidio et al. 1995, 1998). Based on the accumulated research findings, I have identified a few key concepts and characteristics of the improved cognitive flexibility fostered by positive affect, and their implications for behavior and decision making.

Thinking Outside Of the Box: Processing More in an Open and Flexible Way

Prior research suggests that positive affect cues extensive and diverse material held in memory, creating a more complex and broader context for cognitive activity (e.g., Boucher and Osgood 1969; Bousfield 1944; Isen and Daubman 1984; Isen et al. 1985). Thus, positive affect enables more elaborated and inclusive thinking: People are able to see more aspects of material, have more thoughts about those aspects, and also make more associations to them. Further, people in positive affect are more likely to perceive potential relatedness among items or stimuli (relational thinking) and also to see the material through multiple (non-typical as well as typical) perspectives. In short, positive affect facilitates *processing more about the material, but in an open and flexible way*, which enables *thinking outside of the box*.

These characteristics were first evident in research on categorization. For example, Isen and Daubman (1984) found that people tend to generate fewer but more inclusive (i.e., broader) categories under positive affect than neutral affect. This is because, under positive affect, people are able to think of stimuli in multiple, different ways. Thus they can see how seemingly unrelated items can be related to one another and perceive a relationship between less prototypic exemplars and a target category. This ability to think of material in multiple, especially less typical ways has been associated with creative thinking. Indeed, research found that those who experienced positive feelings, by watching a funny film clip or receiving a small bag of candy, performed better on tasks requiring creative ingenuity, such as Duncker's (1945) candle task and the Remote Associates Test (Mednick, Mednick, and Mednick 1964), than did those in neutral affect (Isen et al. 1987).

Appraising a Situation in a Bigger, Broader Context

The ability to see multiple aspects or meanings of material (an open and flexible way of thinking) has important implications for self-regulation behavior. In situations requiring self-control, where typical responses to salient situational cues (i.e., succumbing to temptation) conflict with a long-term interest, construing the situation in the context of a primary, long-term goal is crucial for successful self-control. According to prior research, positive affect improves self-control in such situations by helping people appraise the situation in a bigger frame and thus allowing them to perceive the functional relationship between their present action and its implications for the future (Aspinwall 1998; Erez and Isen 2002; Gervey, Igou, and Trope 2005; Isen 2000, 2007; Isen and Reeve 2005; Trope and Neter 1994; Trope and Pomerantz 1998). Similarly, positive affect is also beneficial in coping with negative life events, as it helps people reappraise a stressful situation in a positive light. For example, positive affect can facilitate

benefit reminding or downward social comparisons (Affleck and Tennen 1996; Folkman and Lazarus 1988; Wood 1989), as well as problem-solving-oriented coping strategies (Folkman and Moskowitz 2000).

Integrating Multiple Pieces of Information in Decision Making

The elaborated and inclusive cognitive processing fostered by positive affect can be especially beneficial in complex decision making, which requires taking multiple factors and information relating to the decision into consideration. For example, research on medical decision making shows that physicians in a positive affective state make a correct clinical judgment sooner (than those in a control condition) by efficiently integrating relevant information (Estrada, Isen, and Young 1997). Also, studies on negotiation show that individuals in positive affect are more likely to increase the joint benefit in a bargaining task by discovering integrative solutions (Carnevale and Isen 1986). This integration of information among people experiencing positive affect is also observed in visual information processing, specifically in face perception. Johnson and Fredrickson (2005) demonstrate that positive affect improves integrated processing of facial features and this leads to reduction of “the own-race bias” in a face recognition task.

Efficient Context-Dependent Decision Making

Related to the integrated thinking discussed previously, another implication of enhanced cognitive flexibility via positive affect is that its effects are contingent on the context relating to the decision. That is, positive affect does not lead to a global increase or decrease in ratings or behavioral outcomes. Rather, because those experiencing positive affect tend to take multiple aspects of the situation into consideration, their responses and decisions vary

depending on situational or contextual factors, such as the nature of materials, importance of the task, and potential benefit and cost of taking an action in the situation.

For instance, in studies on risk taking, people under positive affect wagered more than those in a control condition when the situation involved a low risk (i.e., when the probability of winning on the bet was high), but they wager less than controls on a high-risk bet (Isen and Patrick 1983). Thus, the influence of positive affect on risk taking depends on the level of risk. This flexible responding among people under positive affect is also observed in situations requiring self-control. For example, although people under positive affect show a greater intrinsic interest in working on an enjoyable puzzle task, when there is a work to be done they voluntarily reduce their time on the puzzle task in order to complete the work task (Isen and Reeve 2005). Thus, under positive affect, people's decisions flexibly change depending on the situational context, which leads to more efficient and optimal decisions for the situation.

IMPLICATIONS OF COGNITIVE FLEXIBILITY FOR INTERTEMPORAL DECISION MAKING: OVERVIEW OF PAPERS

The aforementioned research demonstrates that everyday positive affect changes the way people think about things and make decisions. That is, positive affect fosters an open and flexible way of thinking. While the implications of flexible thinking promoted by positive affect have been widely discussed in terms of basic cognitive processes and social behavior, its implications for marketing, and especially for consumer decision making, have not yet been fully explored. In this research, I aim to fill the gap in the literature by examining the implications of cognitive flexibility enhanced by positive affect in the specific context of intertemporal decision making.

Considering that intertemporal decision making is closely tied to issues concerning consumer well-being (e.g., thoughtless present-biased preferences or self-control problems), and that changing people's cognitive processing can improve their decision making (e.g., Mischel et al. 1989), I expect that mild positive feelings can have a beneficial influence on consumers' intertemporal decision making by changing the way they think about intertemporal options and make decisions. Specifically, I propose that mild positive affect facilitates elaborate thoughtful processing of intertemporal options and appraisal of the decision situation in a more integrative and flexible manner, thereby providing functional benefits in intertemporal decision making.

In that theme, I examine three specific issues: 1) the influence of positive affect on consumers' preferences between sooner-smaller and delayed-larger rewards, 2) the interaction of positive affect and cognitive mindset in forming intertemporal preferences, and 3) the influence of positive affect on consumers' budget estimation for the near and the distant future. In the following chapters, I examine each specific issue in more detail over three individual papers.

Chapter 2 examines the influence of positive affect on consumers' intertemporal preferences and the underlying processes. Results of six studies demonstrate that positive affect enables people to think of intertemporal choice situations in a broader context, and thus people experiencing positive affect take both present and future outcomes into consideration with an integrative perspective, rather than focusing only on either immediate or future options alone. They are therefore less likely to discount the value of rewards over waiting time, and when the delayed reward is sufficiently larger than the immediate one, people under positive affect are more willing to wait for the delayed reward than those in a control condition. The findings support the idea that positive affect enables seeing multiple aspects of intertemporal options and situations (i.e., the cost and benefit of choosing each option) and integrating contextual

details (i.e., the reward difference between the immediate and the delayed option) into decision-making, leading to context-dependent intertemporal choices.

Chapter 3 considers the interaction of positive affect and cognitive mindset in forming intertemporal preferences, both of which have been shown to influence intertemporal preferences independently: While positive affect decreases present-biased preferences, procedurally primed low-level or concrete mindsets increase present-biased preferences. Because positive affect fosters the ability to think flexibly about intertemporal options and situations, I propose that under positive affect, people's intertemporal choices will be less affected by an irrelevant cognitive mindset priming task which constrains their way of thinking. The results of studies support the hypothesis. While priming a low-level mindset increased present-biased preferences under neutral affect, under positive affect the effect of mindset priming was eliminated. Overall, people experiencing positive affect showed greater delay of gratification without being stuck in the procedurally primed mindsets. This finding has important implications because it suggests that, while positive affect facilitates taking contextual factors relating to the decision into consideration, it does not mean that their choices or decisions will be swayed by irrelevant contextual properties, such as procedural context.

Lastly, Chapter 4 investigates the role of positive affect in consumers' budget estimation decisions for the near and the distant future. According to prior research, people tend to underestimate their budgets for the next month, but they are fairly accurate at budgeting for the next year (budgeting bias; Ulkumen, Thomas, and Morwitz 2008). Because positive affect facilitates elaborate processing of intertemporal outcomes with a broader and more integrative perspective, I propose that positive affect can improve consumers' budget planning decisions for the future. Supporting the hypothesis, the results of studies show that positive affect reduces budgeting bias by helping people think of budget estimates in a more decomposed, concrete

way for the next month as well as for the next year, which leads to a decrease in their tendency to underestimate budgets under the month frame. Thus, under positive affect, an individual's budget estimates were less likely to be influenced by the temporal frame of the budget period. This finding further suggests that the cognitive flexibility fostered by positive affect enables thinking in a broader perspective, but it does not lead to cursory or careless decision making.

In conclusion, this research suggests that positive affect provides functional benefits in consumers' intertemporal decision making by changing the way they think about intertemporal options and situations, and make decisions. Not only does the research give a better understanding of consumers' decision making processes, but it also offers ways to improve the quality of decisions. Making a decision in a positive affective state can lead to a more optimal consumer choice or decision, especially for complex matters involving conflicting interests among alternatives, for which considering multiple aspects of the situation and thinking in perspective is crucial. This research also has important implications for managers and public policy practitioners as well. Although most marketing promotion programs rely on consumers' impulsive responses, certain products and services (for example, financial savings products or healthy products that offer benefits in the long term), can be better promoted by having consumers pay attention to and process more information about the delayed benefits. Further, government agencies or public policy practitioners who want to create positive behavioral change among consumers can also benefit from this research. Lastly, it is important to note that these functional benefits come from having a more open and flexible way of thinking engendered by positive affect, rather than affect or emotions per se. Thus, besides mild positive affect, anything that can foster such open and flexible mindset may be able to bring similar functional benefits to consumers. Identifying those potential factors or interventions that can improve cognitive flexibility can be a fruitful area for future research.

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CHAPTER 2

POSITIVE AFFECT, INTERTEMPORAL CHOICE, AND LEVELS OF THINKING: INCREASING CONSUMERS' WILLINGNESS TO WAIT

Consumers often face intertemporal choice situations, which involve timing of receipt of goods or services and changes in value over time. Some may involve a trade-off between taking an immediate smaller gain, versus taking a delayed larger gain. For example, in some cases, consumers can get a small amount of money back through an instant rebate or a larger amount of money back through a mail-in rebate. Other intertemporal choice situations involve the tendency for items to lose subjective value if they are delayed (termed "present bias"). The basic principles underlying the effects we study here apply to many kinds of self-control phenomena, but in this article, we focus primarily on self-control in intertemporal choices: increase in willingness to wait and reduction of present-bias.

Understanding consumers' preferences for timing of receipt of products and ways to reduce impulsivity and increase self-control have been of great interest to many researchers. According to prior research, the way people think about an action or an object can increase or decrease self-control. For example, when people think about an action at a higher level – that is, in terms of its consequences and implications – their self-control is enhanced (Fujita et al. 2006; Vallacher and Wegner 1989). In addition, research has shown that focusing on non-consumatory aspects of tempting stimuli (vs. thinking about tempting, "hot" aspects) can increase delay-of-gratification behavior in children (e.g., Mischel and Baker 1975; Mischel, Shoda, and Rodriguez 1989). That stream of research suggests that self-control can be enhanced through cognitive processes that relate to ways of thinking about the situation and options.

Recent research on affect has suggested that mild, everyday positive affect can also enhance self-control. For example, researchers have found that people in a positive state are more likely to forgo otherwise preferred secondary interests to accomplish a goal (e.g., Gervey, Igou, and Trope 2005; Isen and Reeve 2005; for discussion, see Isen 2007). Also, research using a depletion paradigm (Tice et al. 2007) has shown that positive affect enhanced self-regulation by fostering adoption of an appropriate standard (e.g., Wan and Sternthal 2008). In addition, research has shown that, when a goal is relevant to a person, positive affect decreases goal neglect, the tendency to lose focus on one's primary goal (e.g., Kazen and Kuhl 2005). Together, these lines of work suggest that positive affect can enhance self-control by increasing people's ability to monitor and maintain focus on their chosen goals and standards.

In the consumer domain, research on emotion and self-control has primarily focused on the role of visceral ("hot") factors in impulsive decision making. This literature stream suggests that viscerally stimulating factors lead people to be more shortsighted, present oriented, and impatient (e.g., Li 2008; Loewenstein 1996). However, the role of mild positive affect—which, as noted previously, enhances self-control—warrants further investigation in the consumer domain.

In the current research, we investigate the influence of mild positive affect on self-control in intertemporal choice situations using delay-of-gratification and temporal discounting paradigms that assess change in value with time delay. In addition, we examine some possible cognitive processes that may play a role in such situations. Specifically, we propose that because people in positive affect are cognitively more flexible, and thus better able to take a more comprehensive view of the intertemporal choice situation (i.e., to consider both short- and long-term gains rather than only immediate gains), they are more willing to wait for a better reward.

In the following sections, first, we introduce the concept of present bias, which bears

upon the issue of lack of self-control in intertemporal choice, and briefly review the literature pertinent to the role of cognitive processes and positive affect in such self-control problems. Then, we present six studies testing our hypotheses.

THEORETICAL FRAMEWORK

Present Bias: Loss of Self-control in Intertemporal Choice

Psychologists and behavioral economists interpret a person's loss of self-control or impulsive behavior as being related to a tendency to value immediate rewards over delayed future rewards (e.g., O'Donoghue and Rabin 1999). This is known as "present-biased preference" and is also reflected in "hyperbolic discounting" (e.g., Frederick, Loewenstein, and O'Donoghue 2002). For example, present-biased preference is evidenced when people do not care for a product that will be delivered later as much as for the same product delivered immediately, or when people are willing to pay extra to speed up the delivery of a purchased product. "Hyperbolic discounting" refers to the rate of decline in value, or in amount needed to compensate for a longer delay compared with a shorter delay, wherein the rate of discounting of the value of the delayed reward is greater for shorter time horizons (i.e., temporally near) than for longer time horizons. For example, in one study, people requested \$15 in compensation for a delay of three months in receipt of a supposedly instant prize but \$45 for a delay of one year (Thaler 1981). That is, their requested monthly compensation for a short delay was disproportionately greater (\$5) than for a long delay (\$3.75). Thus, although the amount of premium requested increased with a longer proposed delay, the rate of compensation (the amount for each month of delay) decreased as the length of the delay time increased. In short, people tend to discount the value of rewards set to take place in the future and thus show bias

toward the immediate.

The Role of Cognitive Processes in Self-control

Prior research has suggested that this present-biased preference, and, more broadly, self-control problems, are closely related to the ways people think about the self-control-requiring situation. In other words, people behave impulsively when they are narrowly focused on only an immediate gain, neglecting the implications that their impulsive action has for the future. For instance, according to action identification theory (Vallacher and Wegner 1989) and construal level theory (Fujita et al. 2006), a person thinking about his or her action, along with their larger meanings, motives, and implications (high-level thinking), leads to engaging in planned behavior, whereas low-level thinking (not thinking in perspective) leads to responding thoughtlessly only to salient cues in the situation and thus to relatively greater impulsiveness. Consequently, when people are confronted with a situation in which delay of gratification is desirable, thinking of the situation at a high level can be helpful.

Moreover, specifically with regard to intertemporal choices, recent studies have shown that a person's mind-set or level of construal influences these present-biased preferences. For example, research has suggested that conceptualizing a situation at a high level leads to long-term thinking and greater self-control, and thus to decreased preference for immediate over delayed outcomes (Fujita et al. 2006). Furthermore, Malkoc, Zauberman, and Bettman (2007) suggest that a consumer's mind-set influences subsequent decision making, such that people in abstract mind-sets show a decreased level of present bias in consumption timing decisions.

In another relevant line of research, Mischel, Shoda, and Rodriguez (1989) show that the cognitive representation of tempting rewards underlies self-control processes in preschool children. In their experiments, the children who were led to think about tempting stimuli in

non-consummatory ways (e.g., thinking about a marshmallow as a puffy cloud, or a white moon) delayed gratification significantly longer than those who were led to focus on consummatory aspects of the stimulus (e.g., sweet taste). That is, thinking of a reward in various ways beyond its tempting aspects can promote delay of gratification in children. In short, research suggests that the ability to construe a stimulus or situation flexibly, in multiple ways, plays an important role in self-control.

The Influence of Positive Affect on Cognitive Processes and Self-control

It is noteworthy that the affect literature suggests that positive affect has an influence on cognitive processes that is compatible with what we described in the previous section as being conducive to improved self-control – increased cognitive flexibility, resulting in multiple ways of thinking about stimuli and situations (Fredrickson and Branigan 2005; Isen 2007; Isen, Daubman, and Nowicki 1987; Isen et al. 1985; Staw and Barsade 1993).

For example, a series of studies shows that people in positive affect were more likely than those in neutral affect to categorize nontypical exemplars as members of target categories while not losing sight of the typical ways of categorizing the material (Isen and Daubman 1984). This is because positive affect fosters the ability to conceptualize stimuli in multiple ways, and thus those in positive affect are able to perceive relationships among seemingly unrelated exemplars. Furthermore, research has shown that positive affect improves problem solving (e.g., Erez and Isen 2002; Estrada, Isen, and Young 1997) through this flexible and integrative thinking. This also would follow from the dopamine hypothesis, which suggests that positive affect is associated with release of dopamine into frontal regions of the brain that foster the ability to consider multiple ideas and perspectives (Ashby, Isen, and Turken 1999).

Regarding self-control, positive affect has been shown to influence the way people

understand immediate and future rewards. For instance, positive affect enables people to perceive more connection between their effort and outcomes, which increases expectancy motivation and causes more persistence (Erez and Isen 2002). Similarly, positive affect helps people to recognize a functional relationship between future outcomes and present situations through flexible thinking (Aspinwall 1998; Isen 2007; Taylor et al. 1998), and thus, people in positive affect are able to see how present situations are linked to possible future outcomes and their own effort. Thus, when there is a trade-off between short-term, immediate rewards and long-term gains, people in positive affect consider the long term in addition to the present and are willing to forgo present enjoyment if appropriate. For example, in Isen and Reeve's (2005) studies, participants in positive affect showed greater intrinsic motivation in working on an enjoyable puzzle, but when there was work to be done, they voluntarily reduced their time on the puzzle to complete the boring work task. In addition, Gervay, Igou, and Trope (2005) show that participants in positive affect were more likely to seek negative feedback than were those in a neutral state, if that feedback was useful for their goal (e.g., self-improvement). In summary, positive affect enhances a person's self-control by facilitating thinking of an action or a situation in perspective, along with the context, his or her goals, and implications for the future.

OVERVIEW OF CURRENT STUDIES

On the basis of research showing that positive affect increases self-control through cognitive flexibility, it is reasonable to expect that positive affect will promote self-control in the domain of intertemporal choices as well. In the current research, we propose that, because positive affect enables consumers to think flexibly about more aspects of a situation, including future needs and preferences in addition to present needs, people in positive affect will be more

willing to wait for more desirable later outcomes and will show decreased present bias.

First, in Studies 1 and 2, we examine the influence of positive affect on cognitive processes that have been shown to influence self-control in prior research. Specifically, we test the possibility that positive affect can foster forward-looking, high-level thinking, using the Behavior Identification Form (BIF; Vallacher and Wegner 1989) and the Future Time Perspective scale (Carstensen and Lang 1996). In Study 3, we directly test this forward-looking, high-level thinking using the intertemporal choice paradigm and examining participants' choices between an instant rebate returning a smaller reward and a mail-in rebate returning a larger reward. In Study 4, we further investigate the nature of this high-level thinking promoted by positive affect—specifically, whether it is a heuristic process (e.g., ignoring details and responding only to the amount of money) or an attentive process involving consideration of both immediate and delayed rewards and the practicality and desirability of those rewards. We demonstrate that participants in positive affect are more likely to prefer, and to generate positive thoughts on, the larger delayed reward, but this tendency is also contingent on the larger reward's relative attractiveness compared with the smaller, immediate reward. This effect reflects mindful high-level thinking, not heuristic thinking among people in positive affect. Studies 5 and 6 show the intertemporal preference effects in another way, namely, by examining participants' valuation of products with time delay.

STUDY 1: BEHAVIOR IDENTIFICATION

In Study 1, we assessed level of thinking using the BIF (Vallacher and Wegner 1989), which was developed in the context of action identification theory but is also used for measuring the level of construal (e.g., Liberman and Trope 1998). According to action

identification theory, any action can be identified either at a low level (in terms of how the action is performed) or at a high level (in terms of why the action is being performed, along with a primary goal), and the level of identification is relative and sensitive to contextual or situational cues. The theory suggests that people who think at a high level are less impulsive and more persistent when faced with competing goals than low-level thinkers (Vallacher and Wegner 1987, 1989). Similarly, construal level theory (Trope and Liberman 2003) suggests that high-level construal leads to greater self-control and a decreased present bias (e.g., Fujita et al. 2006). On the basis of the literature suggesting that positive affect increases cognitive flexibility (e.g., Isen 2007) and extends the scope of thinking (e.g., Fredrickson and Branigan 2005), we predicted that positive affect promotes integration of detail and thus foster the ability to conceptualize a situation at a higher level.

Method

Forty-one students (21 in the positive-affect condition) at a large university participated in the experiment in exchange for extra credit toward their course grade. Participants were randomly assigned to either a positive- or a neutral-affect condition. They were told that they would pretest a set of pictures for future experiments and were then presented with 14 either mildly positive (e.g., flowers, puppies, trees) or neutral (e.g., chairs, windows) slides, which, as a set, had been pretested to be different in affect but equivalent in arousal. The slides were displayed on a computer, and each image advanced automatically after exposure of six seconds. After viewing the whole set, participants indicated, on eight seven-point rating scales that asked about different feelings, how the slides had made them feel. Three of the eight items were intended to assess positive affect ("positive-negative," "pleasant-unpleasant," and "happy-sad"; $\alpha = .96$), and we subsequently combined them to create an index of positive affect.

After finishing the affect-manipulation task, participants completed Vallacher and Wegner's (1989) BIF. It consists of 26 items, each presenting a behavior paired with two alternatives: a low-level and a high-level identification. For example, "making a list" can be identified as either "getting organized" (high level) or "writing things down" (low level). Participants were asked to choose only one of the two alternatives as the meaning of each behavior. The number of high-level identifications constituted a participant's BIF score.

Results

Compared with participants in the neutral-affect condition, those in the positive-affect condition reported that the pictures made them feel more positive ($M_{\text{pos}} = 1.43$, $M_{\text{neu}} = 3.05$; $t(39) = 7.15$, $p < .01$). A t-test showed that the participants in the positive-affect condition more often identified behaviors at a high level ($M = 16.19$, $SD = 5.02$) than did participants in the neutral-affect condition ($M = 12.85$, $SD = 4.02$; $t(39) = 2.35$, $p < .05$).

STUDY 2: TIME PERSPECTIVE

Study 2 investigates level of thinking in terms of temporal perspective. This approach was based on two streams of research, construal level theory and socioemotional selectivity theory (e.g., Carstensen 2006). The former suggests that levels of construal are related to temporal perspective, such that thinking of the distant future leads to high-level construal, whereas thinking of the present or near future leads to low-level construal. The latter, socioemotional selectivity theory, indicates that perception of future time plays an important role in motivation, influencing whether people pursue long- or short-term goals. It suggests that people with an expanded (vs. limited) time perspective are more likely to consider the long-

term consequences of their choices rather than only the immediate. We propose that because positive affect enables people to consider multiple factors—future as well as present matters—they are more likely to be future-oriented than those in neutral affect. To converge experimentally on the construct of high-level thinking, in Study 2, we used the future time perspective scale (Carstensen and Lang 1996) to examine the possibility that people in positive affect are more likely to take a future-oriented time perspective.

Method

Fifty students (26 in the positive-affect condition) participated in the experiment in exchange for extra credit toward their course grade. We manipulated and confirmed affect the same way as in Study 1. Following the affect manipulation task and check, participants completed the future time perspective questionnaire. The questionnaire consists of ten items (e.g., “I expect that I will set many new goals in the future [reverse coded],” “As I get older I begin to experience time as limited”), anchored on 1 (“strongly agree”) to 7 (“strongly disagree”). We obtained a future time perspective score by averaging participants’ ratings on these items.

Results

As in Study 1, people in the positive-affect condition reported that the slide set made them feel happier ($M_{\text{pos}} = 1.41$, $M_{\text{neu}} = 3.40$; $t(68) = 8.61$, $p < .01$). As we predicted, people in positive affect reported a more future-oriented time perspective ($M_{\text{pos}} = 5.85$, $SD = .66$; $M_{\text{neu}} = 5.33$, $SD = .73$; $t(68) = 2.68$, $p = .01$). This further suggests that people who are feeling positive affect are more likely to take future outcomes into consideration.

STUDY 3: INSTANT VERSUS MAIL-IN REBATE I

Studies 1 and 2 indicated that positive affect, which has been shown to increase cognitive flexibility, can foster forward-looking, high-level thinking, which itself has been shown to influence self-control. In the following studies, which examine participants' choices and evaluations, we directly test the hypothesis that positive affect increases consumers' willingness to wait for larger rewards and decreases present bias. In Study 3, participants chose between an instant rebate and a mail-in rebate, the latter of which provided for a larger amount of money later. We predicted that participants in positive affect would be more likely to choose the mail-in rebate than those in neutral affect, when the difference in amount to be gained was at least moderate and up to the point at which the difference in amounts was so great that almost everyone would opt for the larger amount.

Method

Ninety-five students (42 men and 4 unidentified) participated in the experiment in exchange for extra credit toward their course grade. In this study, we manipulated affect using words. Participants were told that they would complete a set of unrelated short studies. They were then randomly assigned to either a positive- or a neutral-affect condition and began with a word task designed to carry out the affect manipulation. Each participant was given a booklet containing a set of ten positive (e.g., "music," "fun") or neutral (e.g., "shelf," "verb") words that had been pretested to induce affect and did not differ in other ways. Participants were asked to read each one and write down the first word that came to mind.

After completing the word task, participants received the seemingly unrelated second study titled "Consumer Survey," which involved a hypothetical purchase. They were told that

their favorite model DVD player was now available for the same price at two online stores, but with different promotions, one with an instant rebate and the other with a mail-in rebate. The mail-in rebate, the participants were told, provided a greater amount of money than the instant rebate but would take four to six weeks to be received. Each participant made a choice between the two rebates for five hypothetical choice sets. First, the person chose between a \$25 instant rebate and a \$35 mail-in rebate. After making the first choice, participants completed the remaining four choice sets, which were on the next page. In each, the amount of instant rebate stayed the same (\$25), but the mail-in rebate was set to be \$30, \$40, \$45, or \$50. This design enabled us to observe the pattern of rebate choice over different sizes of rebate differentials.

Results

Manipulation checks. Two judges who were unaware of the hypothesis and the participants' experimental conditions scored the positivity and unusualness of each word associate provided by participants (yes-no). Prior research has shown that people in positive affect are more likely to produce more positive and unusual word associations than those in a neutral state (e.g., Isen et al. 1985), and researchers have used such implicit measures previously as manipulation checks (for discussion, see Isen and Erez 2007). As we expected, participants in the positive-affect condition obtained significantly higher positivity scores ($M_{pos} = 2.15$, $M_{neu} = .05$; $t(46.72) = 15.31$, $p < .001$) and unusualness scores ($M_{pos} = .49$, $M_{neu} = .30$; $t(93) = 2.62$, $p = .01$) than controls.

Choice of mail-in rebate. We performed a chi-square analysis for each of the five choice sets. When the mail-in rebate was worth \$35, the case in which we thought the rebate difference (\$10) would be moderate, there was a marginally significant difference between the affect conditions: In the positive-affect condition, 54.3% of participants chose the mail-in rebate, and in

the neutral-affect condition, 34.7% did ($\chi^2 (1) = 3.72, p < .06$).

When the mail-in rebate was worth \$40 (a \$15 difference), there was a significant difference between the affect conditions. Specifically, those in the positive condition showed a stronger preference (82.2%) for the mail-in rebate than those in the neutral condition (60.4%; $\chi^2 (1) = 5.36, p < .05$).

In contrast, when the mail-in rebate was worth \$30 (i.e., when there was only a \$5 rebate difference), a majority of participants, including those in the positive-affect condition, preferred the \$25 instant rebate (80.9%) to the \$30 mail-in rebate (19.1%). In the positive-affect condition, 26.1% of participants preferred the mail-in rebate, a marginally significantly greater percentage than in the control group (12.5%; $\chi^2 (1) = 2.80, p < .10$); nonetheless, it is clear that when the difference in rebate amounts was only \$5, the majority (73.9%) of the positive-affect participants preferred the instant rebate, just as control participants did. Only when the mail-in rebate amount was large enough did the positive affect group prefer the mail-in rebate.

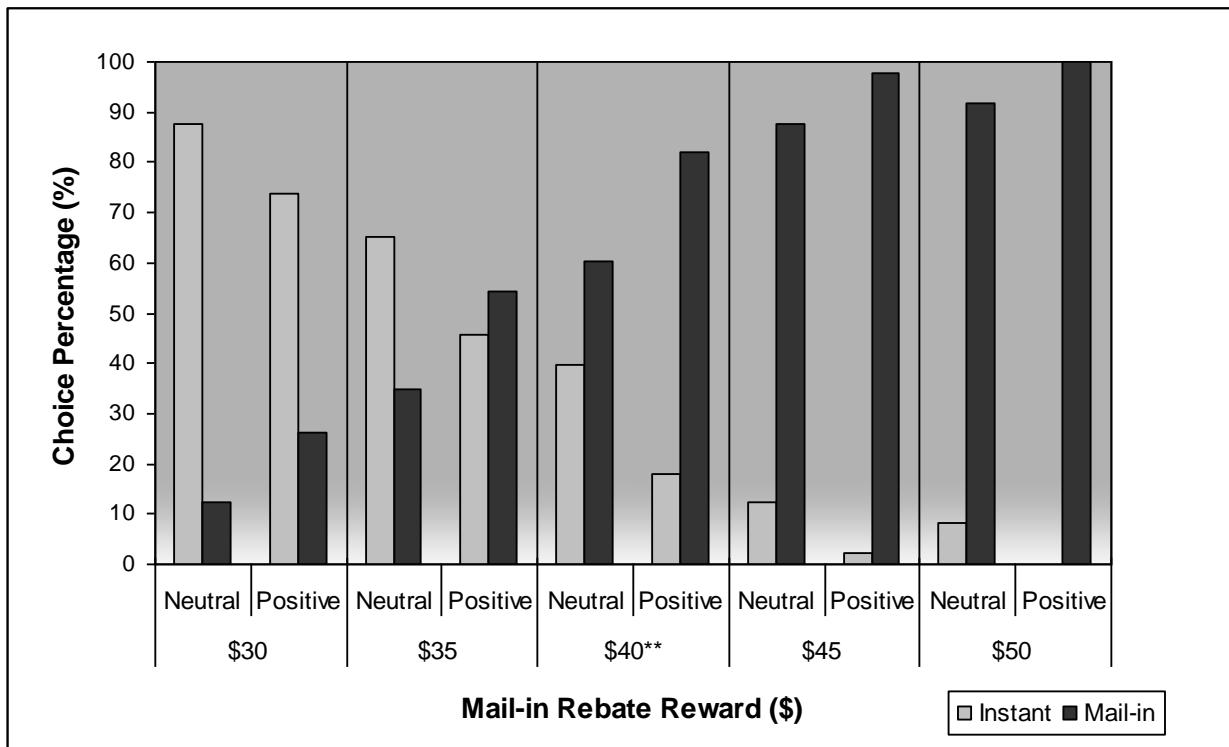
As further demonstration of this point, a repeated-measures logistic regression analysis that compared people's choices for the different choice sets within the positive-affect condition, showed a significant difference between the \$5- and the \$15-differential sets (Wald $\chi^2 (1) = 28.23, p < .001$). Thus, although overall positive affect increased the tendency to defer gratification in favor of a larger payoff, people in positive affect were significantly less likely to opt for the mail-in rebate when the difference between mail-in and instant rebates was only \$5 than when it was \$15 or more. This difference shows that people in positive affect were paying attention to the details of the situation, not choosing thoughtlessly.

When the mail-in rebate was worth \$45 and \$50, most participants chose it over the instant rebate. Within the affect conditions, 97.8% and 100% of those in the positive-affect

condition and 87.5% and 91.8% of those in the neutral-affect condition chose the mail-in rebate (for the \$45 and \$50 mail-in rebates, respectively), and the differences between affect conditions were not statistically significant. Not surprisingly, overall, as the amount of the mail-in rebate increased, preference for it (vs. the instant rebate) also increased (see Figure 2.1).

FIGURE 2.1

STUDY 3: PERCENTAGE OF INSTANT AND MAIL-IN REBATE CHOICES IN POSITIVE-AND NEUTRAL-AFFECT CONDITIONS, OVER INCREASING AMOUNT OF MAIL-IN REBATE



** Comparison between positive affect and neutral affect, $\chi^2 (1) = 5.36, p < .05$.

When the mail-in rebate was worth \$40, but not for other values, the results also showed a significant gender difference: Overall, female participants preferred the mail-in rebate (85.1%)

more than male participants did (57.1%) ($\chi^2 (1) = 8.59, p < .01$). In general, the genders were evenly balanced between the affect conditions (22 women and 21 men in the positive-affect condition and 25 women and 21 men in the neutral-affect condition; we excluded six cases from this analysis because four people did not report gender, and two people did not make a choice in the \$40 choice-set). A logistic regression analysis on the rebate choice, which we conducted to investigate the influence of affect independent of that of gender, revealed that gender was a significant predictor of the mail-in rebate choice (Wald = 8.62, $p < .01$) but that affect, by itself, was still a significant predictor of the rebate choice (Wald = 4.33, $p < .05$): Positive affect still increased the odds of choosing the mail-in rebate (vs. the instant rebate) by a factor of 3.02.

STUDY 4: INSTANT VERSUS MAIL-IN REBATE II

The preceding studies demonstrated that positive affect can foster high-level thinking and increase willingness to wait for better, delayed rewards. Study 3 specifically suggests that this choice pattern is not the result of a heuristic process, such as simply following the larger amount. In Study 4, we explore this aspect of the cognitive processes underlying our findings in more detail – that is, whether positive-affect participants' increase in willingness to wait is attributable to heuristic thinking or to flexible, systematic thinking based on consideration of the costs and benefits of waiting and what other processes may be involved.

In this study, we manipulated the amount of the mail-in rebate between subjects, whereas we had manipulated it within subjects in the previous study. Here, we focused on two choice sets: one with a \$30 mail-in rebate (vs. a \$25 instant rebate), for which Study 3 indicated no difference in rebate choice between the affect conditions, and the other with a \$40 mail-in rebate, for which Study 3 indicated a significant difference between the affect conditions was

shown. Thus, in the present study, participants make a choice between a \$25 instant and a \$30 mail-in rebate in one condition, and a \$25 instant and a \$40 mail-in rebate in the other condition. If people in positive affect always choose the larger amount, regardless of the differential between the instant and the mail-in rebates (i.e., use a heuristic process), they will choose the mail-in rebate in both the \$30 and the \$40 conditions. However, we predict that because positive affect facilitates consideration of both the costs and benefits of waiting, they will choose the mail-in rebate more than controls only when the difference is substantial (\$40 condition) and not when it is small (\$30 condition).

We also added a thought-listing questionnaire to observe whether participants' choices are mediated by their thoughts. If people in positive affect adopt a superficial, heuristic process, they will generate fewer thoughts than controls (because they are simply following a cue such as money, and thus their choice does not involve much thought), or they will generate more positive thoughts about the mail-in rebate regardless of the differential between mail-in and instant rebates. We predict that in positive affect, people's choice will be guided by their thinking about the trade-offs between the two options, and thus they will have more positive thoughts than controls about the mail-in rebate when it is moderately larger than the instant rebate but not when the difference is minimal.

Alternatively, it can be argued that this willingness to wait occurs because positive affect leads people to be more optimistic, and thus to expect that the mail-in rebate will take less time to arrive. In other words, people in positive affect might underestimate the length of the waiting time and thus be more willing to wait. To rule out this possibility, we also asked participants how many weeks they thought it would take to receive the mail-in rebate.

Last, we obtained a measure of the concreteness (vs. abstractness) of the mental representation of the rebates, because previous research has shown that concrete representation

of stimuli leads to less self-control (e.g., Malkoc and Zaiberman 2006; Trope and Liberman 2003). We did this to determine whether positive affect changes the concreteness of the way options are perceived, and whether this change influences the ability to wait.

Method

One hundred seventeen college students took part in the experiment. We manipulated and checked affect using words the same way as in Study 3. After the affect-manipulation task, participants were randomly assigned to either a \$30 or a \$40 mail-in rebate condition, and each participant indicated his or her choice between an instant rebate (\$25) and a mail-in rebate (\$30 or \$40, depending on condition) on a choice-preference scale ranging from 1 ("certainly instant") to 9 ("certainly mail-in") and also by a choice measure.

The rebate questionnaire was almost identical to that of Study 3, except for the following: First, the question stated that the mail-in rebate would take "a few weeks" to be processed, whereas in Study 3 the waiting time had been specified as "4 to 6 weeks." Second, after participants made their choices, we asked them what thoughts they had while making the choice. The questionnaire was divided into three sections – instant rebate, mail-in rebate, and other – and participants listed their thoughts under the corresponding category. After the thought-listing task, participants indicated how concrete (vs. abstract) the instant rebate seemed to them and also how the mail-in rebate was mentally represented on scales ranging from 1 ("very abstract") to 9 ("very concrete"). They then estimated the number of weeks they thought it would take to receive the rebate.

Results

Manipulation check. Our manipulation check results were as expected. Participants in the

positive-affect condition generated more positive ($M_{\text{pos}} = 3.04$, $M_{\text{neu}} = .17$; $t(69.77) = 23.04$, $p < .001$) and unusual ($M_{\text{pos}} = .27$, $M_{\text{neu}} = .12$; $t(102.58) = 2.28$, $p < .05$) word associates than those in the neutral-affect condition.

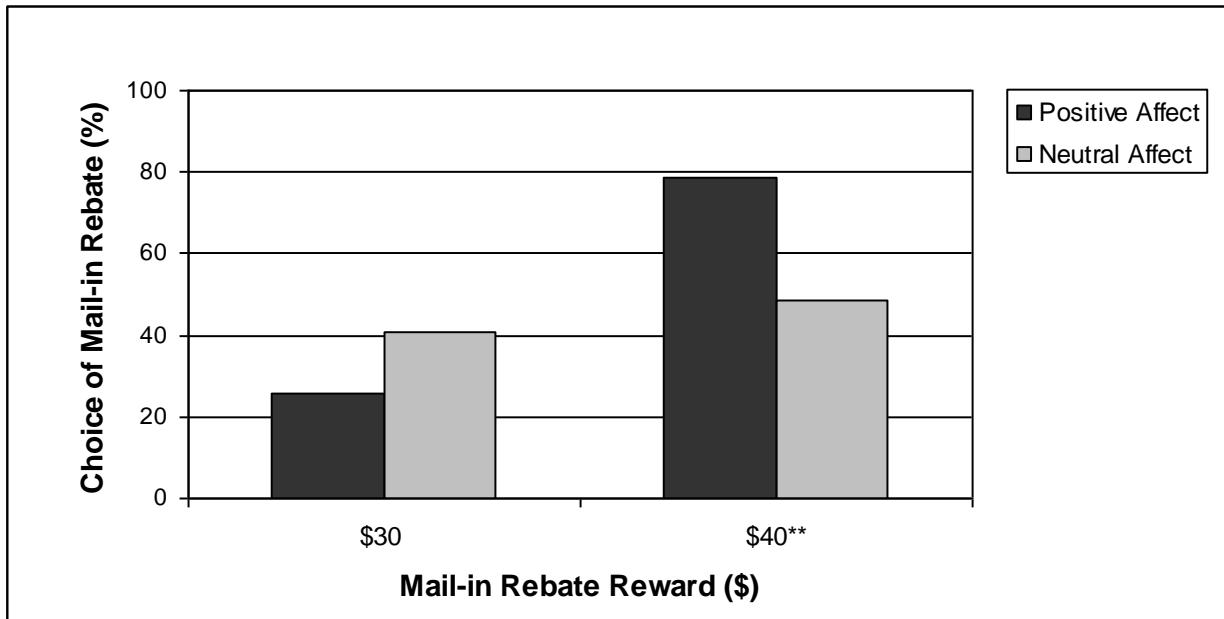
Choice of mail-in rebate. As in Study 3, we performed a chi-square analysis for each choice set. When the mail-in rebate amount was \$30 (i.e., only a \$5 rebate difference), the difference between the positive and neutral conditions (25.8% vs. 40.7%) was not significant ($\chi^2 (1) = 1.46$, n.s.). However, when the mail-in rebate was worth \$40 (a \$15 difference), the difference between the affect conditions was significant. Specifically, participants in positive affect were more likely to choose the mail-in rebate (78.6 %) than those in neutral affect (48.4%; $\chi^2 (1) = 5.73$, $p < .05$). Comparing the mail-in rebate choice within each affect condition, we find that for positive affect, but not for neutral, the percentage of people who chose the mail-in rebate was significantly greater for the \$40 condition than for the \$30 condition (see Figure 2.2).

We also conducted a 2 (affect: positive vs. neutral) \times 2 (mail-in rebate amount: \$30 vs. \$40) between-subjects analysis of variance (ANOVA) on the choice preference rating (1 = "certainly instant rebate"; 9 = "certainly mail-in rebate"). As in the chi-square analysis, the results showed a significant interaction between affect and the mail-in rebate amount ($F(3, 113) = 5.78$, $p < .05$): Positive-affect people showed a stronger preference for the mail-in rebate than controls in the \$40 condition ($M_{\text{pos}} = 6.57$, $SD = 2.66$ vs. $M_{\text{neu}} = 4.87$, $SD = 2.81$; $F(1, 113) = 5.19$, $p < .05$), but not in the \$30 condition ($M_{\text{pos}} = 3.23$, $SD = 2.85$ vs. $M_{\text{neu}} = 4.07$, $SD = 3.13$; $F(1, 113) = 1.27$, n.s.). In other words, as the benefit to waiting increased, the preference for the mail-in rebate significantly increased in the positive affect condition ($M_{\$30} = 3.23$, $M_{\$40} = 6.57$; $F(1, 113) = 20.10$, $p < .001$) but not in the neutral affect condition ($M_{\$30} = 4.07$, $M_{\$40} = 4.87$; $F(1, 113) = 1.12$, n.s.). A 2 (affect) \times 2 (mail-in rebate amount) \times 2 (gender) ANOVA showed no significant effect

of gender or interaction that involved gender.

FIGURE 2.2

STUDY 4: PERCENTAGE OF MAIL-IN REBATE CHOICE IN POSITIVE- AND NEUTRAL-AFFECT CONDITIONS, FOR \$30- AND \$40-MAIL-IN REBATE CONDITIONS (BETWEEN-SUBJECTS DESIGN)



$$^{**} \chi^2 (1) = 5.73, p < .05.$$

Thought listing about intertemporal options. A 2 (affect: positive vs. neutral) \times 2 (mail-in rebate amount: \$30 vs. \$40) ANOVA showed that there was no significant difference between the four conditions in the number of total thoughts ($M_{\text{pos}-\$30} = 6.16$, $M_{\text{pos}-\$40} = 6.54$, $M_{\text{neu}-\$30} = 5.89$, $M_{\text{neu}-\$40} = 5.81$, n.s.), or in the number of thoughts about each type of rebate ($M_{\text{instant}} = 2.56$, $M_{\text{mail-in}} = 3.19$, $M_{\text{other}} = .37$).

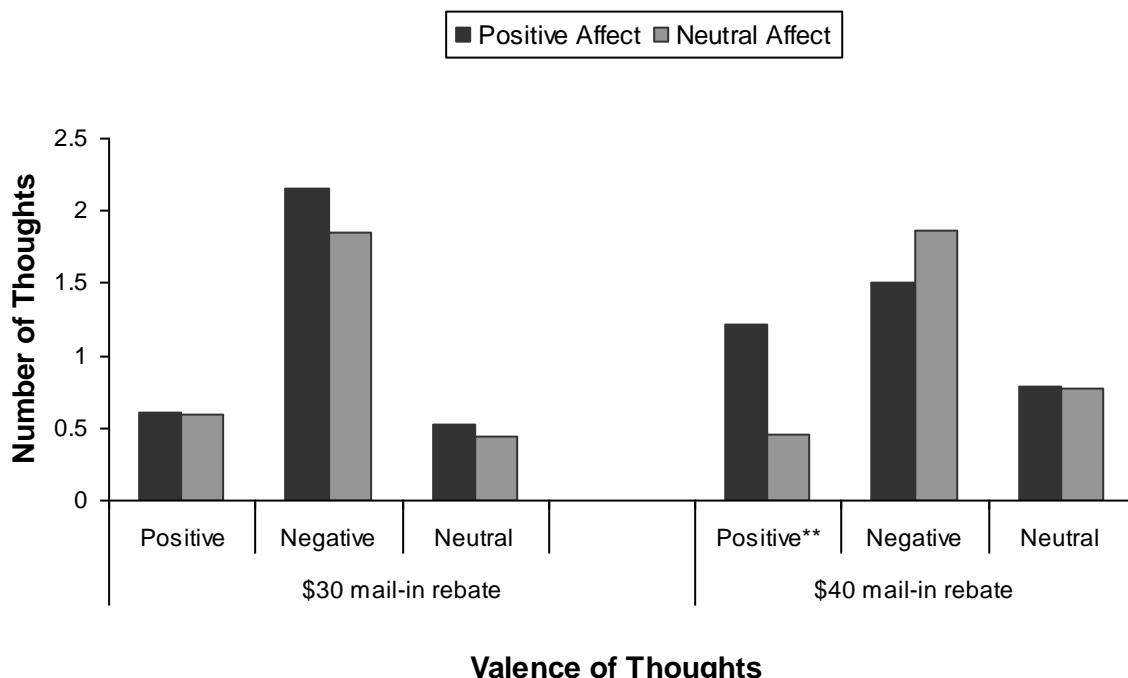
We further coded thought listings for valence to determine whether affect condition and

reward size interacted in producing favorable thoughts about the mail-in rebate. We conducted two 2 (affect: positive vs. neutral) \times 2 (mail-in rebate amount: \$30 vs. \$40) \times 3 (valence of thoughts: positive vs. negative vs. neutral) mixed ANOVAs on the number of thoughts about the instant and the mail-in rebates separately, treating affect and rebate amount as between-subjects factors and thought valence as a within-subjects factor. First, regarding the instant rebate, there was only a main effect of valence, such that people had more positive thoughts (e.g., "fast," "easy") than negative (e.g., "less money") or neutral thoughts (e.g., "Do I need money right now?") ($M_{\text{positive}} = 1.92$, $M_{\text{negative}} = .29$, $M_{\text{neutral}} = .34$; $F(2, 112) = 90.59, p < .001$). No other effects were significant.

However, for the mail-in rebate, there was a significant three-way interaction of affect, rebate amount, and valence of thoughts ($F(2, 112) = 3.49, p < .05$). Specifically, when the mail-in rebate was \$30, people had more negative thoughts ($M = 2.02$; e.g., "waiting," "takes longer") than positive ($M = .60$; e.g., "more money") or neutral thoughts ($M = .48$; e.g., "how many weeks?") about it, and there were no significant differences between the affect conditions. In contrast, when the mail-in rebate was \$40, the two affect conditions diverged: People in positive affect listed as many positive ($M = 1.21$, $SD = .96$) as negative thoughts about the mail-in rebate ($M = 1.50$, $SD = 1.14$; n.s.), but more positive thoughts than the neutral-affect people did ($M = .45$, $SD = .57$; $F(1, 113) = 14.17, p < .001$). In contrast, participants in neutral affect listed more negative ($M = 1.87$) than positive ($M = .45$) thoughts about the mail-in rebate ($F(2, 112) = 10.79, p < .001$), as was true in the \$30 condition. In other words, for only those in positive affect, the number of positive thoughts about the mail-in rebate was greater when the value of the mail-in rebate was \$40 than when it was \$30 ($M_{\$30} = .61$, $M_{\$40} = 1.21$; $F(1, 113) = 8.81, p < .01$). This did not occur for participants in neutral affect ($M_{\$30} = .59$, $M_{\$40} = .45$, n.s.; see Figure 2.3). The number of negative thoughts did not differ between the two affect conditions.

FIGURE 2.3

STUDY 4: THE NUMBER OF POSITIVE, NEGATIVE, AND NEUTRAL THOUGHTS ABOUT
THE \$30 AND THE \$40 MAIL-IN REBATE, BY AFFECT CONDITION



** Comparison of the number of positive thought about the \$40 mail-in rebate in each affect condition ($F(1, 113) = 14.17, p < .001$).

Notes: A three-way interaction: $F(2, 112) = 3.49, p < .05$.

The preceding analyses indicate that the number of positive thoughts on the delayed option may play a key role in the effect of affect on intertemporal choice. Therefore, we conducted a mediation analysis to determine whether positive thoughts about the mail-in rebate mediated the influence of positive affect on the choice preference in the \$40 condition. We regressed participants' choice preference ratings on affect and the number of positive

thoughts about the mail-in rebate (POSMail). We found that affect ($\beta = 1.70$, $R^2 = .09$, $p < .05$) and POSMail ($\beta = 1.87$, $R^2 = .32$, $p < .001$) separately were significant predictors of participants' choice preferences. Positive affect also significantly predicted the number of positive thoughts about the mail-in rebate ($\beta = .76$, $R^2 = .20$, $p = .001$). However, when we entered affect and POSMail together as predictor variables in the analysis, affect was no longer significant ($\beta = .34$, $p = .63$), whereas POSMail was still a significant factor ($\beta = 1.79$, $p < .001$; Sobel test = 3.04, $Z = 2.82$, $p < .01$). This finding indicates that the number of positive thoughts about the mail-in rebates mediates the effects of positive affect on preference for the delayed option.

Concreteness of representation of intertemporal options. We conducted two 2 (affect: positive vs. neutral) \times 2 (mail-in rebate amount: \$30 vs. \$40) ANOVAs separately: one on the concreteness (vividness, temptingness) of the representation of the instant rebate and one for that of the mail-in rebate. The analysis for the instant rebate revealed a significant main effect of mail-in rebate amount, such that the instant rebate was perceived as more concrete when it was paired with a \$30 mail-in rebate ($M = 6.91$, $SD = 1.67$) than when with a \$40 mail-in rebate ($M = 5.88$, $SD = 2.19$; $F(1, 111) = 7.99$, $p < .01$). In addition, there was a marginally significant interaction between affect and mail-in rebate amount ($F(1, 111) = 3.16$, $p < .08$). Specifically, positive-affect people perceived the instant rebate as less concrete when it was contrasted with a \$40 mail-in rebate than when with a \$30 rebate ($M_{\$30} = 7.34$, $M_{\$40} = 5.68$, $p < .01$), whereas we observed no such difference was observed among the neutral-affect participants ($M_{\$30} = 6.44$, $M_{\$40} = 6.06$, n.s.). In contrast, for the mail-in rebate, the concreteness of the representation did not differ by condition. Furthermore, a mediation analysis did not suggest that concreteness of the instant rebate mediated the effect of positive affect on willingness to wait.

Estimated length of waiting time. A 2 (affect: positive vs. neutral) \times 2 (rebate amount: \$30 vs. \$40) ANOVA revealed that there was only a main effect of the rebate amount. Although we

did not anticipate this finding, the results showed that people expected to receive the mail-in rebate sooner when it was worth \$40 ($M = 4.00$ weeks, $SD = 1.02$) than when it was worth \$30 ($M = 4.44$ weeks, $SD = 1.21$; $F(1, 113) = 4.22, p < .05$). However, there was no significant difference between the positive- and neutral-affect conditions ($M_{pos} = 4.28$ weeks, $SD = 1.27$; $M_{neu} = 4.15$ weeks, $SD = .99$; $F(1, 113) = .29$, n.s.), nor was the interaction significant. Thus, there is no evidence that people in positive affect underestimated the length of the waiting time compared with controls.

Discussion

Studies 3 and 4, one using a within-subjects design and one using a between-subjects design, show that positive affect, compared with controls, can foster delay of gratification and increase willingness to wait for a better reward, but only when the difference in rewards is substantial. We found that the choices of neutral-affect participants differed in the \$30 and the \$40 conditions of Study 3 (repeated measure) but not in Study 4, in which participants made only one choice (between-subjects design). That is, unless faced with sequential choices, controls are relatively insensitive to the desirability (amount) of the delayed option. In contrast, people in the positive-affect condition distinguished the \$30 and \$40 rebate amounts in both studies.

Furthermore, Study 4 investigates the processes underlying the influence of positive affect on ability to wait. The thought-listing measure shows that positive affect increases the number of positive thoughts about the future option when it is perceived to be sufficiently valuable. In addition, the mediation analysis reveals that these thoughts mediate the effect of positive affect on preference for the delayed option. Figure 2.3 further demonstrates that, in the \$40 condition, people in positive affect had a more balanced view about the delayed options: They were aware of negative aspects (e.g., waiting time) as well as positive (e.g., money) aspects

of waiting.

Because positive thoughts increased as the desirability of the delayed option increased and participants in positive affect were more likely to choose to wait only in the \$40 condition, we suggest that the way positive-affect people engage in forward-looking, high-level thinking is flexible and mindful rather than superficial or heuristic (i.e., relying on a simple cue, such as choosing the larger rebate every time). If the latter were the case, the positive-affect people would have chosen the mail-in rebate in every choice set, regardless of the size of the difference between the mail-in and instant rebates.

In addition, Study 4 provides no evidence that the reason positive-affect people are more willing to wait is that they underestimate the amount of time it will take to receive the mail-in rebate. There was no difference between positive and neutral affect in estimated waiting time. However, overall, people expected the waiting time to be shorter for the larger mail-in rebate (\$40). Thus, the desirability of a future option seems to influence people's estimated waiting time. This can be investigated further in future research.

The analysis of the perceived concreteness of the instant rebate demonstrates that under conditions of positive affect, the concreteness (temptingness) of the instant option is malleable and depends on the comparable delayed option: People in positive affect, but not controls, perceived a \$25 instant rebate as more concrete (tempting) when compared with a \$30 mail-in rebate than when compared with a \$40 rebate. However, this cognitive representation of concreteness did not mediate the effect of positive affect on willingness to wait: It was the positivity of the thoughts about the future reward that changed positive-affect people's choices. Thus, willingness to wait is determined not by the attractiveness of the immediate or the delayed option in an absolute sense but rather by the relative difference between the immediate and delayed options and, importantly, by the positive thoughts about the sufficiently valuable

delayed option rather than by the temptingness of the immediate.

STUDY 5: WILLINGNESS TO PAY FOR IMMEDIATE VERSUS DELAYED OUTCOMES

As we noted previously, in general, a person's preference for a positive outcome decreases if that outcome is to occur in the distant future. Studies 5 and 6 examine these kinds of present bias in a consumer context. In Study 5, we measured participants' preference for a delayed or an immediate product by examining their willingness to pay, given receipt of the product with different delay times. We expected that, overall, participants would show a stronger preference for an immediate product over a delayed one, as the previous research has shown, but that because people in positive affect consider the future situation as well as the present, their willingness to pay for the product would not decrease as much with time delay.

Method

Forty-four students (21 in the positive-affect condition) participated in the experiment in exchange for extra credit toward their course grade. We manipulated and confirmed positive or neutral affect using pictures as we did in Study 1. Participants then read a product description (movie passes; Fujita et al. 2006). They were asked to imagine purchasing four movie passes (that would not expire) to a local theater and to indicate how much they would pay for the product if they were to receive it immediately and, following that, if they were to receive it one month later.

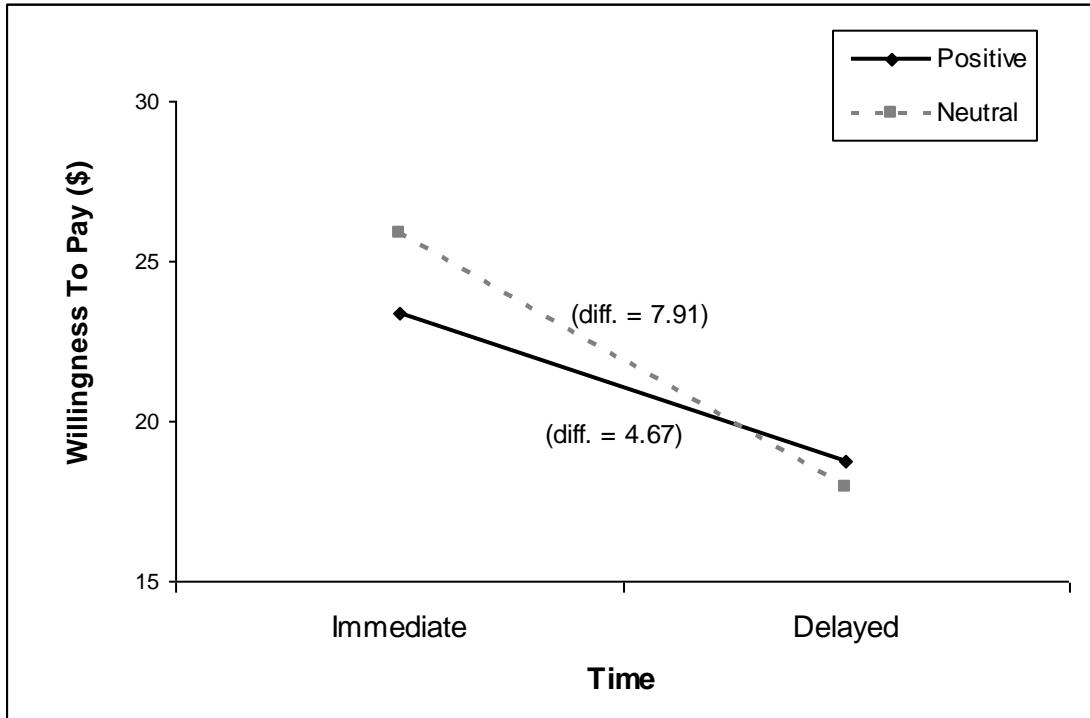
Results

Participants in the positive-affect condition reported that the pictures made them feel

happier ($M_{\text{pos}} = 1.38$, $M_{\text{neu}} = 3.54$; $t(36.72) = 10.18$, $p < .01$). We conducted a 2 (affect: positive vs. neutral) \times 2 (time: immediate vs. delayed) mixed ANOVA on willingness to pay, treating time as a repeated factor. The analysis revealed a significant main effect of time, such that people were willing to pay more for the product when it was to be delivered immediately ($M = 24.69$, $SD = 9.78$) than after a delay ($M = 18.33$, $SD = 8.96$; $F(1, 42) = 63.42$, $p < .001$). More importantly, there was also a significant interaction of time and affect. The difference in willingness to pay for the immediate versus the delayed product was smaller in the positive-affect condition ($M_{\text{immed}} = 23.40$, $SD = 10.72$; $M_{\text{delay}} = 18.73$, $SD = 10.86$; $\text{diff} = 4.67$) than in the neutral condition ($M_{\text{immed}} = 25.87$, $SD = 8.91$; $M_{\text{delay}} = 17.96$, $SD = 7.01$; $\text{diff} = 7.91$; $F(1, 42) = 4.22$, $p < .05$, see Figure 2.4). Thus, as we predicted, positive affect led to a decreased level of discounting over time, less of a decline in the perceived value of a non-perishable product. Contrast tests comparing positive and neutral affect within the immediate and the delayed conditions were not significant, suggesting no effect of positive affect on valuation (willingness to pay) of the product in general.

FIGURE 2.4

STUDY 5: WILLINGNESS TO PAY FOR THE IMMEDIATE AND FOR THE DELAYED
PRODUCT, BY AFFECT CONDITION



Notes: Interaction: $F(1, 42) = 4.22, p < .05$. Contrasts within immediate and delayed conditions were not significant.

STUDY 6: EXPEDITING SHORT VERSUS LONG DELAYS

Like Study 5, Study 6 tests the hypothesis that positive affect reduces present-biased preferences but uses a different, convergent, method. In this study, we measured present-biased preference as Malkoc and Zauberman (2006) did: by examining the amount people would be willing to pay to expedite the product delivery by three (short delay) and ten (long delay) days. We predicted that, as the literature has shown, overall, participants would be willing to pay a

higher daily premium to expedite a short delay than a long delay (hyperbolic discounting) but that positive affect would decrease this discounting (the discounting slope would be less steep).

Method

Participants. Fifty students participated in the experiment in exchange for extra credit. Four people in each of the affect conditions did not follow instructions (they declined to expedite delivery), and one participant was acquainted with the experimenter. We dropped the data of those nine people from the analysis.

Procedure. We manipulated and checked affect the same way as in Study 1. Participants were presented with a scenario asking them to imagine buying a digital camera. They were told that the delivery of their product was scheduled for a future date and were asked how much more they would pay to expedite the delivery by three, and then by ten, days.

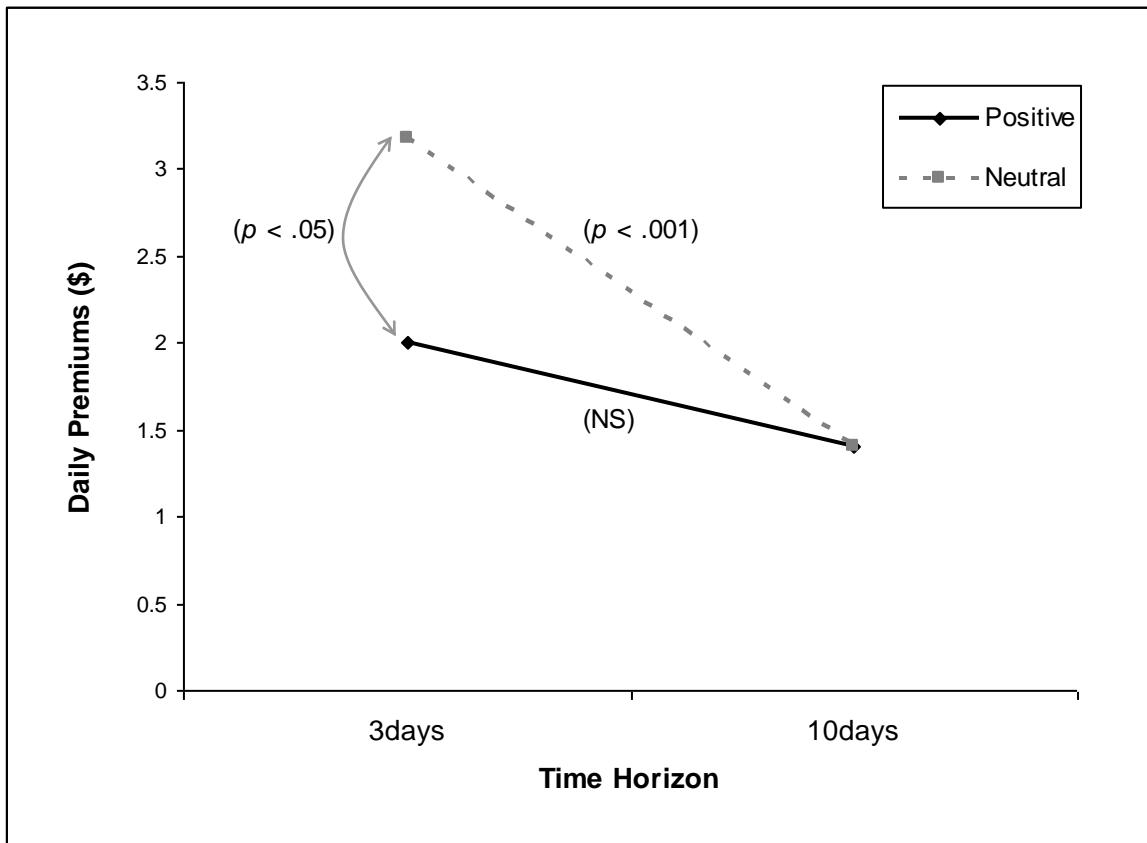
Results

Participants in the positive-affect condition reported that the pictures made them feel happier than did controls ($M_{\text{pos}} = 1.50$, $M_{\text{neu}} = 3.44$; $t(34.48) = 8.99$, $p < .001$). We calculated daily premiums for expediting delivery by dividing the total willingness to pay by the number of days of expediting (three or ten). A 2 (affect: positive vs. neutral) \times 2 (time horizon: three days vs. ten days) mixed ANOVA on daily premiums, treating time horizon as a repeated factor, revealed a main effect of time horizon, indicating that participants placed a higher daily premium on expediting the three-day delay ($M = 2.60$, $SD = 1.88$) than the ten-day delay ($M = 1.40$, $SD = 0.84$; $F(1, 39) = 18.28$, $p < .001$). In addition, there was a marginally significant main effect of affect ($F(1, 39) = 2.96$, $p = .09$) and, more importantly, as we predicted, a significant interaction between affect and time horizon ($F(1, 39) = 4.45$, $p < .05$). Specifically, in the positive-

affect condition, decline of daily willingness-to-pay premiums over the time horizon was less sharp ($M_{3\text{days}} = 2.00$, $SD = 1.36$; $M_{10\text{days}} = 1.40$, $SD = 0.86$; $F(1, 39) = 2.29$, $p = .14$, n.s.) than among controls ($M_{3\text{days}} = 3.17$, $SD = 2.15$; $M_{10\text{days}} = 1.40$, $SD = 0.83$; $F(1, 39) = 20.90$, $p < .001$; see Figure 2.5). Contrasts showed that participants in neutral affect were willing to pay significantly more per day to expedite the short delay (three days) than were those in positive affect ($M_{\text{neu}} = 3.17$, $M_{\text{pos}} = 2.00$; $F(1, 39) = 4.32$, $p < .05$). There was no significant difference for expediting the long delay (ten days) ($M_{\text{neu}} = 1.40$ and $M_{\text{pos}} = 1.40$). Thus, as we predicted, present bias was less in the positive-affect condition.

FIGURE 2.5

STUDY 6: DAILY PREMIUMS FOR THREE-DAY AND TEN-DAY EXPEDITING OF PRODUCT DELIVERY, BY AFFECT CONDITION

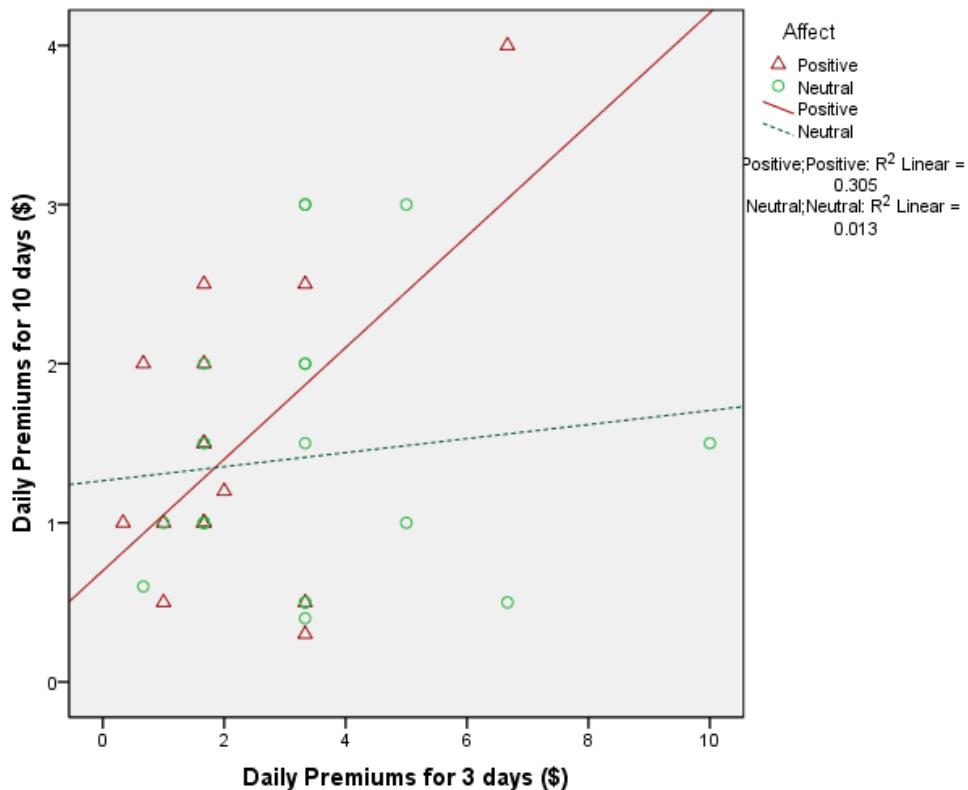


Notes: Interaction: $F(1, 39) = 4.45$, $p < .05$.

A scatterplot of daily premiums (see Figure 2.6) further demonstrates the relationship between present-biased discounting and affect. In the positive-affect condition, but not in the control condition, there was a positive relationship between participants' daily premium for the three-day delay and their daily premium for the ten-day delay. In other words, those in the positive-affect condition tended to estimate daily premiums for ten days proportionally according to their daily premiums for three days, whereas those in the neutral-affect condition disproportionately estimated daily premiums for ten days, without regard to the daily premium for three days.

FIGURE 2.6

STUDY 6: SCATTERPLOT OF DAILY PREMIUMS FOR EXPEDITING PRODUCT DELIVERY
BY TEN DAYS AGAINST THREE DAYS, FOR POSITIVE- AND NEUTRAL- AFFECT
CONDITIONS



Discussion

Studies 5 and 6 investigated people's intertemporal preferences by examining their present-biased discounting of a desired product over time. In Study 5, in the positive-affect condition, participants' willingness to pay for a product was not decreased as much by having to wait for the product as it was in the neutral condition. The product (movie passes) was not perishable and retained its full actual value over time. It is possible that for some types of products, ones that actually lose value with time, people in positive affect might instead show a reduction in value. This remains to be investigated.

Using another measure, Study 6 shows that people in positive affect were willing to wait for a valued product, in that they allocated less than controls to expedite its delivery. They also continued to value the product equally regardless of whether the delay was three or ten days, because they showed the same level of daily premiums from the shorter to the longer time horizon. That is, they maintained interest in obtaining the product regardless of whether a long or short delay was involved. In contrast, people in the neutral-affect condition emphasized the short-term delay and lost interest in the product if a long delay was involved.

As Figure 2.6 shows, the affect conditions differ in perceived relationship between present and future outcomes. People in positive affect consider the long-term option in the context of the short-term option, suggesting that they perceive present and future options as interrelated, whereas those in neutral affect view intertemporal options as relatively distinct. This finding is compatible with those of previous research, suggesting that positive affect helps people see how present situations are functionally linked to future outcomes (e.g., Aspinwall 2005; Erez and Isen 2002; Taylor et al. 1998).

The results of studies 5 and 6 together show that our findings pertain to the present-

biased preferences and willingness to wait, and are not best attributed to lessened willingness to pay or concern with money in general. This is because in the two studies, the measures that showed greater willingness to wait among people in positive affect involved both greater willingness to pay in one instance (Study 5: valuation of the delayed object) and less willingness to pay in the other (Study 6: expediting delivery).

GENERAL DISCUSSION

The current research examines the influence of positive affect on flexible, forward-looking, high-level thinking in the context of intertemporal choice phenomena. Specifically, the studies examined the influence of positive affect on consumers' willingness to wait for a better option that is available, and on their level of overvaluing the present (present bias), as indicated by valuation and discounting rates for a desired product. Furthermore, this work examines the cognitive processes underlying this kind of self-control and valuation of material benefits.

Studies 1 and 2 show that positive affect can increase the level of thinking, which we measured with both the BIF and the time perspective scale. Studies 3 and 4 demonstrate that people in a positive feeling state are more likely than comparable controls to wait to get a larger rebate, when the difference between the immediate and delayed rebate is moderately large. (When the difference is small, people in positive affect do not differ from controls in willingness to wait). In addition, the studies reveal that this occurs because positive affect enables people to consider more positive aspects of the delayed option, whereas in neutral affect, people tend to focus on the instant option without regard for the desirability of the delayed option. Studies 5 and 6 examine the influence of positive affect on intertemporal preferences, using additional measures. The results show that people in positive affect, compared with controls, reported less

devaluation of a product that would be delayed (Study 5) and also less willingness to pay to receive the product immediately (Study 6). Thus, as indicated by converging measures, for people in mild positive affect, the immediate reward seems relatively less tempting when there is a better option in the future, and when they have more positive thoughts about that future option, they are more patient and able to wait.

Furthermore, these studies demonstrate the influence of positive affect on the cognitive representation of intertemporal outcomes. For example, the scatterplot of daily premium by affect and time horizon (Figure 2.6) suggests that people in positive affect are more likely to perceive outcomes that will occur at different points in time as interrelated rather than as independent. That is, they are more likely to see and value future outcomes in the context of present outcomes.

These findings are compatible with the previous research suggesting that positive affect leads to more mindful thinking and deployment of attention, which enable people to consider and integrate more factors and aspects of situations (e.g., Erez and Isen 2002; Fredrickson and Branigan 2005; Isen 2007; Johnson and Fredrickson 2005). People in positive affect may see more aspects of both present and future outcomes, ultimately enabling them to understand the continuity between them and consider the trade-offs. Thus, this flexibility may enable people to wait for larger rewards and to exert self-control in other ways as well.

Note that although the present work demonstrates that positive affect can foster high-level thinking in the domain of self-control, the concept of high-level thinking does not imply superficial thinking or inability to focus on details of the context. Rather, the evidence suggests that the forward-looking, high-level thinking promoted by positive affect is characterized by comprehensive integration of both situational factors and the person's goals or concerns: People in positive affect take the specifics of the task or situation into account in construing an object or

a behavior and deciding about it.

For example, consider that in Studies 3 and 4, the size of the rebate difference influenced the effect of positive affect on willingness to wait, such that positive-affect people chose to wait only when the difference between the instant and mail-in rebates was moderately large. This shows that they considered both time and money and made trade-offs rather than just choosing the larger rebate. Likewise, in Studies 5 and 6, if people in positive affect were deciding superficially, there should have been only main effects of affect rather than interactions between affect and time horizon. These findings have important implications for understanding the effects of positive affect more generally because they add to the literature showing that positive affect does not impair systematic, careful processing but rather facilitates it (e.g., Erez and Isen 2002; Nadler, Rabi, and Minda 2010; Staw and Barsade 1993).

Mischel, Shoda, and Rodriguez (1989) convincingly demonstrate that the ability to delay gratification is associated with success in many spheres of life, even years after the initial observation of delay behavior, and they also show that this ability can be influenced by cognitive and situational interventions. The current work, then, contributes to the growing body of research indicating that positive affect also facilitates the ability to delay gratification and wait for better rewards, contributing an important source of strength and benefit in peoples' lives.

The current research has significant implications for managers and consumer researchers as well. For example, according to this work, it seems that inducing positive affect may lead consumers to be more likely to join consumer reward programs (e.g., stamp cards, mileage programs) because such programs depend on people's understanding that rewards grow over time and that the future soon becomes the present. Those who join consumer reward programs may develop a strong relationship with the firm, which will increase their customer

lifetime value to the firm. Because, as we demonstrate, mild positive affect leads people to appreciate the promise of larger benefits later and to be more willing to wait for those benefits, marketers may want to combine positive-affect inductions with consumer reward programs. It is important to note that the positive affect inductions used in this stream of research, more generally, include small gifts or free samples, coupons, and the like, in addition to factors such as environmental influences, pleasant pictures and décor, and so on. These are small, everyday interventions that are easily under companies' and marketers' control.

In addition, the findings of the current studies suggest interesting possibilities regarding financial instruments and products, and factors that may help consumers of those products put their investments into perspective. Not only might marketers of high-quality investment or credit options be better able to present their products to consumers who are in a mildly positive state, but the affective state may also help the consumer to understand the benefits to be had in investments that will pay well in the future. Thus, the current research suggests important directions for future research in both theoretical and applied domains.

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CHAPTER 3

NOT GETTING STUCK IN A CONSTRAINED MINDSET: POSITIVE AFFECT CAN ELIMINATE THE MALADAPTIVE INFLUENCE OF LOW-LEVEL CONSTRUAL IN INTERTEMPORAL PREFERENCES

People make decisions for now and later everyday, and oftentimes they get to choose between instantly gratifying a smaller gain versus delaying the gratification for a larger gain later. Recent research suggests that the mindset in which people make such intertemporal decisions influences their intertemporal preferences, and the mindset can be triggered by people's mode of cognitive processing for an irrelevant matter and can be carried over to subsequent intertemporal choices. Specifically, thinking about an action or a situation in terms of means (versus an end) triggers a low level of construal, and this low-level (versus high-level) mindset has been shown to increase people's preference for immediate-smaller (versus delayed-larger) rewards in intertemporal choice situations (Fujita et al., 2006). Similarly, concrete (versus abstract) processing mindsets that have been procedurally evoked by prior decision tasks influence subsequent consumption decisions, leading to greater present bias or impulsivity (Malkoc, Zauberman, & Bettman, 2010). In short, cognitive mindsets influence people's intertemporal preferences.

On the other hand, the affect literature suggests that mild positive affect facilitates cognitive flexibility (e.g., Isen, 2008), and thus by helping people think of intertemporal choice situations in a more integrative and comprehensive manner, it increases people's self-control in goal pursuit (e.g., Aspinwall, 1998) and enables greater delay-of-gratification (Pyone & Isen, 2011). In other words, positive affect can alone influence people's intertemporal preferences.

Although both positive affect and cognitive mindsets have been shown to influence intertemporal preferences independently, it hasn't been investigated yet how they would interact concurrently. In everyday decision making, it is very likely that affective states and cognitive mindsets work together in forming people's choices and preferences. In this research, by manipulating both affect and construal levels at the same time, we investigate how positive affect would interact with cognitive mindsets and influence intertemporal preferences.

According to recent research in affect and neuropsychology, positive affect is associated with release of dopamine into frontal regions of the brain that foster people's ability to think of stimuli or situations in multiple ways (i.e., *increased cognitive flexibility*; Ashby, Isen, & Turken, 1999; Subramaniam, Kounios, Parrish, & Jung-Beeman, 2008), and this has been suggested to improve creativity and problem solving performance among positive-affect people (e.g., Amabile, Barsade, Mueller, & Staw, 2005; Carnevale & Isen, 1986; Estrada, Isen, & Young, 1997; Isen, Daubman, & Nowicki, 1987; Isen, Johnson, Mertz, & Robinson, 1985).

Drawing on the affect and neuropsychology literature, we propose that under positive affect, people will have a more open and flexible way of thinking. Therefore, they are less likely to be constrained by procedurally primed cognitive mindsets, and thus can overcome the suboptimal influence of low-level construals in intertemporal choice. First, in study 1, we demonstrate that positive affect can alone decrease present-biased preferences. Then, in studies 2, 3, and 4, using convergent methods, we demonstrate that positive affect can override the effects of the mindset priming, and can lead to greater delay-of-gratification regardless of the procedurally primed mindsets.

STUDY 1: GIFT CHECK CHOICE

Method

Sixty seven students at a large northeastern university participated in the study in exchange for extra credit toward their course grade. In the first study which was intended to carry out affect induction, participants were told that they would pre-test a short video clip designed for a future study on visual attention. They watched either a positive (a cartoon clip showing a dancing hippo) or a neutral video clip (showing color bars moving around; Gross & Levenson, 1995) randomly assigned by computer. After watching the clip, they completed a 15-item questionnaire asking what they thought of the visual image and how the clip had made them feel. Three of the items (*positive-negative, pleasant-unpleasant, happy-sad*; $\alpha = .95$) were intended to assess affective states and were combined later for an affect index variable.

After the affect induction task, participants received a decision making study, and were asked to imagine that they won a lottery and were about to receive a gift check as a prize. For the prize, they were given two options: 1) a \$75 check to arrive immediately, or 2) a \$90 check to arrive 2 months from now. Participants indicated their choices.

Results

Affect manipulation check. A t-test on the affect index variable (1 = positive, 5 = negative) showed that people in the positive affect condition ($M = 1.55$, $SD = .70$) felt more positive than those in neutral affect ($M = 3.28$, $SD = .85$), $t(65) = 9.12$, $p < .001$.

Gift check choice. A chi-square analysis revealed a significant difference between the positive and neutral affect conditions in their gift check choice. Specifically, people in the positive affect condition were more likely to choose the delayed-larger option (a \$90 check) over the sooner-smaller option (a \$75 check) than those in neutral affect (79.4% vs. 54.5%, respectively), $\chi^2(1, N = 67) = 4.70$, $p = .03$, $\varphi = .26$. Thus, the results of study 1 demonstrate that

positive affect can alone decrease present-biased preferences and increase delay-of-gratification.

STUDY 2: AFFECT AND LOW-LEVEL MINDSET

In study 1, we demonstrate that positive affect decreases present-biased preference. In study 2, we examine how positive affect would interact with cognitive mindsets. Specifically, we induced a concrete low-level mindset by asking people to plan a trip to New York City in specific details.

Method

Participants ($N = 115$) were randomly assigned to one of four conditions in a 2 (affect: positive, neutral) \times 2 (mindset priming task: control, planning) between-subjects design. Affect was induced and confirmed in the same way as in study 1. After the affect induction task, participants received the mindset induction task and were asked to imagine that they would be taking a weekend trip to New York City. In the control (no-planning) condition, participants were provided with six tourist spots or activities they can engage in in NYC (e.g., *Broadway shows, Central Park, Historical monuments, Museums and galleries, Restaurants or bars, Shopping*), and were asked to rank them in the order of preference. In the low-level mindset (planning) condition, they were asked to plan the trip in detail, specifically in two steps. In the first step, their task was packing their bag and they listed all the items they would take on the trip. They were told to be as specific as they can. Then, in the next step, they chose a method of transportation and described how they would make the reservation or preparation in detail.

Since the planning task is longer than the control task, we measured participants' affective states once again after the mindset priming task in order to ensure that the positive

affect initially induced by the video clip did not fade away after the planning task¹. The second affect manipulation check was conducted in an implicit way. Prior research suggests that people in positive mood tend to generate more positive and unusual word associations due to enhanced cognitive flexibility, and this has been used for affect manipulation checks (for discussion, see Isen & Erez, 2007; Isen, Johnson, Mertz, & Robinson, 1985). Adopting this method, after the mindset priming task, we asked participants to list the first five words that come to mind that begin with the letter "H," and scored each word associate in terms of positivity and unusualness and combined the scores for each participant. After the second affect manipulation check, participants received the same gift check choice questionnaire as in study 1.

Results and Discussion

Affect manipulation checks. As expected, people who watched the positive clip reported feeling happier ($M = 1.76, SD = .79$) than those who watched the neutral clip ($M = 3.36, SD = .72$), $t(113) = 11.31, p < .001$. After the mindset priming task, affect was re-assessed based on the positivity and the unusualness of word associates that participants generated. A 2 (affect: positive, neutral) \times 2 (mindset priming task: control, planning) ANOVA was conducted on the positivity and the unusualness scores, separately. For the positivity, there was a marginally significant main effect of affect ($M_{\text{positive}} = .74$ vs. $M_{\text{neutral}} = .50$), $F(1, 111) = 3.17, p = .078$, and a marginally significant main effect of mindset priming task ($M_{\text{control}} = .73$ vs. $M_{\text{planning}} = .49$), $F(1, 111) = 3.17, p = .078$. Thus, overall, participants in the positive (versus neutral) affect condition and those in the control (versus planning) task condition appeared to be happier. No other

¹ The number of packing items generated for the planning task did not significantly differ between the two affect conditions ($M_{\text{positive}} = 14.04, SD = 5.09$ vs. $M_{\text{neutral}} = 14.57, SD = 4.06$), $t(53) = .43, p = .67$.

effects were significant. Our main interest was if positive affect was maintained even after the planning task. A contrast test within the positive affect condition revealed no significant difference between the control and planning conditions ($M = .67$ vs. $.80$, respectively), $t(51.84) = .61, p > .5$. Thus, this shows that positive affect lasted even after the planning task. On the other hand, among those in neutral affect, the positivity scores were significantly higher in the control than in the planning condition ($M = .67$ vs. $.32$, respectively), $t(50.90) = 2.19, p = .033$. Further, the control task condition in neutral affect was not significantly different from the control-positive condition ($M = .67$ vs. $.80$, respectively), $t(57.74) = .70, p > .4$, in terms of the positivity. That is, those in the neutral affect condition felt as happy as those in the positive affect condition after the control task. We speculate that the control task (to rank tourist spots or activities in New York City) induced positive affect even among those in the neutral affect condition.

The same ANOVA was conducted on the unusualness scores, and revealed a marginally significant main effect of mindset priming task, $F(1, 111) = 3.75, p = .056$, and a significant interaction of affect and mindset priming task, $F(1, 111) = 5.79, p = .018$. Contrast tests revealed that within the neutral affect condition, the unusualness scores didn't differ between the control and planning conditions ($M = .53$ vs. $.46$), $t(111) = .33, p > .7$; however, among those in positive affect, the unusualness scores were significantly higher in the planning than in the control condition ($M = 1.04$ vs. $.40$, respectively), $t(111) = 3.06, p = .003$. Although we didn't expect this result and do not have a clear explanation, it seems that when people are in positive mood, engaging in light cognitive training exercises, such as the planning activity in this study, enables people's cognitive organization to be more flexible, rather than depletes their cognitive resources. Comparing the two affect conditions within each mindset condition, there was no significant difference within the control task condition. But within the planning task condition,

scores of the positive affect group were significantly higher than those of the neutral affect group, $t(111) = 2.70, p = .008$. Thus, after the planning task, the initially induced positive affect was manifested through the unusualness of the word associates.

Gift check choice. First, participants' gift check choices were compared in each affect condition, separately. Among the neutral affect condition, their choice of the delayed-larger check was significantly lower in the planning than in the control task condition (60.7% vs. 86.7%), $\chi^2(1, N = 58) = 5.09, p = .024, \phi = .30$. However, among those in positive affect, their choice of the delayed check didn't differ significantly between the planning and the control task condition (85.7% vs. 80%, respectively), $\chi^2(1, N = 57) = .26, p > .6$ (see Figure 3.1). Thus, supporting our hypothesis, in positive affect, people's choices were not influenced by the procedurally primed mindsets. Comparing people's choices in each mindset condition separately shows that, within the planning condition, positive-affect people were more likely to choose the delayed check (85.2%) than were those in neutral affect (60.7%), $\chi^2(1, N = 55) = 4.15, p = .042, \phi = .27$. On the other hand, within the control task condition, the positive (80%) and the neutral affect condition (86.7%) didn't differ, $\chi^2(1, N = 60) = .48, p > .4$. We speculate that this is because the control task put even those in the neutral affect condition into a mildly positive state afterwards.

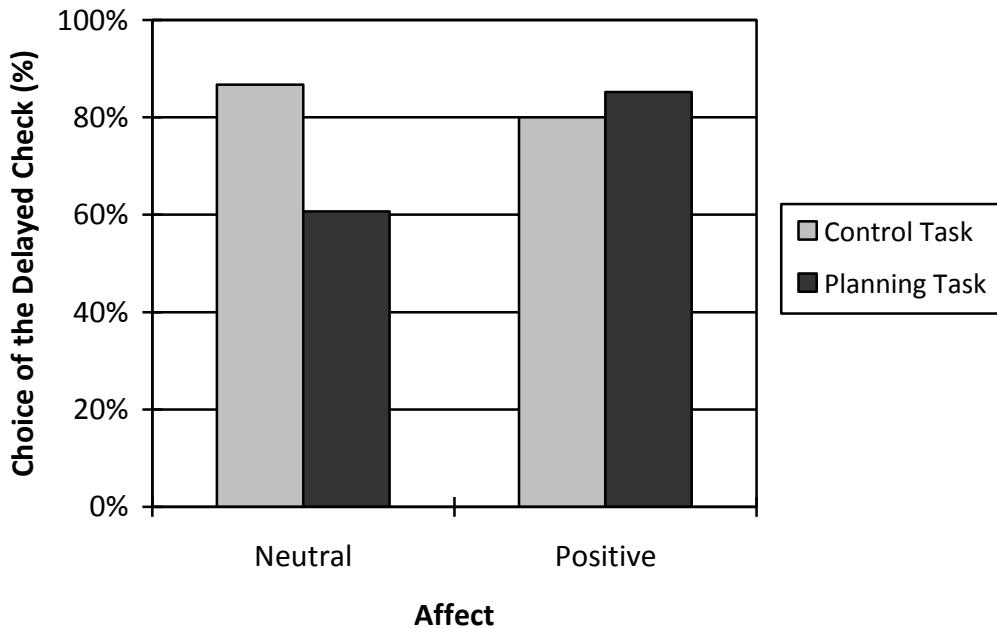


Figure 3.1. Choice percentage of the delayed-larger gift check as function of affect and mindset priming task (Study 2).

STUDY 3: CUSTOMER REWARD PROGRAM CHOICE

The objective of study 3 is to replicate earlier findings with convergent methods, using a different affect induction method, a different mindset priming task, and an intertemporal choice in a different context. In this study, we induced affect using pictures, and manipulated people's mindset using a procedural priming task that has been used by other researchers in the construal level theory literature. Also, we framed the intertemporal choice to be more applicable to real-world settings.

Method

Affect manipulation. Participants ($N = 81$) were randomly assigned to one of four

conditions in a 2 (affect: positive, neutral) \times 2 (construal level: high, low) between-subjects design. In the first task which was intended to carry out affect induction, participants were told that they would pre-test a set of pictures designed for a future study, and viewed 13 either mildly positive (e.g., flower, puppies) or neutral pictures (e.g., chair, door) depending on their affect condition. The pictures had been pre-tested to differ on affective states but not on arousal. Each picture advanced automatically by computer after exposure of six seconds, and after viewing the whole set of pictures, participants completed a 13-item questionnaire asking about the picture set. Three of the items (positive-negative, pleasant-unpleasant, happy-sad) were designed to assess affective states, and were later combined for an affect index variable ($\alpha = .96$; 1 = positive, 5 = negative).

Mindset manipulation. After the picture task, participants received a procedural priming task for mindset manipulation. In the task, for an identical activity ("Improving and Maintaining One's Psychical Health"), participants answered the questions of either "why" (high level) or "how" (low level) they engage in the activity depending on their mindset condition (Freitas, Gollwitzer, & Trope, 2004). Participants in both conditions completed four blank boxes connected with either upward (high level) or downward (low level) arrows to the target activity. Thus, whereas the low-level mindset task (i.e., planning task) was longer than the control task in study 2, in study 3, the tasks in both mindset conditions were identical in terms of the length and the procedure, except for the concreteness and the level of construal of the responses. Following the method in the literature (e.g., Liberman & Trope, 1998), for mindset manipulation check, participants' each response was scored based on the level of construal. If the response was thought of as a subordinate means to the target activity (low-level construal), it received a score of -1, and if it was thought of as a higher end served by the activity (high-level construal), it received a score of 1. Responses which belong to neither were

coded as 0. Then, the scores for four responses were combined for each participant and used as an index of construal level with a range of -4 to 4. Thus, higher scores indicate a higher level of construal.

Intertemporal choice. After the mindset priming task, participants received an ostensibly unrelated “Consumer Preference Survey” study. They were told that a well-known supermarket store in their neighborhood is trying to launch a new customer reward program, and the firm would like to know customers’ preferences beforehand. The new reward program will offer a reward point for every dollar spent on the purchases at the store, and they can be redeemed for a variety of items at the store as well as for cash back. Specifically, two types of programs will be available: 1) earning 1 reward point for every \$1 you spend, and the reward points can be redeemed instantly, and 2) earning 1.5 reward points for every \$1 you spend, but the reward points can be redeemed after 1.5 months of the purchase. Participants were asked to indicate their preference on a 1 (*Certainly, Type 1*; the instant reward program) to 9 (*Certainly, Type 2*; the delayed reward program) scale, and also by a forced choice measure.

Results

Affect manipulation check. People who viewed the positive picture set reported feeling happier ($M = 1.24, SD = .41$) than those who watched the neutral set ($M = 2.83, SD = .63$), $t(79) = 13.54, p < .001$.

Mindset manipulation check. As expected, people who answered “why” questions ($M = 3.90, SD = .63$) were in the higher level of construal than those who answered “how” questions ($M = -3.63, SD = .99$), $t(68.07) = 40.84, p < .001$. However, affect didn’t have an influence on their level of construal ($M_{\text{positive}} = .02, SD = 3.95$ vs. $M_{\text{neutral}} = .15, SD = 3.85$), $t(79) = .15, p > .8$, and it didn’t interact with the mindset priming condition. Thus, independent of the initial affect

induction, all participants were successfully put into either a high or a low level of construal depending on their mindset condition.

Reward program preferences and choice. A 2 (affect: positive, neutral) \times 2 (construal level: high, low) ANOVA conducted on the preference ratings revealed a significant interaction of affect and construal level, $F(1, 77) = 5.20, p = .025, \eta^2 = .06$. Within the neutral affect, we replicated earlier findings in the literature: People in high-level construal ($M_{\text{high}} = 7.55, SD = 1.93$) liked the larger-delayed reward program more than did those in low-level construal ($M_{\text{low}} = 5.25, SD = 2.92$), $F(1, 77) = 7.96, p = .006, \eta^2 = .09$. However, as in study 2, positive-affect people's intertemporal preferences were not influenced by the levels of construal ($M_{\text{high}} = 6.40, SD = 2.80$ vs. $M_{\text{low}} = 6.71, SD = 2.55$), $F(1, 77) = .15, p > .6$. Comparing the two affect conditions within each construal level condition separately, showed that within the low-level construal condition, positive-affect people liked the delayed reward program more than did those in neutral affect, and this was marginally significant, $F(1, 77) = 3.31, p = .073, \eta^2 = .04$. Within the high-level construal condition, the difference between the two affect conditions was not significant, $F(1, 77) = 1.99, p < .2$.

Chi-square analyses for the choice measure revealed the same results (see Figure 3.2). Among those in neutral affect, replicating the earlier findings, participants in high-level construal were more likely to choose the delayed reward program than those in low-level construal (90% vs. 50%, respectively), $\chi^2(1, N = 40) = 7.62, p = .006, \phi = .44$. However, among those in positive affect, their choices of the delayed reward didn't differ between high- and low-level construal conditions (70% vs. 85.7%, respectively), $\chi^2(1, N = 41) = 1.48, p > .2$. Thus, overall, positive-affect people preferred the delayed-larger reward, and their choices were not influenced by the procedurally primed mindsets. Comparing the affect conditions in each construal level condition separately, again, shows that within the low-level construal condition,

positive-affect people were more likely to choose the delayed reward than those in neutral affect (85.7% vs. 50%, respectively), $\chi^2(1, N = 41) = 6.03, p = .014, \varphi = .38$. On the other hand, within the high-level construal condition, the difference did not reach the statistical significance level (70% vs. 90%, positive and neutral affect, respectively), $\chi^2(1, N = 40) = 2.50, p < .2$.

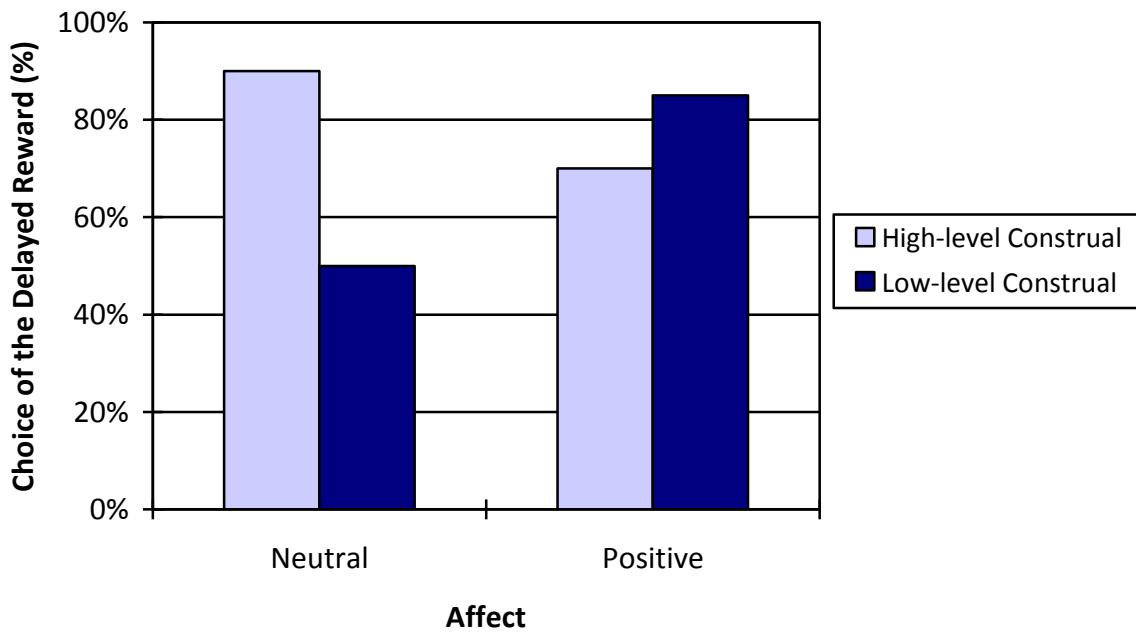


Figure 3.2. Choice percentage of the delayed-larger customer reward program as function of affect and construal level (Study 3).

STUDY 4: SPENDING VERSUS SAVING

Method

The objective of study 4 is to conceptually replicate earlier findings with different types of intertemporal decision making: We examined how much people would like to spend their money away versus to save it for later. Affect and mindsets were induced and confirmed in the

same way as in study 3. Then, participants ($N = 75$) received the next questionnaire entitled “Consumer Preference Survey,” in which they were asked to imagine that they received a \$500 bonus from the company they had worked for over the last summer. Specifically, they were asked what they would like to do with the money and presented with two options: 1) spend it, and 2) put it in a saving account. Participants indicated their preferences by allocating the \$500 between the two categories (with a total to sum to \$500).

Results

Affect manipulation check. As expected, people in the positive affect condition ($M = 1.25$, $SD = .42$) reported feeling happier than those in the neutral affect condition ($M = 2.83$, $SD = .66$), $t(73) = 12.41$, $p < .001$.

Mindset manipulation check. Participants who answered “why” questions ($M = 3.89$, $SD = .65$) were in the higher level of construal than those who answered “how” questions ($M = -3.59$, $SD = 1.04$), $t(60.08) = 37.31$, $p < .001$. Again, affect didn’t influence their level of construal ($M_{\text{positive}} = .13$, $SD = 3.95$ vs. $M_{\text{neutral}} = .27$, $SD = 3.83$), $t(73) = .15$, $p > .8$, and it didn’t interact with the mindset priming condition.

Spending (versus saving) amount (\$). A 2 (affect) \times 2 (construal level) ANOVA conducted on the money allocated to spending (versus saving) revealed a main effect of construal level, $F(1, 71) = 4.15$, $p = .045$, and an interaction of affect and construal level, $F(1, 71) = 4.81$, $p = .032$, $\eta^2 = .06$. Specifically, among the neutral affect condition, those in low-level construal allocated more money to spending ($M = \$262.22$, $SD = 110.27$) than did those in high-level construal ($M = \$155.79$, $SD = 97.88$), $F(1, 71) = 8.83$, $p = .004$, $\eta^2 = .11$. However, among the positive affect condition, their spending didn’t differ between the construal level conditions ($M_{\text{high}} = \$175$, $SD = 126.11$ vs. $M_{\text{low}} = \$171.05$, $SD = 99.05$), $F(1, 71) = .01$, $p > .9$. Thus, again, the levels of construal

had no impact on spending among the positive-affect people, while among the controls, the earlier findings in the literature were replicated.

GENERAL DISCUSSION

Affect and cognitive mindset both have been shown to influence people's self-control, more specifically intertemporal preferences. However, how they would interact with each other in intertemporal decision making has not been examined yet. In this research, using convergent methods, we demonstrate that people in positive affect are able to hold back from the maladaptive influence of low-level mindsets, and show the same level of delay of gratification without getting stuck in the procedurally primed mindsets. Over the four studies, we induced affect in two ways, using video clips and pictures, and manipulated cognitive mindsets using different procedural priming tasks. Also, people's intertemporal preferences were assessed in multiple contexts, by examining their choice between sooner-smaller and delayed-larger rewards in various formats, and their allocation of money between spending and saving. We obtained consistent findings: As shown in the literature, concrete low-level mindsets led to relatively greater present-biased preferences among those in neutral affect, but under positive affect, the effects of the mindset priming were eliminated.

The results of the current research contribute to the affect as well as the intertemporal choice literature. In this research, we induced affect before manipulating cognitive mindsets in order that the procedurally primed mindsets do not get washed away by the following affect induction task. Thus, it is a more conservative measure of the effects of affect, and we were still able to observe the effects of the initially induced mild positive affect even after the mindset priming task. This suggests that affective states may last longer than one might think. In some

situations, people may not be able to report their mild affective states consciously, but the effects of affect could still be manifested in the form of behavioral or implicit measures. While the current research examined the interaction of affect and cognitive mindsets primarily in the domain of intertemporal preferences, their interaction in other domains can be investigated further in future research.

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CHAPTER 4

CONCRETE CONSTRUAL OF MONTH AND YEAR WITH AN INTEGRATIVE PERSPECTIVE: POSITIVE AFFECT REDUCES BUDGETING BIAS BY ENHANCING COGNITIVE FLEXIBILITY

Accurate estimation of future spending is important for consumers' welfare and well-being since it directly influences their financial decisions in the present as well as for the future. The errors in budget estimation can be costly, for instance, resulting in overspending and excessive consumer debt. Decades of research in psychology suggests that people are poor at predicting their future actions and performances in a variety of judgment and decision domains (for review, see Dunning 2007; Ross and Buehler 2001). For example, people often mispredict how much time they will need to complete a project or work, typically underestimating their task-completion time ("planning fallacy"; Kahneman and Tversky 1979). While the prediction bias is very well documented in terms of time-related decisions (e.g., Buehler, Griffin, and MacDonald 1997; Buehler, Griffin, and Ross 1994, 2002), relatively little research has examined people's prediction bias in the domain of financial, money-related decisions.

Recent research has started examining this area, and demonstrated that personal spending or budgeting decisions are no exception to this prediction bias. Specifically, people tend to predict that they would spend substantially less money than they actually spend ("budget fallacy"; Peetz and Buehler 2009), and further, their budget estimates are heavily influenced by the temporal frame of the budget period ("budgeting bias"; Ülkümen, Thomas, and Morwitz 2008). For example, people's budget estimates for the *next month* tend to be lower than their actual expenses, whereas those planned for the *next year* are closer to their actual

expenses. Thus, the research has delineated the problem, showing that prediction bias does exist for budgeting decisions as well, and offers plausible explanations about why it occurs. However, potential interventions to reduce such bias have not been fully investigated yet.

The purpose of this article is to offer one way to reduce the bias. Specifically, we propose that putting people into a mild positive affective state can reduce the budgeting bias. Drawing on the affect and neuropsychology literature suggesting that positive affect increases cognitive processing capacity and flexibility (Federmeier et al. 2001; Isen 2008; Subramaniam et al. 2009), and thus enables an extended, long-term time perspective (Pyone and Isen 2011), we hypothesize that under positive affect, people are more likely to consider multiple expense categories in detail (i.e., unpacking or decomposing future budgets), and they do so with an extended and integrative time perspective. Thus, the concrete construal of future budgets will mitigate people's underestimation tendency especially under the month frame, and thus their budget estimates will be less likely to be influenced by the temporal frame of the budget period. In following sections, first, we will briefly review the research on budgeting bias and the role of positive affect in enhancing cognitive flexibility, and then present three studies examining the influence on budgeting bias of positive affect and other related cognitive interventions.

THEORETICAL FRAMEWORK

Prediction Bias in Budgeting

It is prevalent that people underestimate their task-completion time, which is known as "planning fallacy" (Kahneman and Tversky 1979), and this leads to typical problems of procrastination or delays in projects. Similarly, people do underestimate their spending in the near future. For example, people predicted that they would spend less in the upcoming week

than they actual spent (Peetz and Buehler 2009), and their estimated budgets for the next month were lower than their actual expenses. However, interestingly, this bias was reduced when they were budgeting for a distant, longer time period, such that their unitized budget estimates for the next year (vs. next month) were closer to their actual expenses (Ülkümen et al. 2008).

Researchers further explored possible factors that may cause this bias. Peetz and Buehler (2009) offer a motivational account. That is, people's general desire to minimize future spending or to save money (i.e., savings goals) leads to underestimation of their spending in the near future, but the savings goals often do not lead to actual saving behavior, which results in overspending. Thus, the gap between motivated intention and actual behavior seems to be the source of the prediction bias. On the other hand, Ülkümen, Thomas, and Morwitz (2008) offer a metacognitive account. They found a similar underestimation bias for the budgets predicted for a near, shorter time period, "next month," but not for the "next year." They posit that the ease or difficulty of the budgeting task influences people's confidence about their budget estimation, and the feeling of confidence subsequently influences their adjustments to the initial estimates. That is, budgeting for the next year (vs. next month) is more difficult, and thus people feel less confident about their estimation, and the lack of confidence leads them to make upward adjustments to their budget estimates for the next year, which ironically results in more accurate estimation.

Although each offers different explanations, researchers seem to agree that the bias is less likely to be caused by one single factor. Rather, multiple factors (e.g., whether to consider past experiences, number of expenditure categories considered) seem to jointly play roles in producing the bias. Yet, beyond these underlying factors, what is consistently and clearly observed is that people tend to underestimate their future budgets, and this is influenced by the temporal frame of the budget period. That is, people's budgets predicted for a near, shorter time

period (next month) are inaccurately low (i.e., underestimated), whereas their budget estimates for a distant, longer time period (next year) are closer to their actual expenses. This will be the primary focus of the present research.

Positive Affect Increases Cognitive Flexibility

Decades of research findings on the influence of positive affect on cognitive processes suggest that positive affect increases cognitive flexibility (e.g., Ashby, Isen, and Turken 1999; Isen 2009; Isen and Daubman 1984; Subramaniam et al. 2009), and thus it leads to more inclusive, integrative, and creative thinking (e.g., Amabile et al. 2005; Isen 2008; Isen, Daubman, and Nowicki 1987) and broadens the scope of cognition and attention (Fredrickson and Branigan 2005).

Specifically regarding intertemporal decision making, recent research suggests that under positive affect, people are more likely to consider future as well as present outcomes in the context of one another, and thus they are more likely to wait for a larger delayed reward (Pyone and Isen 2011). More importantly, they demonstrate that this willingness to wait among positive-affect people is contingent on the reward difference between immediate and delayed rewards (i.e., observed only when the delayed reward is perceived substantially larger than the immediate reward) by flexibly changing their positive thoughts about the delayed reward relative to the immediate one. Thus, the research suggests that under positive affect, willingness to wait was enabled by increased cognitive flexibility which entails consideration of relational and contextual properties, rather than by increasing lenient inattentiveness in a global sense. In short, positive affect helps people do more integrative thinking with an extended scope, but it also facilitates incorporating contextual components for decision making.

The Influence of Positive Affect on Budgeting Bias

Based on the research suggesting that positive affect enhances cognitive flexibility, and thus facilitates considering multiple aspects of a situation and construing intertemporal outcomes in a more integrative way (Pyone and Isen 2011), we propose that under positive affect, people's intertemporal budgets will be less likely to be influenced by the temporal frame of the budget period. That is, their unitized budget estimates would stay the same regardless of whether they are estimated under the "next month" or the "next year" frame.

Specifically, we predict that positive affect will reduce the budgeting bias by mitigating people's underestimation tendency (i.e., increasing their underestimated budgets) under the next month frame, rather than by decreasing the accurately estimated budgets under the next year frame. Research demonstrates that the budgeting bias stems from people's underestimation tendency under the next month frame, and several factors (e.g., savings goals, ease of estimation, disregarding past experiences) have been suggested as possible reasons for this underestimation tendency (Ülkümen et al. 2008; Peetz and Buehler 2009, 2012). While the exact underlying process was not fully captured, it appears that the near and shorter time frame (next month) narrows people's scope of thinking, and this leads to less comprehensive (myopic and cursory) construal of budget estimates. For example, people took fewer categories into consideration when budgeting for the next month (vs. next year), their unitized budget estimates per category were lower under the next month (vs. next year) frame (Ülkümen et al. 2008), and they were less likely to use the information from past experiences when budgeting for the upcoming (vs. distant) week (Peetz and Buehler 2012). This might be because people's belief that they can control their future spending or budgets is stronger for the near and shorter time period, which subsequently leads to greater confidence. And, this might have resulted in less thoughtful consideration of possible expenses for the next month frame.

While prior research focused on what triggers this tendency, in this research we focus on how to reduce it: We hypothesize that, because positive affect facilitates processing multiple budget categories for estimation, positive-affect people's budget estimates will be more likely to be unpacked or decomposed under the next month frame as well as under the next year frame. This will specifically reduce the underestimation tendency under the next month frame, which, in turn, will lead to a decrease in budget variability across the temporal frames of the budget period among the positive affect group (i.e., reduces budgeting bias).

Overview of Present Studies

In this research, we test the hypothesis that positive affect reduces budgeting bias and explore other possible interventions that can also reduce the bias. Over three studies, we induced positive and neutral affect in two different ways, and then asked participants to estimate their budgets for the next month or next year depending on their condition. In study 1, we examine if positive affect can reduce budgeting bias, and consider the underlying processes. Based on the results of study 1, we design potential interventions and test if they can reduce the bias among the neutral affect group. Specifically, study 2 examines if procedural priming of a concrete mindset which prompts decomposition of budget estimates can reduce the bias, and study 3 examines if cuing yearly budgets while budgeting for the next month can reduce the bias.

STUDY 1: BUDGETING FOR THE NEXT MONTH VERSUS NEXT YEAR

The objective of study 1 is to examine the influence of positive affect on budgeting bias and to explore the underlying processes. We manipulated affect using pictures, and then

following Ülkümen and colleagues' (2008) design, we asked participants to budget for the next month or next year depending on their condition. Our main interest was in if participants in positive affect would be less likely to underestimate their budgets for the next month than those in neutral affect, and also if they would take more expense categories into account than controls for their budget estimation.

Method

Participants and design. Ninety three students at a large northeastern university participated in this study in exchange for extra credit toward their course grade. Participants were randomly assigned to one of four conditions in a 2 (affect: neutral, positive) \times 2 (time frame: month, year) between-subjects design, and were told that they would complete several short studies for the experiment.

Affect induction. In the first study which was intended to carry out affect induction, participants were told that they would pre-test a set of pictures for future experiments, and were presented with 14 either positive (e.g., flowers, puppies) or neutral pictures (e.g., chairs, windows) as a set in a slideshow. The pictures had been pre-tested to be different in affect, but equivalent in arousal, and had been shown to manipulate affect successfully in prior research (Pyone and Isen 2011). Each picture was advanced by computer automatically after exposure of six seconds. After viewing the whole set, participants indicated how the image set had made them feel on 7-point scales, asking about different feelings. Three of the items were intended to assess positive affect (*positive-negative*, *pleasant-unpleasant*, and *happy-sad*), and were later combined to create an index of positive affect.

Budgeting task. After the affect induction task, participants received an ostensibly unrelated budgeting study in which they were asked to budget for the next month or next year

depending on their condition. In the instruction, they were told to take a moment and imagine their life during the next month (or next year). Then, they reported expense categories they considered and indicated an amount for each of the categories they listed. After that, they indicated their total budget for the respective budget period (next month or next year).

Results

Affect manipulation checks. An index variable of positive affect was obtained by averaging ratings on three items (*positive-negative*, *pleasant-unpleasant*, and *happy-sad*; $\alpha = .97$; 1 = positivity, 7 = negativity). T-test results revealed that participants experienced more positive feelings after viewing the positive ($M = 1.90$, $SD = 1.04$) than the neutral ($M = 3.24$, $SD = 1.27$) picture set ($t(91) = 5.59$, $p < .001$).

Number of expense categories. In order to compare the number of expense categories across conditions, we conducted a 2 (affect: neutral, positive) \times 2 (time frame: month, year) between-subjects ANOVA on the total number of budget categories generated. Results revealed a significant main effect of time frame, such that participants considered more categories under the year frame ($M = 5.22$, $SD = 1.35$) than the month frame ($M = 4.08$, $SD = 1.16$; $F(1, 89) = 18.74$, $p < .001$). More importantly, there was a significant main effect of affect. Supporting our hypothesis, overall, positive-affect people ($M = 4.94$, $SD = 1.31$) considered more categories than those in neutral affect ($M = 4.30$, $SD = 1.37$; $F(1, 89) = 5.07$, $p < .05$). Although the interaction of affect and time frame was not significant, since we were interested in if the positive affect group considered more categories than those in neutral affect, especially under the next month frame, we compared two affect conditions within each time frame. Pairwise comparisons results revealed that, within the month condition, the number of budget categories seemed to be higher in the positive than the neutral affect condition ($M_{\text{positive}} = 4.42$ vs. $M_{\text{neutral}} = 3.75$; $F(1, 89) = 3.51$, p

= .06), while the difference was not significant within the next year condition ($M_{\text{positive}} = 5.44$ vs. $M_{\text{neutral}} = 4.95$; NS).

While examining participants' expense categories, we noticed that some people included *tuition* in their yearly budget categories. Indeed, there was a significant difference between the month and year conditions in terms of whether tuition was included or not (percentage of people who included tuition: 33.3% vs. 0%, for the year and the month condition, respectively; $\chi^2 (1) = 19.08, p < .001$). Because, tuition, by nature, is to be included in the yearly budget, but not in the monthly budget, it should be excluded from the analysis comparing budget estimates between the month and year conditions.

Another commonly reported expense category was *housing rent*. Although there was no significant difference between the month and year conditions in the inclusion of housing rent, it appeared that people in the positive affect condition (42.9%) were more likely to include housing rent in their budget categories than were those in neutral affect (25%, $\chi^2 (1) = 3.28, p = .07$). On one hand, this is compatible with our hypothesis that positive affect facilitates taking more expense categories into account, but it is also possible that, for some people, housing rent is not counted as expenses in their budget estimation. In other words, it is not clear if housing rent was left out because of their myopic and less comprehensive construal of budget estimates, or because of individual differences in the norms of budget planning. Furthermore, housing rent as well as tuition takes up a great portion of total budget estimates compared to other expense items due to the nature of the expense, and this creates huge variances in budget estimates. Thus, although including housing rent in the analysis will favor our hypothesis, in order to measure budgeting bias more conservatively and to minimize the noise from irrelevant random factors, we compared budget estimates with tuition and housing rent excluded in the subsequent analyses. By doing so, we can ensure that the differences in budget estimates across

conditions are not attributed to the inclusion of these two items.

We re-ran the same ANOVA on the total number of categories after excluding tuition and housing rent. This time, only was the main effect of time frame significant: The number of expense categories was still greater in the year than the month condition ($M_{\text{year}} = 4.49$ vs. $M_{\text{month}} = 3.79$; $F(1, 89) = 7.71, p < .01$). While the interaction of affect and time frame was not significant, pairwise comparisons results suggested that among the neutral affect group, their number of budget categories was still influenced by the temporal frame of the budget period: Fewer categories were considered under the month than the year frame ($M_{\text{month}} = 3.58$ vs. $M_{\text{year}} = 4.35$; $F(1, 89) = 4.59, p < .05$). No other comparisons were significant.

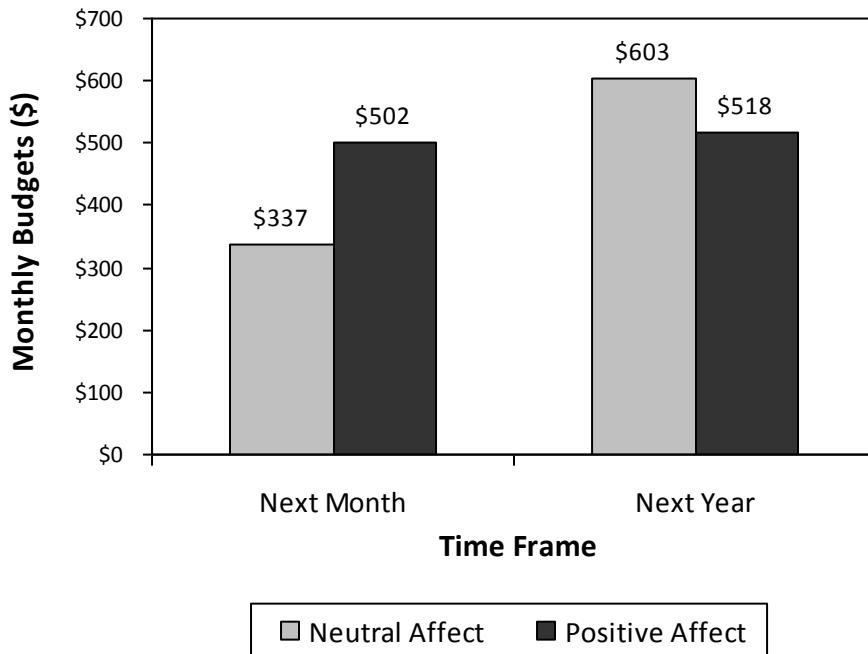
Budget estimates (\$). In order to compare budget estimates across conditions, we obtained unitized monthly budgets by dividing total budget estimates (with tuition and housing rent excluded) by the number of month corresponding to the budget period (1 for the next month condition, and 12 for the next year condition). A 2 (affect: neutral, positive) \times 2 (time frame: month, year) between-subjects ANOVA was conducted on the log-transformed unitized monthly budgets. Note that the analysis on the raw data produces the same effects. For the purpose of data presentation, we will report raw means and standard deviations here.

First, the analysis revealed a significant main effect of time frame, such that unitized monthly budgets were lower for the next month ($M = \$419.50, SD = 249.78$) than the next year ($M = \$555.65, SD = 307.07; F(1, 89) = 5.00, p < .05$). More importantly, there was a significant interaction of affect and time frame ($F(1, 89) = 4.44, p < .05$). Supporting our hypothesis, under the next month condition, positive-affect people's budget estimates ($M = \$502.03, SD = 298.48$) were higher than those of controls ($M = \$336.88, SD = 155.42; t(89) = 2.2, p < .05$), whereas under the next year condition, there was no significant difference ($M_s = \$518.03$ vs. $\$602.67$; for positive and neutral affect, respectively, NS; see figure 4.1). Comparing month and year

conditions within each affect condition also produced results that are compatible with our hypothesis: Among the positive affect group, their budget estimates didn't differ between the time frame conditions; however, among the neutral affect group, as shown in the literature, their budget estimates were significantly lower for the next month than the next year ($t(89) = 2.99, p < .01$).

FIGURE 4.1

STUDY 1: BUDGET ESTIMATES ACROSS MONTH AND YEAR FRAMES BY AFFECT



Budget per category (\$). Another way to look at budgeting bias is to compare per-category budget estimates across the conditions. It is possible that, although those in neutral affect reported fewer categories than those in positive affect, they might have put more money into each category because their categories are more inclusive than those of the positive affect

group. Thus, in order to compare per-category budget amounts, we divided the unitized monthly budgets by the number of expense categories. The analysis revealed a significant interaction of affect and time frame ($F(1, 89) = 4.03, p < .05$). Pairwise comparisons showed that those in the neutral affect group did not necessarily put more money into each category than those in positive affect, and their per-category budget was also influenced by the temporal frame of the budget period, such that it was lower under the month than the year frame ($M_{month} = \$103.36, SD = 66.75$ vs. $M_{year} = \$150.46, SD = 86.54$; $t(89) = 2.10, p < .05$). Thus, as for the budget estimates, participants in neutral affect showed budgeting bias in terms of the per-category budget as well. In contrast, among those in positive affect, again, their per-category budget was not influenced by the temporal frame of the budget period ($M_{month} = \$130.90$ vs. $M_{year} = \$115.94$; NS).

Discussion

The results of study 1 supported our hypothesis, demonstrating that under positive affect, people were less likely to underestimate budgets under the month frame compared to those in neutral affect, and they are more likely to consider multiple expense categories across the intertemporal frames. In other words, their budget estimates were not influenced by the temporal frame of the budget period. However, under neutral affect, replicating earlier findings in the literature, participants' unitized budget estimates were significantly lower for the next month than the next year. It appeared that controls took fewer expense categories into account under the month (vs. year) frame, and their per-category budget was significantly lower under the month than the year frame. Thus, the budgeting bias among controls seems to arise from two sources under the month frame: 1) less detailed processing of potential expense items (i.e., less unpacked or less decomposed construal of budget estimates), and (or) 2) setting a lower

budget for each category. In the next two studies, we explore potential interventions which can reduce such underestimation bias under the month frame among controls.

STUDY 2: PROCEDURAL PRIMING OF CONCRETE DECOMPOSITION MINDSET

The results of study 1 suggest that one major difference between the positive and the neutral affect condition is in the number of expense items considered for their budget estimation. That is, people in positive affect are more likely to consider multiple expense categories across the temporal frames of the budget period. In contrast, among those in neutral affect, their lack of consideration of enough expense categories, particularly under the month frame, seemed to contribute to their underestimation tendency.

Coming up with multiple budget categories may mean that their budgets are more concretely construed in detail, and this is also similar to the concept of “unpacking” (Kruger and Evans 2004) or “decomposition” (Connolly and Dean 1997; Forsyth and Burt 2008) which has been shown to increase people’s prediction accuracy of their task-completion time estimation. In study 2, we examine if procedurally priming such concrete mindset which prompts unpacking or decomposition can reduce budgeting bias among controls, without inducing positive affect.

Specifically, we predicted that among the neutral affect group, priming a concrete mindset would decrease their underestimation tendency under the month frame. Thus, their budget estimates for the next month would not be significantly different from those of the positive affect group. Also, neutral-affect people’s unitized budget estimates would not differ between the month and the year condition under the concrete mindset condition (i.e., reduction of budgeting bias). On the other hand, among the positive affect group, their budget estimates

would not be affected by this mindset priming task since they would be already unpacking their budget estimates under the control as well as under the concrete mindset condition. Regarding the budget categories, we expected that priming a concrete mindset would also increase the number of expense categories considered among the neutral affect group, especially under the month frame.

In this study, we manipulated affect in a different way from study 1, using video clips. Also, in order to get insight on people's mental representation of budget categories, we have them list expense categories in two levels, superordinate and subordinate, so that we can measure the level of abstractness or concreteness of their budget categories.

Method

Participants and design. One hundred and fifty eight students participated in this study in exchange for extra credit toward their course grade. Five cases were excluded from the data analysis because one participant left the total budget estimate blank, and four people included exceptional purchases (e.g., a diamond ring for engagement, a car) in their budget items and their unitized budget estimates fell more than 3 standard deviations away from the mean. This left a total of 153 cases. Participants were randomly assigned to one of eight conditions in a 2 (affect: neutral, positive) \times 2 (mindset: control, concrete) \times 2 (time frame: month, year) between-subjects design, and were told that they would complete a set of unrelated studies for the experiment session.

Affect induction. In the first task which was intended to carry out affect induction, participants were told that they would pre-test a short video clip designed for a future study on visual attention. In the positive affect condition, they watched an amusing cartoon clip which shows a dancing hippo, and in the neutral affect condition, participants watched a video clip

showing color sticks moving around (Gross and Levenson 1995). Both clips were 63 seconds long, and have been shown to induce affect successfully in prior research (Pyone and Isen 2011). After watching the clips, participants completed a 13-item questionnaire asking what they thought of the visual image of the clip, and how the clip had made them feel on 5-point scales. Three of the items (*positive-negative, pleasant-unpleasant, happy-sad*) were intended to assess participants' affective states.

Concrete mindset manipulation. After the affect induction task, participants received a second task designed for mindset manipulation. They were asked to imagine taking a weekend trip to New York City, and then half of the participants (control condition) were provided with a short list of tourist spots or activities in New York City and chose three items which they would be interested in. The other half of the participants (concrete mindset condition) were asked to plan the trip in detail in two stages. In the first stage ("packing your bag"), participants were asked to list all the items that they would take on the trip. In the next stage ("transportation"), they chose a method of transportation and described how they would make the reservation or preparation in detail. Participants were asked to be as specific as they could in the process.

After the procedural mindset priming task, participants' affective states were measured once again in an implicit way in order to see if the initially induced affective states were still there. Following prior research (Isen et al. 1985), we asked participants to list the first five words that come to mind that begin with the letter "H." The research suggests that people in positive mood tend to generate more positive and unusual word associations because their cognitive organization becomes more flexible (Isen 1993; for discussion, see Isen and Erez 2007), and this has been associated with improved creative problem solving ability fostered by positive affect (Isen et al. 1987). Thus, we scored participants' each word associate in terms of its positivity and

unusualness by giving 1 point to each positive or unusual word associate, and combined the score points for each participant.

Budgeting task. After the mindset manipulation check, participants received the budgeting task. The questionnaire was almost identical to the one in study 1, except for one thing. While in study 1, the budgeting questionnaire has two columns (category and amount (\$)), in this study we added one more column for “sub-items (components).” Thus, participants were able to list budget categories in two levels: superordinate (high) and subordinate (low), and this allowed us to see the depth or concreteness of their budget categorization process.

Results

Affect manipulation checks. As in study 1, an index variable of positive affect was created by averaging means on three items (*positive-negative, pleasant-unpleasant, happy-sad*; $\alpha = .93$; 1 = positive, 5 = negative). T-test results confirmed that those who watched the amusing clip felt more positive ($M = 1.62$, $SD = .68$) than those who watched the neutral clip ($M = 3.26$, $SD = .84$; $t(150) = 13.23$, $p < .001$).

Number of packing items. In order to ensure that both positive and neutral groups performed the concrete mindset priming task successfully, we compared the number of packing items generated by each affect condition. There was no significant difference between the positive and the neutral affect condition ($M_s = 15.84$ vs. 15.92 , respectively, *NS*).

Affect manipulation checks – word associations. For each participant, positivity and unusualness scores were obtained by summing their points for the five word associates. A 2 (affect: neutral, positive) \times 2 (mindset: control, concrete) between-subjects ANOVA was conducted on the positivity, and also on the unusualness, separately. Regarding the positivity, there was only a main effect of mindset, such that, overall, participants in the control mindset

condition reported higher positivity scores ($M = 1.08, SD = .85$) than those in the concrete mindset condition ($M = .76, SD = .84; F(1, 148) = 5.40, p < .05$). We ran contrast tests in order to see if there are any differences across conditions. Contrast tests showed that among the positive affect group, those in the control mindset condition reported higher positivity scores than those in the concrete mindset condition ($M_{\text{positive-control}} = 1.18, SD = .82$ vs. $M_{\text{positive-concrete}} = .74, SD = .86, t(148) = 2.29, p < .05$). However, there was no significant difference between the positive-control and neutral-control conditions ($M_{\text{neutral-control}} = .97, SD = .87, \text{NS}$). Thus, it seems that after the control task, even those in the neutral affect condition were put into a positive affective state. There was no significant difference between the neutral-control and neutral-concrete conditions ($M_{\text{neutral-concrete}} = .78, SD = .83, \text{NS}$).

Regarding the unusualness, there was only a marginally significant main effect of affect, such that those in the positive affect condition reported higher unusualness scores than those in neutral affect ($M_{\text{positive}} = .73, SD = .84$, vs. $M_{\text{neutral}} = .48, SD = .76, F(1, 148) = 3.67, p < .06$). Interestingly, follow-up contrast tests revealed that the difference between positive and neutral affect conditions was significant specifically in the concrete mindset condition ($M_{\text{positive-concrete}} = .84, SD = .86$, vs. $M_{\text{neutral-concrete}} = .47, SD = .74, t(148) = 1.99, p < .05$). Thus, after the concrete mindset task, while the influence of the initially induced positive affect was not evidenced through the positivity scores, it was manifested in terms of the unusualness of their word associates.

Budget estimates (\$). As in study 1, unitized monthly budgets were obtained by dividing the total budget estimates (with tuition and housing rent excluded) by the number of month of the budget period (1 or 12). A 2 (affect: neutral, positive) \times 2 (mindset: control, concrete) \times 2 (time frame: month, year) between-subjects ANOVA was conducted on the log-transformed unitized monthly budgets. Note that the analysis on the raw data produced the same results.

For the purpose of data presentation, we will report raw means and standard deviations. The analysis revealed a main effect of time frame ($F(1, 145) = 7.23, p < .01$), an interaction of affect and mindset ($F(1, 145) = 3.85, p = .05$), an interaction of mindset and time frame ($F(1, 145) = 4.06, p < .05$), and more importantly, a three-way interaction of affect, mindset, and time frame ($F(1, 145) = 4.04, p < .05$).

Our main interest was in if the concrete mindset priming task would reduce the budgeting bias among the neutral affect group. Pairwise comparisons results partially supported our hypothesis. Under the concrete mindset condition, as we expected, the budget estimates for the next month of the neutral affect group didn't differ from those of the positive affect group, and also they didn't differ from the unitized budget estimates for the next year under the control mindset condition, which are considered as accurate budget estimates. Thus, procedural priming of a concrete mindset reduced the underestimation tendency under the month frame. However, neutral-affect people's budget estimates still significantly varied across the month and the year frame under the concrete mindset condition ($F(1, 145) = 16.83, p < .001$, see figure 4.2).

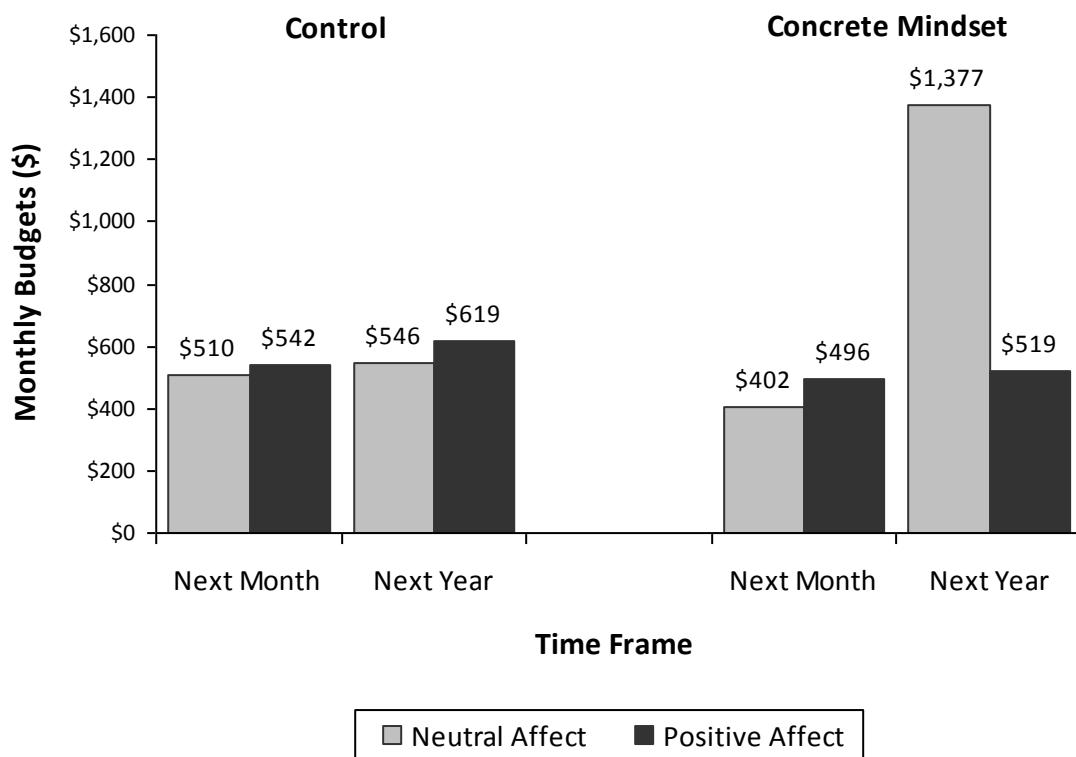
Specifically, while in study 1, the difference between the positive and the neutral affect condition was shown under the month frame, in this study, it was observed under the year frame under the concrete mindset condition ($F(1, 145) = 10.22, p < .01$). Thus, budgeting bias emerged in an unexpected way under the concrete mindset. Considering the budget estimates for the next year in study 1 and those in the control mindset condition of this study, it seems that neutral-affect people's budgeting bias comes from *overestimating* their budgets for the next year, rather than *underestimating* their budgets for the next month. Thus, while the concrete mindset priming reduces neutral-affect people's underestimation tendency under the month frame by increasing their underestimated budgets, it seems to create an overestimation

tendency under the year frame by increasing the otherwise accurately estimated budgets.

On the other hand, supporting our hypothesis, positive-affect people's unitized budget estimates didn't vary across the month and the year frame, and also across the control and the concrete mindset condition. Thus, they were not only free from the influence of temporal frame of the budget period, but also were not affected by the mindset priming.

FIGURE 4.2

STUDY 2: BUDGET ESTIMATES ACROSS MONTH AND YEAR FRAMES BY AFFECT AND MINDSET



Number of budget categories. We conducted a 2 (affect: neutral, positive) \times 2 (mindset: control, concrete) \times 2 (time frame: month, year) between-subjects ANOVA on the total number of budget categories. Again, as in study 1, there was a significant main effect of affect, such that positive-affect people considered more categories ($M_{\text{positive}} = 9.42, SD = 3.84$) than those in neutral affect ($M_{\text{neutral}} = 8.21, SD = 2.86; F(1, 145) = 5.06, p < .05$). Also, there was a significant interaction of mindset and time frame ($F(1, 145) = 4.59, p < .05$). In the control mindset condition, as shown in study 1, participants considered more categories under the year frame ($M_{\text{year}} = 9.43, SD = 3.67$) than the month frame ($M_{\text{month}} = 7.53, SD = 3.19, F(1, 145) = 6.71, p < .05$). However, in the concrete mindset condition, there was no significant difference ($M_{\text{year}} = 8.92, SD = 2.95$ vs. $M_{\text{month}} = 9.26, SD = 3.61, F(1, 145) = .21, NS$).

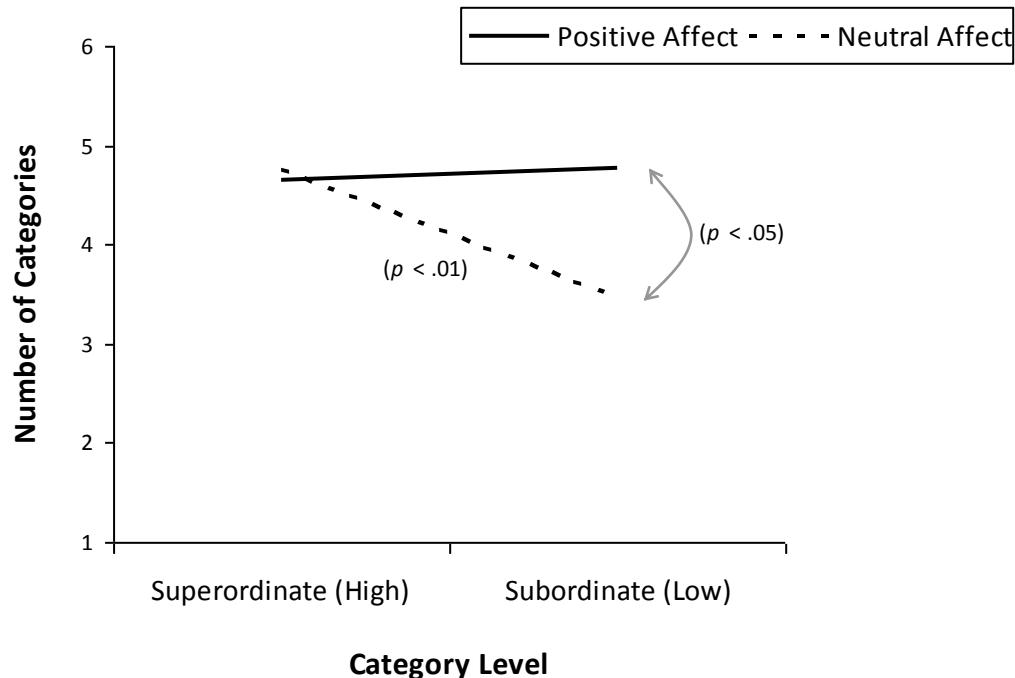
We also compared the two mindset conditions within each time frame. First, under the year frame, the control and the concrete mindset condition didn't differ in their number of budget categories ($M_{\text{year-control}} = 9.43$ vs. $M_{\text{year-concrete}} = 8.92, NS$). However, under the month frame, the concrete mindset condition considered more categories than the control mindset condition ($M_{\text{month-concrete}} = 9.26, SD = 3.61$ vs. $M_{\text{month-control}} = 7.53, SD = 3.19, F(1, 145) = 5.08, p < .05$). A three-way interaction among affect, mindset, and time frame was not significant. Thus, unlike our expectation, this mindset priming effect was not specifically pronounced among the neutral affect group. However, the overall pattern was compatible with our hypothesis. That is, the concrete mindset priming task eliminated budgeting bias in terms of the number of expense categories, by increasing the number of budget categories considered especially under the month frame. As in study 1, we re-ran the analysis excluding tuition and housing rent from the budget categories, and it produced the same results: The direction of effects and the significance level stayed the same.

In order to examine the depth or concreteness of the budget categorization process, we

conducted a 2 (affect: neutral, positive) \times 2 (mindset: control, concrete) \times 2 (time frame: month, year) \times 2 (category level: superordinate (high), subordinate (low)) mixed ANOVA, with category level as a within-subjects factor. The results revealed a significant interaction of affect and category level ($F(1, 145) = 4.93, p < .05$). That is, positive-affect people generated an equal number of high- and low-level categories; however, those in neutral affect generated more high-level categories than the low-level ones ($F(1, 145) = 8.21, p < .01$). Thus, the significant difference between the positive and neutral affect conditions emerged only for the low-level categories ($F(1, 145) = 6.09, p < .05$, see figure 4.3).

FIGURE 4.3

STUDY 2: NUMBER OF BUDGET CATEGORIES IN HIGH AND LOW LEVELS BY AFFECT

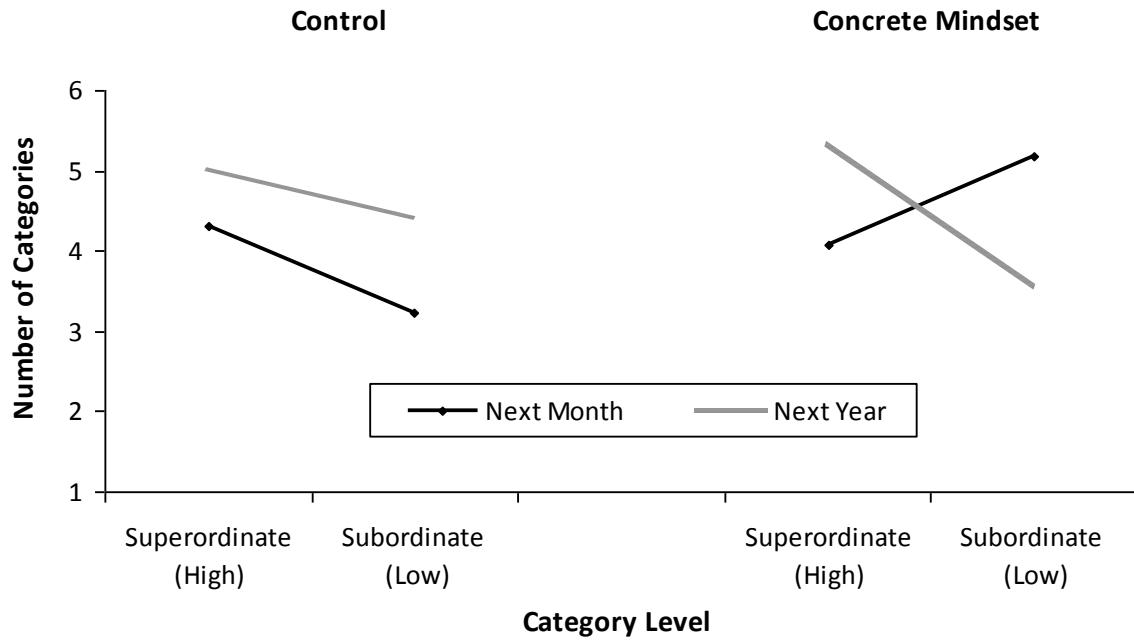


Further, there was a three-way interaction among mindset, time frame, and category

level ($F(1, 145) = 6.84, p = .01$). Specifically, the concrete mindset seemed to have different effects on budget categorization under the month and the year frame. Under the month frame, the concrete mindset appeared to generate more low-level categories than the high-level ones ($M_{\text{low}} = 5.18, SD = 3.41$ vs. $M_{\text{high}} = 4.08, SD = 1.36$), and the difference was marginally significant ($F(1, 145) = 2.81, p < .1$). However, under the year frame, it generated more high-level categories than the low-level ones ($M_{\text{high}} = 5.35, SD = 1.80$ vs. $M_{\text{low}} = 3.57, SD = 3.21, F(1, 145) = 7.34, p < .01$). In other words, the concrete mindset may facilitate in-depth elaboration of low-level budget categories under the month frame; in contrast, it facilitates elaboration of high-level categories under the year frame (see figure 4.4).

FIGURE 4.4

STUDY 2: NUMBER OF BUDGET CATEGORIES IN HIGH AND LOW LEVELS BY TIME
FRAME AND MINDSET



Discussion

Based on the findings in study 1, suggesting that positive affect facilitates considering multiple expense categories across the time frames, in study 2, we examined if inducing a concrete mindset which prompts such decomposition process can reduce budgeting bias among the neutral affect group. The procedural priming of a concrete mindset indeed facilitated considering more budget categories, and reduced neutral-affect people's underestimation tendency under the month frame. However, interestingly, it also increased their budget estimates under the year frame, creating an overestimation tendency. This also seems related to their budget category generation process: After being primed with a concrete mindset, participants generated more abstract high-level categories than specific low-level ones under the year frame. Thus, it suggests that prompting decomposition or unpacking through a procedural priming task may not completely reduce budgeting bias, and thinking in specific terms, under some circumstances, may induce a different type of bias.

One thing to note is that, within the control mindset condition, we did not observe the budgeting bias as shown in study 1. Neutral-affect people's budget estimates did not vary across the month and the year frame (i.e., no underestimation tendency under the month frame), and also within the month frame, we did not see any difference between the positive and the neutral affect condition. We speculate that this is because the control task asking participants to choose tourist spots or activities in New York City induced mild positive affect even among those who were initially assigned to the neutral affect condition. This is also supported by the implicit affect measure conducted after the mindset priming task: The positivity and the unusualness scores between the positive and the neutral affect condition did not differ significantly after the control task.

In the next study, we explore another type of intervention that might help reduce this budgeting bias. Specifically, we examine if cueing yearly budgets under the month frame can reduce the budgeting bias by extending people's scope of thinking.

STUDY 3: CUEING YEARLY BUDGETS

The results of study 2 suggest that decomposed or detailed thinking, alone, cannot completely eliminate the budgeting bias, and it is still prone to bias. In study 3, we explore another type of intervention which can reduce budgeting bias. One of the characteristics of cognitive flexibility enhanced by positive affect is that it enables people to think of intertemporal outcomes in an integrative way: thinking of present outcomes in the context of future outcomes or vice versa, rather than focusing solely on either future or present options as a separate entity in an isolated context (Pyone and Isen 2011). Based on the research, we suggest that extending people's scope of thinking under the next month frame, and thus fostering an extended, integrative perspective, can reduce budgeting bias. Specifically, in this study, we added one more condition to the design of study 1, a "month-cued by-year" condition, in which we tried to extend people's scope of thinking by cueing yearly budgets while participants estimate their budgets for the next month.

This study does not only investigate the role of scope of thinking in reducing budgeting bias, but it also rules out the alternative explanation about budgeting bias in general, such that budgeting bias is simply due to the different nature of the expense categories for different budget periods. That is, certain expenses are more likely to be included in the next-year budget, but not in the next-month budget by nature, and this leads to lower budget estimates for the next month. Also, someone may argue that the underestimation tendency is more specific to the

next month rather than the temporal frame of the budget period (month vs. year) in general, and thus people may not show the same kind of underestimation tendency for *other* months. Prior research suggests that this is not the case (Ülkümen et al. 2008). If that is the case, cueing yearly budgets should not influence people's budgets for the next month.

We predicted that under the month condition, as shown in study 1, participants in neutral affect would show the underestimation tendency: Their budget estimates will be lower than those in the positive affect condition, and also their unitized budget estimates will be lower than those of the next year condition. However, under the *month-cued by-year* condition, the difference between the two affect conditions would be no longer significant. That is, cueing yearly budgets under the month frame will reduce the underestimation tendency among the neutral affect group. Thus, their unitized budget estimates in the *month-cued by-year* condition will be higher than those in the *next month* (no cueing) condition, but will be no different from those in the *next year* condition. On the other hand, among the positive affect group, because positive affect by itself facilitates taking multiple expense items into account with an integrative, extended scope, we expected that their budget estimates would be less likely to be affected by this cueing. We predicted that the analysis on the number of budget categories would produce the same patterns as those on the budget estimates.

Method

Participants and design. One hundred and eighty six students participated in this study in exchange for extra credit toward their course grade. Participants were recruited from undergraduate classes, and freshmen were excluded from the participation since they are required to live on campus (i.e., living in a dormitory) with meal plans and thus their budgets would be substantially different from those of the other classes. Participants were randomly

assigned to one of six conditions in a 2 (affect: neutral, positive) \times 3 (time frame: month, month-cued by-year, year) between-subjects design.

Affect induction. Affect was induced using pictures and video clips, and the procedures were the same as in studies 1 and 2. After watching either a picture set or a video clip corresponding to their affect condition, participants completed a 13-item questionnaire which included the affect measure as well as filler items.

Budgeting task. After the affect induction task, participants received the budgeting study. The questionnaires for the month and for the year condition were the same as those in study 1. The questionnaire in the month-year (month-cued by-year) condition was almost identical to the one in the month condition, except for one thing: Instead of asking to think of their life during the next *month*, we told them to think of their life during the next *year*, and then based on the yearly budget, to estimate their budget for the next month. As in study 1, participants indicated expense categories they considered, amounts for the categories, and finally their total budget for the next month or the next year depending on their condition.

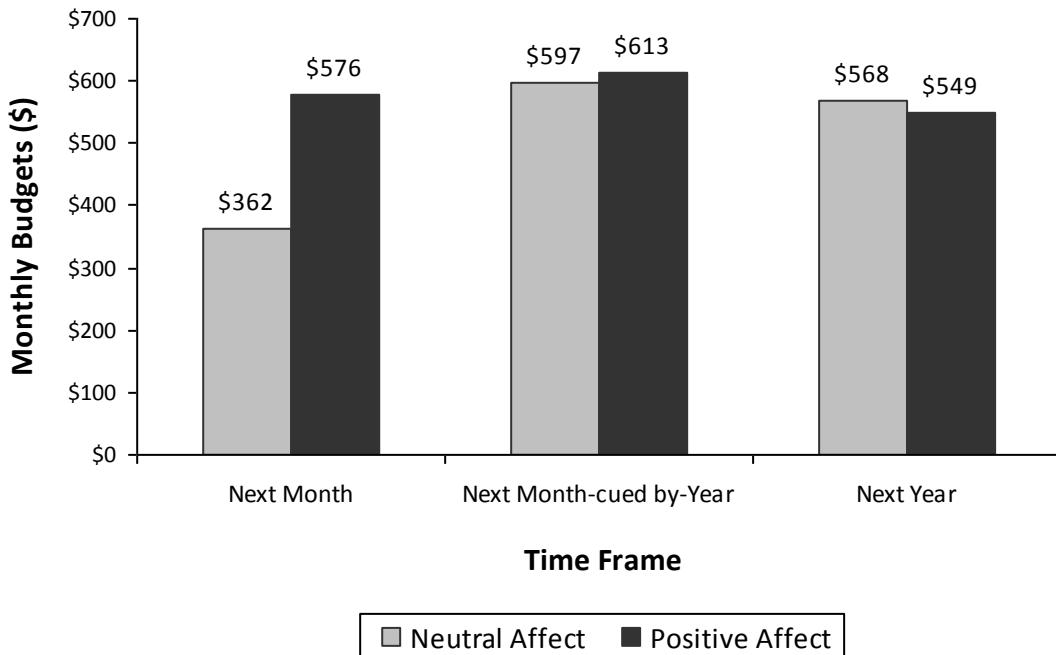
Results

Affect manipulation checks. As in earlier studies, an index measure of positive affect was created by averaging ratings on three items (*positive-negative, pleasant-unpleasant, happy-sad*; $\alpha = .94$; 1 = positive, 5 = negative). The affective state induced by picture sets and video clips didn't differ significantly ($M_s = 2.13$ vs. 2.11 , respectively, *NS*), and thus the ratings based on the two induction methods were combined. We ran a t-test to compare the affective state between the positive and the neutral affect condition. As expected, those in the positive affect condition experienced more positive feelings ($M = 1.38$, $SD = .52$) than those in the neutral affect condition ($M = 2.82$, $SD = .64$; $t(184) = 16.78$, $p < .001$).

Budget estimates (\$). Unitized budget estimates were compared across the conditions, with tuition and housing rent excluded as in the earlier studies. A 2 (affect: neutral, positive) \times 3 (time frame: month, month-year, year) between-subjects ANOVA revealed a marginally significant main effect of affect ($F(1, 180) = 3.09, p = .08$), a main effect of time frame ($F(2, 180) = 3.94, p < .05$), and more importantly, an interaction of affect and time frame ($F(2, 180) = 3.35, p < .05$).

As shown in earlier studies, participants in neutral affect underestimated their budgets under the month frame compared to those in positive affect ($t(180) = 3.16, p < .01$), and also compared to when they were budgeting under the year frame ($t(180) = 2.98, p < .01$). However, supporting our hypothesis, the two affect conditions did not differ under the *month-cued by-year* condition as well as in the year condition (see figure 4.5). Thus, cueing yearly budgets while budgeting for the next month reduced people's underestimation tendency under neutral affect. Indeed, among the neutral affect condition, their budget estimates in the *month-year* condition were significantly higher than those in the *next month* condition ($t(180) = 3.43, p = .001$), but they are not significantly different from those in the *next year* condition. On the other hand, among the positive affect condition, as shown in studies 1 and 2, their budget estimates didn't differ across the time frame conditions.

FIGURE 4.5
STUDY 3: BUDGET ESTIMATES ACROSS TIME FRAMES BY AFFECT



Number of budget categories. A 2 (affect: neutral, positive) \times 3 (time frame: month, month-year, year) between-subjects ANOVA was conducted on the total number of budget categories. The analysis revealed a marginally significant main effect of affect ($F(1, 180) = 2.77, p < .1$), suggesting that those in positive affect tended to consider more budget categories, and a significant main effect of time frame ($F(2, 180) = 6.37, p < .01$). Specifically, participants considered more budget categories under the year frame than the month ($t(183) = 3.14, p < .01$) and the month-year frame ($t(183) = 3.02, p < .01$). No other effect was significant.

We further compared the positive and the neutral affect condition within each time frame condition in order to see if positive and neutral affect conditions diverge in any of the time frame conditions. Contrast tests revealed that the difference between the affect conditions

was significant only for the month condition. That is, replicating earlier findings, participants in positive affect considered more expense categories than those in neutral affect under the month frame ($t(180) = 2.05, p < .05$). In addition, comparing three time frame conditions within each affect condition revealed that, among the neutral affect group, those in the *year* condition considered more categories than those in the *month* ($t(180) = 3.55, p < .001$) and the *month-year* condition ($t(180) = 3.19, p < .01$), but there was no significant difference between the *month* and *month-year* conditions. Thus, unlike our expectation, cueing yearly budgets under the month frame did not necessarily increase the number of budget categories considered among the neutral affect group. On the other hand, among the positive-affect people, their number of budget categories didn't differ across the time frame conditions (see table 4.1).

Budget per category (\$). We also compared the budget amounts allocated per category by dividing the unitized budgets obtained earlier by the total number of budget categories (note that tuition and housing rent items were excluded from the total number of categories as well). The 2 (affect: neutral, positive) \times 3 (time frame: month, month-year, year) between-subjects ANOVA revealed only a main effect of time frame, ($F(2, 180) = 4.95, p < .01$), such that per-category budgets in the *month-year* condition ($M = \$162.93, SD = 94.91$) were higher than those in the *month* ($M = \$118.55, SD = 69.05, t(103.07) = 3.06, p < .01$) and the *year* condition ($M = \$127.95, SD = 76.75, t(109.73) = 2.39, p < .05$).

We further compared three time frame conditions in each affect condition. Within the neutral affect group, their per-category budgets were higher in the *month-year* condition ($M = \$167.60$) than the *month* ($M = \$103.25, t(180) = 3.20, p < .01$) and also the *year* condition ($M = \$126.67, t(180) = 1.99, p < .05$). However, among the positive affect group, again, their per-category budgets didn't differ across the time frame conditions ($M_{\text{month}} = \$134.33, M_{\text{month-year}} = \$157.56, M_{\text{year}} = \$129.11, F(2, 180) = 1.02, \text{NS}$).

Table 4.1

Study 3: Number of Budget Categories by Time Frame and Affect

		Time frame			
		Next month	Next month-cued by-year	Next year	Total
Positive affect	Sample size (N)	32	27	33	92
	Means	4.84	4.78	5.15	4.93
	SD	(1.22)	(1.42)	(1.40)	(1.34)
Neutral affect	Sample size (N)	33	31	30	94
	Means	4.15	4.26	5.37	4.57
	SD	(1.48)	(1.34)	(1.27)	(1.46)
Total	Sample size (N)	65	58	63	186
	Means	4.49	4.50	5.25	4.75
	SD	1.39	1.39	1.33	1.41

Discussion

The results of study 3 suggest that extending the scope of thinking by cueing yearly budgets does reduce budgeting bias among the neutral affect group by decreasing their underestimation tendency under the month frame. Replicating the findings in study 1, we observed budgeting bias across next-month and next-year conditions among the neutral affect group. However, when they were led to think about yearly budgets while budgeting for the

next month, their unitized budget estimates for the next month were no different from those for the next year.

However, interestingly, the number of budget categories in the month-cued by-year condition was still lower than those in the year condition. This suggests that cueing yearly budgets reduces budgeting bias, by increasing the budget allocated per category, rather than by increasing the number of specific expense categories in consideration. Our contrast tests results support this interpretation: While the number of budget categories didn't differ between the *month* and the *month-year* condition, per-category budgets were higher in the *month-year* condition than the *month* condition. Although we don't have a good explanation for this, one possible reason is that the budget categories generated under the *month-year* condition might be more inclusive or abstract in nature than those in the *month* condition. On the other hand, the number of budget categories in the *month-year* condition was smaller than that of the *year* condition, but per-category budget amounts were higher in the *month-year* condition than the *year* condition, which leads to no significant difference between the *month-year* and the *year* condition in their unitized budget estimates. This suggests that the underlying process by which people estimate budgets may not be the same across time frames even when their unitized budget estimates are the same.

One thing to note is that, in this research we did not measure the nature of budget categories (i.e., the relative abstractness or concreteness of each item) qualitatively. Although it sounded reasonable to do so, by looking at participants' thought listings, we realized that each participant's budget items are quite unique, and often they were not structured hierarchically, which made it difficult for us to infer the level of each item in terms of its meaning or concept. Also, the same categories could have meant different things to each respondent. For example, for some, "food" was an abstract category which includes groceries, eating out, drinks, etc. But

for the other, it was a more concrete item referring to groceries only. Thus, it seemed implausible and inappropriate to subjectively rate the relative abstractness or concreteness of each item. Rather, we measured it by having participants list their categories in two hierarchical levels, as in study 2.

As shown in study 2, among the positive affect condition people's budget estimates were not influenced by the temporal frame of the budget period, and so are their number of budget categories. People in positive affect compared to those in neutral affect, considered more expense categories, and were less likely to underestimate their budgets for the next month. Thus, this study as well as studies 1 and 2 supports our hypothesis that positive affect reduces budgeting bias by helping people construe future budget estimates in a concrete way but with an integrative perspective.

GENERAL DISCUSSION

Over three studies, we demonstrate that putting people into a mild positive state can reduce budgeting bias. Study 1 demonstrates that under positive affect, the temporal frame of the budget period (month vs. year) does not influence people's budget estimates. Further, participants took more expense categories into account under positive (vs. neutral) affect, and they did not show the budget underestimation tendency under the month frame. Study 2 demonstrates that prompting people to consider detailed components of future spending through a procedural priming task reduces their underestimation tendency under the month frame, but it led to overestimated budgets under the year frame. Thus, the study suggests that unpacking or thinking in detail, alone, is not enough to remove budgeting bias, and under some circumstances, it can lead to an overestimation bias. Study 3 shows that cueing yearly budgets

while budgeting for the next month can reduce budgeting bias, suggesting that promoting a long-term perspective or extending the scope of thinking plays an important role in reducing the bias. Taken together, the results of three studies suggest that both the scope and the depth or concreteness of thinking matter in reducing budgeting bias. Simply prompting specific or detailed thinking out of perspective may also induce different types of cognitive biases.

Although what causes budgeting bias was not the main focus of this research, according to prior research, both motivational and cognitive factors seem to interact with each other in producing the bias. That is, people have a general tendency or desire to minimize future spending (savings goals; Peetz and Buehler 2009), and this savings goal may interact with people's belief that unexpected events are less likely to happen especially in the near and shorter time frame (next month). The belief, in turn, may lead to greater certainty or confidence about their budget-control ability, and thus the savings goals might have a stronger influence on people's budget estimation under the next month frame than the next year frame. On the other hand, the enhanced cognitive flexibility fostered by positive affect might have mitigated this influence of motivational goals under the next month frame by enabling people to access more potential expense items.

In this research, we compared budget estimates under the month frame with those under the year frame. But, it is noteworthy that people do not show the same underestimation bias under the day frame. For example, in Peetz and Buehler's (2009) studies, participants predicted their spending for the day in the morning, and their predicted spending was not significantly different from their actual spending that they reported in the evening that day. However, they showed the same prediction bias for their weekly spending, underestimating their spending in the upcoming week. The author interpreted that this is because people become less optimistic once they know that their prediction will be verified very soon. Thus,

both much shorter (e.g., today) and much longer (e.g., next year) time frames appear to reduce prediction bias in a different way, and there seems to be an optimal length of budget period for the budgeting bias to occur, which can allow room for people's optimistic belief about their budget-control ability.

Our research suggests that mild positive affect helps people do more integrative thinking when budgeting, and this may sound compatible with the widely accepted belief that positive affect leads to global processing. Similarly, there has been a recent tendency to associate positive affect with abstract construal (e.g., Forster and Dannenberg 2010). Regarding the fact that positive affect extends the scope of thinking, helping people think of a target option or a situation in a broader context, the influence of positive affect is similar to that of high-level construal. Indeed, recent research suggests that high-level construal (enabled by temporal distance), too, can reduce budgeting bias (Peetz and Buehler 2012), and the finding in our and prior research (Ülkümen et al. 2008) that people do not show budgeting bias under the year (vs. month) frame can be explained by this framework.

However, it is important to note that the process or the factor underlying the influence of positive affect and that of high-level construal is quite different: While high-level construal or abstract thinking is enabled by psychological (e.g., temporal, social, and spatial) distance (Trope and Liberman 2010), the integrative thinking fostered by positive affect is enabled by cognitive flexibility (e.g., Isen 2008). Whereas the former is characterized as a consistent and context-independent process (Ledgerwood, Trope, Liberman 2010), the latter is characterized as a flexible and context-dependent process. That is, the process by which positive affect enables high-level thinking is rather concrete in that it facilitates incorporating local, contextual components into people's decision making (Pyone and Isen 2011). This is opposed to the concept of global processing or abstract thinking, which is also often associated with less

detailed, schematic thinking in the literature (e.g., Forster and Dannenberg 2010; Schwarz and Clore 1983). Thus, the similar notion of high-level thinking can result in quite opposite implications depending on the underlying process. Therefore, associating the two concepts, and stretching the association onto other domains of research as a theoretical framework, should be conducted with careful specifications on their different characteristics.

The current research has practical implications for consumer well-being as well as theoretical implications for consumer research. While much of consumer research regarding positive affect concerned its influence on evaluative judgments, relatively little research has been conducted regarding its influence on adaptive decision making or its other functional benefits. This research not only presents novel findings in terms of budgeting bias, but also deepens our understanding about the influence of positive affect on enhanced cognitive flexibility, which has been investigated relatively less in consumer research. Examining the role of cognitive flexibility in consumer decision making, especially in reducing consumer biases stemming from myopic and constrained thinking, can be a fruitful area for future research.

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