University of Nevada, Reno

The Interplay between Self-Construal and Regulatory Focus in Decision Making under Risk and Uncertainty

A dissertation submitted in partial fulfillment of the
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by

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Abstract

This dissertation examined the motivational and cultural underpinnings of financial decision making under risk and uncertainty, using regulatory fit theory, self-regulatory focus theory, self-construal theory, and prospect theory as guiding frameworks. Based on a comprehensive review of the literature, a theoretical model was proposed that sought to resolve existing conceptual questions and debates. Central predictions of the model were the differential implications of two different types of fit, i.e., incidental fit and integral fit, for processing mode (intuitive versus systematic), motivational experiences (feeling right versus task engagement) as well as use of different types of information (emotions versus objective factors).

Across two online and offline experiments, incidental fit was operationalized as fit between self-construals and self-regulatory focus, and integral fit as fit between self-regulatory focus and decision context. Specifically, Study 1 used a 2 (self-construal: independent versus interdependent) x 2 (self-regulatory focus: promotion versus prevention) x 2 (decision context: gain versus loss versus mixed-gamble) design and required participants to work on hypothetical scenarios, which assessed changes in risk seeking, risk aversion and loss aversion separately. Study 2 used a 2 (self-construal) x 2 (self-regulatory focus) design but relied on the Balloon Analogue Risk Task (BART), in which participants earned real money.

Results showed that incidental fit (fit between self-construal and regulatory focus), but not integral fit (fit between decision context and regulatory focus) influenced the processing mode and the type of factors taken into account in financial decision making under risk and uncertainty. Study 1 revealed that incidental fit resulted in more

risk-neutral choices, which maximize monetary outcome. However, systematic processing was not consistently related to better decision outcomes, suggesting that incidental fit between independent self-construals and promotion focus, and incidental fit between interdependent self-construals and prevention focus improves decision making independent of processing mode. Results also replicated and extended previous research in that decision context (loss versus gain) influenced risk-taking, motivational experiences, and processing.

The discussion explored different theoretical explanations of fit effects, and argued that they are likely the result of increased processing fluency. In light of the experimental findings, a revised model is proposed.

To my grandmother, Ayten Yetkin, and my grandfather, Muammer Yetkin

To my mother, Emel Yetkin, for being inspirational

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To my husband, Tamer Uz, for being calm and wise

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Chapter 1 – Overview

People make risky decisions every day. Whether it is the decision to cross a busy intersection or not, or to invest one's life savings into the stock market, people have to make choices between alternatives that promise cost and benefits with differential likelihoods. As every financial advisor knows, there is little doubt that individuals differ in their proclivities to accept or avoid risks (e.g., Frank, 1994). Yet, there are not only stable dispositions toward risk-taking, but the preference or avoidance of risk changes across tasks and situations (e.g., Kühberger, 1998). Financial risk-taking is influenced by a myriad of factors including one's motivational orientation (e.g., Scholer, Zou, Fujita, Stroessner, & Higgins, 2010), self-construal (e.g., Mandel, 2003) and the decision context (Kahneman & Tversky, 1979). Researchers have suggested that how well the motivational orientation is in line with the self-construal or the decision context may influence decision making (e.g., Aaker & Lee, 2001). For instance, when one's motivational focus is on approaching gains and ensuring growth (promotion) and the self-construal is independent, people tend to evaluate products based on the gains that they offer, but are less concerned about the losses the same product can cost. Conversely, when one's motivational focus is on avoiding losses and ensuring security (prevention) and the self-construal is interdependent, product preferences reveal an evaluation that takes into account the possible losses more than the gains associated with a particular choice (Zhang & Mittal, 2007)

The alignment of motivational orientation with other factors is called self-regulatory fit (Higgins, 2000). I suggest that self-regulatory fit influences financial

decision making under risk and uncertainty. Self-regulatory fit changes the way people process information. As a result, people base their financial decisions on their emotions more when experiencing self-regulatory fit, and on objective real-constraints (like their income) when experiencing self-regulatory non-fit.

To date, the literature in self-construal, motivation, and judgment and decision making provides only limited help in understanding and predicting the nature of differences in risk-taking (e.g., Choi, Choi, & Norenzayan, 2004). In the process of globalization, with economic, political and social ties becoming increasingly denser and stronger between people with very different motivational orientations and cultural cognitions, differences in risk-taking can present issues for cooperation and negotiation. For example, within the context of a multinational company it is likely that an executive from one country has to approach an employee from another country as well as meeting expectations of customers from with different backgrounds. Knowing the joint influence of motivational orientation, cultural cognition, and the situation can guide positioning a product in the market, for example, by either stressing the benefits the product can promote or the losses it can prevent. People with different orientations have a better chance of successfully negotiating an issue if they have a mutual understanding of each other (Bazerman, Curhan, Moore, & Valley, 2000). Likewise, the economic upturns and downturns may call for greater or lesser risk-taking. For instance, the great recession of 2007 to 2009 was initiated by the mortgage crisis, which was in part a reflection of overly optimistic risk-taking behavior. This is particularly pertinent in multi-cultural societies, such as the United States, where there are members of various cultures who may be very different from each other living in close proximity and doing business with each other.

In the present dissertation, I hope to add to the understanding of the motivational and cultural basis of decision making under risk and uncertainty. Specifically, I seek to focus on the fit between social cognition, motivation, and decision context in an attempt to integrate theories of motivation, culture and cognition, and decision making under risk and uncertainty. I propose that the differences in decision making are a function of how people in different situations think about themselves, their motivational tendencies, and a mediating thought process that either focuses more on one's emotional response or more objective factors (Figure 1).

In the next two chapters, Chapter 2 and 3, I lay the theoretical groundwork for my studies by reviewing the literature on self-construal, self-regulatory focus and fit, economics of decision making as well as mode of thinking. In Chapter 4, I integrate the theoretical perspectives described in Chapter 2 and 3 into a coherent framework. Chapter 5 contains a description of my theory and hypotheses. Chapter 6 describes Study 1, an experiment that examines responses to hypothetical decision making scenarios under financial risk. Study 2, which is reported in Chapter 7, consists of an experiment on financial decision making under uncertainty with real monetary consequences for the participants. The final Chapter 8 summarizes the results of my research program, discusses its implications, its limitations and suggests directions for future research.

Chapter 2 – Cultural Cognitions and Motivational Orientations

The present research is predicated on the idea that there is meaningful cultural variability in motivational orientation that is primarily a consequence of the differences in cultural self-construals. For this purpose, Chapter 2 will provide a brief overview of self-construal theory. Likewise, this dissertation investigates decision making under risk. Because individuals' motivational concerns are paramount in when they are willing or unwilling to take risk, Chapter 2 will review self-regulatory focus theory. Finally, Chapter 2 will elaborate on the links between self-construal theory and self-regulatory focus theory through regulatory fit theory.

Cultural Cognitions: Self-Construal Theory

Since the seminal work of Hofstede (1980), cross-cultural psychologists and cultural psychologists have used the concepts of individualism and collectivism to describe cultures. Conceived as broad descriptive dimensions to elucidate cultural syndromes, individualism and collectivism are related to different values, attitudes, and behaviors. A central aspect of the individualism-collectivism distinction is the role that different cultures assign to the role of groups and group memberships. This includes one's motivation and interest, such that in collectivist societies group goals are often expected to take priority over individual goals, whereas the reverse tends to be true for individualist societies (Triandis, 1995). Likewise, because of the importance of groups in many aspects of life, in collectivist cultures people try to maintain harmony within the group more than people from individualist cultures (Leung, 1997; Ohbuchi, Fukushima, & Tedeschi, 1999). People in collectivist cultures perceive the distinction between ingroup and outgroup as more salient than do people in individualist cultures (Iyengar,

Lepper & Ross, 1999). By contrast, the distinction between the individual and (ingroup) others is more salient for people in individualist cultures than for people in collectivistic cultures (e.g., Meeres & Grant, 1999). For example, members of collectivist cultures performed better when working within their own group than individually (Earley, 1993). The performance of the members of individualist cultures, in contrast, was higher when they were working alone than when they thought they were working in their groups. Indeed, the intrinsic motivation of the members of individualist cultures was highest when they were allowed to make their own choice, whereas those from collectivist cultures were most intrinsically motivated when a trusted authority figure or peers made the choice for them (Iyengar & Lepper, 1999). In other words, working as part of a group was motivating for members of collectivist cultures, whereas it seemed to be demotivating to members of individualist cultures in line with the culturally prescribed goals.

Theorists have long argued that individuals' self-concepts encompass different aspects, which are generally referred to as independent and interdependent self-construals (Markus & Kitayama, 1991; see also Trafimow, Triandis, & Goto, 1991). Though the self-concept of members of all cultures includes both self-construals, research has shown that they are differentially salient in different cultures. In individualist societies, such as the U.S., independent self-construals are most prominent, according to which the individual is unique and separate from others, and individual choice is of paramount importance (e.g., Markus & Kitayama, 1991). In contrast, in collectivist societies, such as China or Mexico, interdependent self-construals are much more likely to be dominant according to which individual is inherently embedded within his or her social

relationships and social groups, and group harmony takes priority over individual preference (Oyserman, Coon, & Kemmelmeier, 2002; Triandis, 1995).

Much research in cultural psychology has documented how different self-construals are rendered more or less salient in different cultures (e.g., Trafimow et al., 1991). Generally speaking, cultures provide cultural tasks to achieve culture's values and render salient important aspects of the self. Tasks that members of a culture routinely engage in are also the types of tasks that achieve cultural adaptation, that is, that socialize individuals and reinforce cultural patterns that are consistent with cultural expectations. In the process of repeated engagement in cultural tasks, "new neural activities are induced, reinforced, and established. These culturally patterned neural activities enable the person to seamlessly perform his or her own significant cultural tasks, thereby solidly anchoring the self and identity in the cultural world" (Kitayama & Park, 2010, p. 121). For instance, in individualist societies, such as the United States, many cultural tasks involve choice, in which individuals are expected to express personal preferences by selecting between different options. These choice situations typically render independent self-construals salient. By contrast, in collectivist societies, such as China or various Latin American societies, individuals are often expected to conform to the group or subordinate personal preference to the goal of achieving a harmonious interaction, and these types of situations are likely to highlight interdependent self-construals (e.g., Kitayama, Duffy, & Uchida, 2007; Markus & Kitayama, 1991).

Cultural self-construals, in turn, influence the reproduction of culture via the reenactment of tasks (e.g. Kitayama, Park, Sevincer, Karasawa, & Üskül, 2009). In other words, members of a culture are then likely to recreate their social world by recreating

and perpetuating tasks and situations that ensure the survival of the cultural patterns that previously shaped their own self-construals. In this sense, culture and self-construals are inseparably intertwined (Kitayama & Park, 2010).

As discussed before, a critical assumption of self-construal theory is that individuals in all cultures possess independent and interdependent aspects of the self. At the same time, self-construals are contextually malleable, with different cultures and cultural practices making independent or interdependent self-construal salient in individualist and collectivist cultures, respectively. This assumption has made it possible to use experimental manipulations within the same culture to simulate differences between cultures. Specifically, when independent self-construals are rendered salient in one experimental condition and interdependent self-construals are rendered salient in another, the resulting differences often mirror those observed in cross-cultural comparisons (e.g., Gardner, Gabriel, & Lee, 1999). The present research will also rely on this approach, and examine differences in experimentally induced independent versus interdependent self-construals. At the same time, it has to be acknowledged that not all cross-culturally differences are necessarily the result of cultural differences in the salience of self-construals. Yet, for the time being the study of experimentally induced differences in self-construals is a theoretically sound avenue to attempt to understand cultural differences.

There are multiple ways in which independent and interdependent self-construals might be rendered salient in an experiment (e.g., Brewer & Gardner, 1996; Oyserman & Lee, 2008; Trafimow et al., 1991). Typically, participants are made to focus on personal or unique aspects of the self to highlight independence, whereas participants are asked to

focus on their group memberships or personal relationships in order to render interdependence salient. This is often accomplished by asking participants divergent questions about themselves, though one popular priming manipulation varies independent and interdependent self-construals by asking participants to either identify first person singular pronouns or first person plural pronouns in the same text (e.g., Brewer & Gardner, 1996; Gardner et al., 1999; Trafimow, Silverman, Fan, & Law, 1997). With different priming methods being essentially equivalent, the present research will make use of an established method to experimentally vary the salience of independent versus interdependent self-construals.

Motivational Orientations: Self-Regulatory Focus Theory

Self-regulatory focus theory is a modern motivational theory that builds on the old recognition that organisms seek out pleasant and beneficial experiences, and stay away from unpleasant and harmful ones. Self-regulatory focus, SRF, theory maintains that people are guided by approach and avoidance principles in their actions (cf. Higgins, 1997). However, departing from previous conceptions of motivation (e.g., Atkinson, 1964), it asserts that approach and avoidance tendencies are not merely a function of pleasure and pain, but rather they depend on one's self-regulatory focus, i.e., one's cognitive-motivational orientation towards different ways of approaching desired end-states.

SRF theory proposes two distinct self-regulatory systems: a promotion system for the pursuit of nurturance needs, and a prevention system focusing on security needs. When an individual is focused on promotion, the desired end-states are ideals related with hopes, wishes, and aspirations, whereas under prevention-focus the individual seeks to

fulfill their duties, obligations and responsibilities. Although individuals typically differ in their habitual self-regulatory focus, promotion and prevention-focus can also be induced temporarily (e.g., Higgins, Roney, Crowe, & Hymes, 1994). Under promotion-focus individuals are concerned with achieving hits and ensuring against errors of omission, with relatively low concern for errors of commission. Conversely, under prevention-focus individuals are interested in achieving correct rejections and ensuring against errors of commission, yet with comparatively low concern for errors of omission. That is when individuals work on a signal detection task that requires them to decide whether they did or did not detect a signal, those in a promotion-focus are more likely to say "yes," whereas those in a prevention-focus are more likely to say "no" (Crowe & Higgins, 1997).

Crowe and Higgins (1997) suggest that eagerness and vigilance are associated differentially with one's regulatory focus. Eagerness leads to trying to ensure the presence of positive outcomes and ensure against the absence of positive outcomes, whereas vigilance leads to trying to ensure the absence of negative outcomes and ensure against the presence of negative outcomes. Therefore, there is a natural fit between eagerness and promotion-focus on the one hand, and vigilance and prevention-focus on the other (Crowe & Higgins, 1997). In return, the attainment of goals in promotion results in cheerfulness, and that in prevention results in quiescence. Similarly, the failure to attain goals brings about dejection emotions in promotion-focused people, and agitation emotions in prevention-focused ones.

Promotion-focused people are characterized by speed in solving problems. Prevention-focused people are caring about the accuracy of their solutions. People with

the promotion-focus are more creative than people with the prevention-focus (Friedman & Förster, 2001). The former, compared to the latter, is less likely to use causal inferences to predict outcomes (Liberman, Molden, Idson, & Higgins, 2001). At its core, those with a predominantly promotion-focus are concerned with gains and non-gains, whereas those with a predominantly prevention-focus are concerned with losses and non-losses. In other words, promotion-focused people are sensitive to the presence or absence of positive outcomes, and prevention-focused people are sensitive to the presence or absence of negative outcomes (e.g., Higgins, 1997).

The Relation between Self-Construal and Self-Regulatory Focus

Self-construals and SRF are theoretically distinct concepts. Yet, recent research has shown them to be empirically related (Elliot, Chirkov, Kim, & Sheldon, 2001; Lee, Aaker, & Gardner, 2000; Lockwood, Marshall, & Sadler, 2005). People with independent selves are more likely to have a promotion-focus and less likely to have a prevention-focus, whereas people with interdependent selves are more likely to have a prevention-focus and less likely to have a promotion-focus. According to Lee et al. (2000) and Lockwood et al. (2005) this link between self-construals and self-regulatory focus occurs because goals and values in individualism versus collectivism are more compatible with promotion versus prevention-focus, respectively. Prevention is concerned with security needs, whereas promotion is concerned with nurturance needs. In individualist societies distinguishing oneself from others in a positive manner is a dominant value, whereas in collectivism conformity to the group is a dominant value. People with an independent self are more attuned to positive information, whereas people with an interdependent self are more attuned to negative information (Elliot et al., 2001; Lee et al., 2000; Lockwood et

al., 2005). Likewise, and as described above, promotion-focused people are more concerned with gains, and prevention-focused people are more concerned with losses. In other words, both promotion-focus and independent self-construal lends itself to a concern with gains, whereas both prevention-focus and interdependence self-construal lends itself to a concern with losses. Moreover, people with independent selves are more attuned to promotion-focused information, and people with interdependent selves are more attuned to prevention-focused information (Lee et al., 2000). Therefore, people feel more right and become more strongly engaged in the tasks they are doing when promotion-focus is coupled with independent self-construal and prevention-focus is coupled with interdependent self-construal, i.e., under conditions of regulatory fit.

Lee and Higgins (2009) suggest that, when independent self-construals are paired with promotion-focus and interdependent self-construals are paired with prevention-focus, regulatory fit occurs. Regulatory fit is the state in which people feel right about the task they are doing and are more strongly engaged in it. Building upon regulatory fit theory (Avnet & Higgins, 2006a, 2006b), researchers in the domain of culture and self-construals suggest that when self-construal (or culture) and the regulatory focus of people are compatible, existing differences in self-construals are strengthened (Lee et al., 2000; Lockwood et al., 2005).

Recent research has explored the processes associated with the regulatory fit between self-construals and self-regulatory focus. In a study on product choices, Zhang and Mittal (2007) presented participants with a choice between two vacation trips: one that had extremely positive and negative ratings (enriched option), and one that had moderate ratings (impoverished option). The enriched option had more intense positive

and negative aspects whereas the impoverished option had moderately negative and positive aspects. Yet, if the negative and positive aspects were averaged, the two trips would be indistinguishable in terms of their overall valence. Zhang and Mittal (2007) found that an independent self-construal activated a promotion-focus, and interdependent self-construal activated a prevention-focus. The authors hypothesized that promotion-focused people would find positive information more relevant than negative information, whereas prevention-focused would people find negative information more relevant. As predicted, the enriched option was more attractive to people with an independent self-construal because its positivity was greater than that of the impoverished option. Conversely, the impoverished option was more attractive to people with an interdependent self-construal because its negativity was less than that of the enriched option. Importantly, the effect of self-construals was mediated by the promotion goal and prevention goal. That is, the differential activation of promotion versus prevention resulted in the differential weighting of positive and negative information.

There are two ways in which regulatory fit manifests itself: One is feeling right, and the other is increased strength of engagement. Cesario, Grant and Higgins (2004) suggested that people feel right when a message is communicated in a way that is consistent with their regulatory focus, which in turn increases the persuasiveness of the message. In a recent study, Üskül, Sherman, and Fitzgibbon (2009) compared East-Asians who are predominantly interdependent and White British participants, who are predominantly independent. These authors demonstrated that East-Asians were more persuaded by a message that is framed as a loss, whereas White British participants were more persuaded when the message is framed as a gain. This finding provided supportive

evidence that loss- and gain-framed messages are more likely to resonate with individuals living in collectivist and individualist societies, respectively. Further, Üskül et al. (2009) found that measured SRF mediated the responses toward both loss- and gain-framed messages, but this mediation process occurred differentially for East Asians and White Britons. Among East-Asians, the evidence for SRF being a mediator was stronger for loss messages than gain messages. This relationship was reversed among White Britons, for whom SRF mediated responses to the gain messages to a larger extent than responses to the loss messages. The authors explain this effect with the "feeling right" component of regulatory fit, which White Britons and East Asians experienced under different conditions.

The other component through which regulatory fit operates is strength of engagement. Avnet and Higgins (2006a, 2006b) suggest that, when there is a fit between the regulatory focus of people and the means of attaining a goal, the strength of one's engagement in the pursuit of that goal increases. Higgins and Scholer (2009) use strength of engagement to mean absorption of attention, or in the words of Higgins (2006) "to be involved, occupied, and interested in something" (p. 442). Along these lines and complementing the Üskül et al. study (2009), Hamamura, Meijer, Heine, Kamaya, and Hori (2009) examined memory for approach and avoidance information, which are closely related to promotion and prevention foci, respectively. The authors found that North Americans are more likely to recall approach information than avoidance information, whereas East-Asians are more likely to recall avoidance information than approach information. However, Hamamura et al. (2009) departed from the Üskül et al.'s (2009) explanation of feeling right as the underlying mechanism behind fit effects.

Instead, Hamamura et al. (2009) offered the view that greater recall of approach information by North Americans and the greater recall of avoidance information by East-Asians is mainly a function of differential attentiveness. The authors claimed that their finding was the consequence of regulatory fit between avoidance and collectivism, and between approach and individualism; yet, they suggested engagement in the activity as underlying mechanism.

To summarize, it seems that when the goal pursuit or the outcome fits the regulatory focus of the individual, the fit between self-construals and SRF results in both feeling right and strengthening of engagement in the task at hand. At the same time, there is a debate as to which of the two paths, feeling right or strength of engagement, is responsible for the different results found under regulatory fit. This issue is tackled in Chapter 4 after examining the financial decision making under risk and uncertainty in the next chapter.

Chapter 3 – Choices under Risk and Uncertainty

According to prospect theory (Kahneman & Tversky, 1979), a major economic perspective on risk-taking, decision context has a profound influence on risk-taking. Prospect theory provides different constructs to examine risk decisions based on whether the decisions pertain to gains, losses, and a trade-off between gains and losses. Therefore, it is important to lay out the relation between self-construals and risk-taking as well as to develop a theory connecting motivational orientation with prospect theory.

Two building blocks of this dissertation, self-construal theory and self-regulatory theory, were explained in the previous chapter. The present chapter focuses on risk-taking as conceptualized by prospect theory, which includes a discussion of the relation between self-construal and risk-taking as well as an integration of self-regulatory focus and prospect theory.

Risk-taking as a Function of Task Framing

Under any economic theory of risk-taking behavior, it is important to adopt an unambiguous definition of risk-aversion, risk-seeking, and loss aversion. Before discussing prospect theory in greater detail, it is critical to define these three concepts. Risk seeking and risk-aversion pertain to a preference for risk associated with a course of action given a payoff. When offered the choice either to participate in a gamble with a 50% chance of winning $40 or to receive $20 for sure, a risk-seeking person might opt for the gamble. Both courses of actions have an identical expected payoff ($20).[1]

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[1] Expected value is calculated as (1/2 x $40) + (1/2 x $0), which is $20.

However, the dissimilarity or variance of possible outcomes is much greater for the gamble than it is for the sure option. This preference for risk is referred to here as risk-seeking. Conversely, a risk-averse individual might prefer the sure option in the scenario above. While this course of action does not offer the possibility of a comparatively high payoff ($40), the variance of possible outcomes is minimal. This preference for predictable outcomes is termed risk-aversion. It is critical to emphasize that risk-seeking and risk-aversion can be examined when decisions address gains only (losses only); that is, when a decision might produce a gain or no gain (a loss or no loss), but not when decisions involve a trade-off between gains and losses.

Loss aversion, by contrast, addresses how decision makers judge any trade-offs between losses and gains. When offered the choice to participate in a choice task between a gamble in which a person has an equal chance of winning $40 or losing $20, or not playing the gamble at all, a loss-averse person might choose not to play the gamble because their decision is primarily driven by the prospect of a certain loss. On the other hand, a person who is not loss-averse might be more likely to select the gamble because the expected payoff ($10) is greater than 0.

The concept of certainty equivalence can help to define these terms further. Kahneman and Tversky (1979) used certainty equivalence to denote the sure amount that people would feel is as attractive as a gamble with a probabilistic payoff. In other words, the certainty equivalent is the sure amount that, if individuals were to accept it, would not make them feel any worse or better that than the probabilistic proceeds from a gamble. For instance, if someone feels the same about accepting $50 for sure, and receiving $100 if the toss of a coin produces a head (and $0 otherwise), then $50 is the certainty

equivalent of this coin-toss gamble for that individual.

The concept of the certainty equivalent allows for a straightforward definition of risk-aversion and risk-seeking. People are risk-averse if their certainty equivalent for a gamble is less than the gamble's expected value, such as when a person considers a certain $40 to be the equivalent of a win of $100 with a probability of .5. Conversely, a person is risk-seeking if their certainty equivalent amount is higher than the expected value of the gamble, e.g., when they treat a sure $60 as the equivalent of winning $100 with a probability of .5. Finally, a person is considered risk-neutral if the certainty equivalent amount is identical to the expected value of the gamble. It is in this formal sense that the concepts of risk-aversion and risk-seeking are used in this paper. Note that the term risk-taking does not refer to any specific type of risk preference; instead, it is the outcome resulting from preference for risk. Lower risk-aversion and greater risk-seeking result in greater risk-taking.

The precise definition of risk-aversion and risk-seeking makes it also easier to delineate the related, yet distinct concept of loss aversion. Loss aversion refers to the relationship between anticipated losses versus anticipated gains, or more precisely: the ratio of the degree of dislike for the losses to the degree of like for the gains of the same amount. Loss aversion in decision making under risk is based on the exchange rate between losses and gains, with highly loss-averse individuals demanding a much greater potential gain to make the same potential loss worthwhile than non-loss-averse individuals. However, this does not necessarily imply that loss aversion results in less risk-taking as defined above. To the contrary, loss aversion can result in greater risk-taking when one is trying to recover previous losses (Thaler & Johnson, 1990), e.g., when

a stock trader tries to "make up" for losses in the morning by engaging in more risky behavior in the afternoon (Coval & Shumway, 2005). However, loss aversion can result in lesser risk-taking when there is no initial loss from which to recover.

Decision research has repeatedly demonstrated that risk decisions can vary greatly as a function of whether they pertain to losses or gains; that is, whether the structure of the task suggests that individuals need to minimize their losses (e.g., avoid casualties, lose money) or maximize their gains (e.g., increase the number of survivors, win money) (Kühberger, 1998). Prospect theory (Kahneman & Tversky, 1979) states that when a problem is concerned with gains, individuals are risk-averse, but when a decision problem concerns losses, individuals tend to be risk-seeking. Prominently, prospect theory seeks to model decision making under risk by specifying a systematic relationship between the subjective values of an alternative relative to its objective outcome. The theory assumes that gains and losses are being evaluated based on different value functions. As can be seen on Figure 2, the value function for gains is concave: in other words, the subjective value derived from gains is a decelerating function of the objective outcome. By contrast, the value function for losses is convex, such that the subjective value foregone in the losses is a negatively decelerating function of objective outcomes.

Kahneman and Tversky (1979) also specify that people are generally loss-averse. In other words, the value derived from the gain of a certain amount is less than the absolute amount of the value foregone in the loss of the same amount: $100 gain causes less enjoyment in absolute terms than a $100 loss causes pain. This is represented by a steeper value function for the losses than gains (Figure 2). An example of a risk-taking situation that might reveal loss aversion is an investor faced with the decision whether to

invest in a start-up company, with potentially high return but also involving possibility of substantial loss. Here, loss aversion would be apparent in investors not putting their money in the start-up for fear they might lose their investment.

Along with basic principles of psychophysiology, prospect theory assumes diminishing marginal sensitivity: People are less able to discriminate between two sums of money when the amount is large than when the amount is small. That is, people are perceptually more sensitive to a difference between $10 and $20 than they are to a difference between $110 and $120 dollars. Due to this differential sensitivity, the value function is always curved, with function for gains being concave and the function for losses being convex (see Figure 2). This feature of the value function implies risk-aversion in the domain of gains and risk-seeking in the domain of losses. For the gains, a concave value function represents decreasing positive utility derived from additional gains. For example, a risk-averse person with a concave function over the gains would prefer to have the sure amount of $750 rather than play a gamble with 50-50 chance of winning $500 or $1000. That is so because the value derived from $750 is, according to the hypothetical value function in Figure 2, is 85 whereas the mean of the value derived from gamble is 80. Likewise, according to the hypothetical value function for the losses in Figure 2, the value forgone by accepting to lose $750 is -170, whereas the value forgone by accepting to play the gamble of losing either $500 or $1000 with equal chance is -165. Because the value forgone by playing the gamble is less than the value forgone by accepting to lose for sure, people are risk-seeking in the domain of losses when their value functions are convex as in Figure 2.

However, prospect theory is more than psychophysiology. It predicts that the

functions for gains and losses have a different steepness, even when their curvature might be identical. Losses loom larger than gains: the value function for losses is steeper than the value function for gains. Curvature and steepness are in principle independent, highlighting the distinctness of the risk-aversion/seeking concept and the loss aversion concept under prospect theory. A comparison between gains and losses cannot be made by looking into the curvature of the respective value functions, but rather the steepness of value functions. For example, if a person is offered to make a choice between losing nothing or playing a gamble with equal chance of winning $750 or losing $750, according to the Figure 2, the point of comparison now involves the trade-off between the gains and losses, i.e., the steepness of the value functions. The value of losing nothing is 0, whereas the mean value of the gamble is -170 plus 85, which is -95. Because -95 is a greater loss than 0, people with steepness in their value functions similar to the Figure 2 prefer the sure option.

As alluded to above, this concept of loss aversion contrasts with the notion of risk-aversion. While risk-aversion and risk-seeking pertain to gambles involving only one domain, loss aversion pertains to mixed gambles, i.e., a trade-off between gains and losses. In Figure 2, loss aversion is represented as the relative steepness of the curve on lower-left quadrangle to the steepness of the curve on upper-right quadrangle.

Risk aversion and loss aversion are independent as long as the decision is made about gambles that involve a potential gain and a potential non-gain, e.g., winning $50 or winning nothing, or a potential loss and a potential non-loss (losing $50 or losing nothing). As demonstrated above, risk-aversion might come about because the subjective value of a $50 gain at 50% is lower than the subjective value of $25 (the expected value).

The degree of the dislike for losses relative to the degree of like for gains would not make a difference in whether X will be preferred over Y, as long as both X and Y are represented as potential losses and non-losses or potential gains and non-gains. For example, suppose someone does not like gambles involving potential losses as well as gains of $100. How much she dislikes those gambles would not make a difference in deciding between whether to accept $50 or take a gamble involving no loss such as getting $100 versus getting nothing based on a toss of a coin. On Figure 2, the relevant area of the value curve is only the upper-right quadrangle if decision pertains solely to the non-losses, and it is the lower-left quadrangle if decision pertains only to the non-gains. The relative steepness of the latter to that of former does not affect the choices under those decision contexts.

Put differently, if X and Y can be represented as points on a single continuous curve (i.e., only as losses and non-losses or only as gains and non-gains), the steepness of the curve (exactly how far away the certainty equivalent amount is from the expected value of the gamble) would not predict what is chosen, but the curvature of it (whether it is far away) would. For preference in the domain of losses and non-losses or gains and non-gains, the only thing that matters is whether the certainty equivalent amount is less or more than the expected value of the gamble. If X is preferred over Y by a person who likes X two times as much as he likes Y, X will also be preferred over Y when it is liked three times as much as Y. For instance, whether someone likes cheesecake twice or thrice as much as a donut does not make any difference in whether this person prefers cheesecake over a donut. In both cases, cheesecake is preferred over a donut. The difference between the former and the latter would be evident only in how much X is

preferred over Y, not whether X is preferred over Y. As long as it is one single continuous curve without a kink, (i.e., a broken point or a swift shift in function, over the losses and non-losses or over the gains and non-gains as both prospect theory and expected utility theory predicts the shape of the functional curve to be) steepness of that curve does not matter.

When, however, a decision is framed as consisting of both gains and losses, such that the prospect X or prospect Y has both a gain and loss component, then the attractiveness of X over Y depends also on the degree of preference. For instance, X may have components in both losses and gains domains, as when individuals are offered a gamble in which the toss of a coin will either get them $150 dollars or make them lose $100. In such a gamble, whether X is selected depends on how much the loss is disliked compared to the subjective value that the individual derives from the gain. In this situation, the steepness of the value function does matter.

Self-Construal and Risk-taking in Loss versus Gain Situations

Individualism-collectivism and self-construals are thought to influence decision making under risk (Hsee & Weber, 1999; Mandel, 2003; Weber & Hsee, 1998). Hsee and Weber (1999) found that people from a collectivist culture are more likely to take financial risks compared to people from an individualist culture in both loss and gain situations. This is supposed to occur because people in collectivist societies tend to be embedded in a social support network that can protect the individual from financial disaster, whereas in individualist societies individuals may be on their own when disaster strikes (Hsee & Weber, 1999). Hsee and Weber (1999) called this the cushion hypothesis, where the social network in collectivist societies cushions one against the possible losses.

Mandel (2003) hypothesized that the finding obtained by Hsee and Weber (1999) may have occurred because individuals in individualist and collectivist cultures tend to differ with regard to their self-construals. Mandel (2003) manipulated self-construals experimentally and replicated the findings pertaining to individualist and collectivist societies: Individuals primed with an interdependent self, compared to those primed with independent self, stated that they had a higher number of close relationships and could turn to more people for financial help in case they found themselves in financial trouble. Consistent with Hsee and Weber (1999), Mandel (2003) also found that the size of this financial network mediated the degree of risk-taking in financial gain and loss situations. In other words, people with interdependent self-construals not only treated their financial networks as a cushion against catastrophic loss, but they also decided on the extent of risk that they could take based on the size of their safety network. For social decisions such as whether to wear an unconventional dress to a party, on the other hand, a large psychological network led to lesser risk-taking. That was supposed to occur because the more connected an interdependent person is, the greater is the potential embarrassment that would result from making a risky social decision.

The cushion hypothesis, although plausible, did not remain without challenge. Lau and Ranyard (2005) found that the difference between Chinese and American participants in risk-taking was due to differences in thinking with probabilities, with Chinese participants engaging in less probabilistic thinking. Weber and Hsee (1998) also found that there was no cross-cultural difference in risk-taking per se when there was a possibility of both loss and gain, i.e., a mixed situation. Yet, there was a cross-cultural difference in risk-perceptions mirroring that found by Lau and Ranyard (2005): compared

to people in individualist societies, people in collectivist societies were less likely to think that a prospect at different probability levels was risky, but they were equally likely to take risks given a certain level of risk perception. These latter findings suggest that, when little or no probabilistic reasoning is required, there should be little, if any, differences in risk-taking as a function of individualism and collectivism.

Another challenge to the cushion hypothesis came from the specific samples used in the studies of Weber and Hsee (1998) and Mandel (2003). All these authors noted that their findings on risk within the student samples can be reversed when one repeats the same study using a sample of parents. The authors suggested that people from collectivistic cultures who are parents are less risk-taking than their counterparts in individualist cultures because the former is embedded in social responsibilities that would make individual risk-taking more difficult. Indeed, not all studies found a cross-cultural difference in risk-taking when the samples were older, that is, more likely to be parents than student samples. For example, Orpen (1983) studied risk-taking in managers from India, Japan, and U.S. and found that U.S. managers fall in between Japanese and Indian managers in risk-aversion and risk-seeking.

Similarly, people with interdependent selves were not always found to be more risk-taking in the financial domain than people with independent selves. If people with interdependent selves were to have larger social networks than people with independent selves, or if the size of the social network is the sole explanation for differences in risk-taking, the former group should have been found to be always more risk-taking than the latter group. However, Hong (1978) reported that, compared with Taiwanese, Americans were more likely to advise others to choose a risky option over a safer option. Hamilton

and Biehal (2005) found that, when interdependence and independence is measured or manipulated, as opposed to assumed based on culture, independent people are more risk-taking than interdependent people. They explained the difference between their own findings and those of Mandel (2003) as being due to different conceptions of self activating different motivational goals. Specifically, Hamilton and Biehal (2005) suggested that interdependent people can be more risk-taking if the experimental manipulation of self-construals heightens promotion-focus, but not when it does not activate a promotion-focus. Weber and Hsee (1998), too, did not find any differences in financial risk-taking as a function of culture.

A closer inspection of studies that found people with interdependent selves (or those from collectivist cultures) to be more risk-taking than people with independent selves (or those from individualist cultures) reveals that they were all asking about either gains or losses, but not both, i.e., pertaining to risk-aversion and risk-seeking but not loss aversion. In contrast, the studies that found the opposite or no effects (Hamilton & Biehal, 2005; Weber & Hsee, 1998) were asking about decisions involving both gains and losses, i.e., situations in which loss aversion plays a role. This points to the possibility of a decision domain effect. This suggests that perhaps people with interdependent selves (or people from collectivist cultures), compared to people with independent selves (or people from individualist societies), are more risk-taking under gain or loss because they are less risk-averse under gain and because they are more risk-seeking under loss. Yet, they are not more risk-taking when decisions pertain to situations that have a trade-off between gains and losses because they are not less loss-averse than people with independent selves (or people from individualist cultures).

Theoretical Connection between Self-Regulatory Focus Theory and Prospect Theory

Notwithstanding the findings on a link between risk-taking and self-construals, there is other research showing that individuals with a promotion-focus, relative to those with a prevention-focused, take more risks because promotion-focus is associated with eagerness and prevention-focus is associated with vigilance (Crowe & Higgins, 1997; Friedman & Förster, 2001, 2002; Levine, Higgins, & Choi, 2000, Scholer, Stroessner, & Higgins, 2008). All these studies however, have dealt with risk only indirectly. Moreover, it remained unspecified whether a particular experimental task dealt with loss or gain. Yet, there is some suggestive evidence concerning an interaction between loss versus gain framing and SRF. Markman, Baldwin, and Maddox (2005) found that promotion-focused people performed best when payoffs consisted of all gains, whereas prevention-focused people performed best when the payoffs consisted of all losses. The authors suggested that promotion-focused people are more sensitive to gains, but prevention-focused people are more sensitive to losses, because the gain frame fits the promotion-focus and the loss-frame fits the prevention-focus. Similarly, Sassenberg, Kessler, and Mummendey (2003) revealed that during the distribution of positive resources, promotion-focus engendered ingroup favoritism, whereas no such effect occurred with the distribution of negative resources. Conversely, prevention-focus produced ingroup favoritism when the task concerned the distribution of negative resources, but no such effect emerged for the distribution of positive resources. These findings are in line with the theorizing of SRF theory with promotion-focused people being sensitive to presence or absence of positive outcomes and prevention-focused people being sensitive to

presence or absence of negative outcomes (Higgins, 1997).

As a general prediction, Higgins (2000) suggested that promotion-focused people value gain-framed activities more than loss-framed activities, whereas prevention-focused people value loss-framed activities more than gain-framed activities. This fit between regulatory orientation and the decision context is called integral regulatory fit, whereas the fit between SRF and self-construals surrounding the task is called incidental regulatory fit. As previously mentioned, regulatory fit has two consequences, feeling right and strength of engagement (Avnet & Higgins, 2006a, 2006b). When chronic motivation is in line with the situational means of attaining a goal, people feel right about pursuing the goal and their engagement in the activity is strengthened. That is to say, people experience a subjective sense of harmony between their preferred motivational approach and the task demands when there is a fit between two. Consequently, they judge their own approach to the task as correct, which motivates them further to pursue the goal. Regulatory fit increases the value of what a person is doing (Avnet & Higgins, 2006a, 2006b; Cesario, Grant, & Higgins, 2004). For instance, people who experienced regulatory fit when making purchase decisions were willing to pay up to 70% more for the good under consideration than those who experienced regulatory non-fit (Higgins, Idson, Freitas, Spiegel, & Molden, 2003).

I propose that prospect theory (Kahneman & Tversky, 1979) can be used to conceptualize the consequences of self-regulatory focus, as well as regulatory fit. As described above, prospect theory suggests that people are risk-seeking in the domain of losses (represented by a convex value function), and risk-averse in the domain of gains (represented by a concave value function), and that they are loss-averse (the value

function is steeper for losses than it is for gains). To establish a common ground between self-regulatory focus theory and prospect theory, we need to disentangle the differential sensitivity of promotion and prevention-focused to gains and losses into two parts: one pertaining to the relative value of gains and losses (represented by the steepness of the value function in the two domains) and the other pertaining to discrimination (represented by the curvature of the value function). In this context, discrimination refers to perceptually being less able to tell apart the constant difference between two different amounts as the absolute amounts become larger.

Regarding the relative value of gains versus losses, it is established that promotion-focused people prefer gain framed activities more than loss framed activities, whereas prevention-focused people value loss framed activities more than gain framed activities (e.g., Avnet & Higgins, 2006a, 2006b; Cesario et al., 2004; Idson, Liberman, & Higgins, 2000). If promotion-focused people are more sensitive to gains than prevention-focused people, their value function for gains should be steeper than the corresponding value function of prevention-focused individuals (see Figure 3). Likewise, if prevention-focused people are more sensitive to losses, their value function for losses is steeper than the value function for losses of promotion-focused people. Corroborating this prediction is the finding that promotion-focused people feel better about positive outcomes than prevention-focused people, and that prevention-focused people feel worse about the negative outcome than promotion-focused people (Idson et al., 2000). Thus, one can expect that the degree of loss aversion (not risk-aversion) should be less for promotion-focused people than it is for the prevention-focused people.

In line with the earlier distinction between loss aversion and risk-aversion/risk-

seeking, it is important to note that it is unclear what consequence, if any, variability in loss aversion may have for risk-taking behavior. Indeed, loss aversion can lead to greater or lesser risk-taking depending on the task at hand. On the one hand, loss aversion may prompt people to be less risk-taking in order to avoid any losses in return for an equal gain. However, under some circumstances, loss aversion may make people more risk-taking than they otherwise would be. This situation arises when a person has already incurred losses. Loss aversion may prompt gambler to play risky bets because they seek to recover the previous losses (Coval & Shumway, 2005; Scholer et al., 2010; Thaler & Johnson, 1990). That is, a loss-averse gambler who has already gambled the majority of his life savings away may grow increasingly desperate and, therefore, place increasingly risky bets in the hopes of winning big to undo the losses.

Regarding discrimination, the evidence is supportive of the idea that promotion-focused people exhibit a greater tendency to discriminate between gains than between losses. Correspondingly, prevention-focused people exhibit a tendency to discriminate losses better than gains, and prevention-focused people exhibit tendency to discriminate losses better than gains. That is, people with different regulatory foci tend to distinguish better between outcomes within the same domain, that is, discriminate better between different losses or between different gains. Zhou and Pham (2004) found that financial products representative of promotion, e.g., stocks, were evaluated with a greater sensitivity to potential gains than losses, and financial products representative of prevention, e.g., mutual fund in IRA, were evaluated with a greater sensitivity to potential losses than gains. Similarly, Zhang and Mittal (2007) found that promotion-focused people take into account positive information more than negative, and prevention-focused

people take into account negative information more than positive. Shah and Higgins (2001) revealed that promotion increases the speed of assessment for emotions consistent with promotion and decreases the speed of assessment for emotions consistent with prevention. The reverse holds for prevention. Lee and Aaker (2004) found that people presented with health-related information that fits their regulatory focus perceive the information as easier to process. Neuroscientific evidence, too, is pointing in the same direction: promotion-focus is associated with greater activity in areas implicated in emotion, attention, and perception for positive stimuli, whereas the prevention-focus is associated with greater activity in the same areas for negative stimuli (Cunningham, Raye, & Johnson, 2005). A similar finding emerged in a gamble task with decks: Promotion-focused people earned more money than prevention-focused people when they were playing with a deck involving gains, and prevention-focused people lost less than promotion-focused people when they were playing with a deck involving losses (Markman, Maddox, Worthy, & Baldwin, 2007). The specific psychological processes that have been suggested as possible explanation of these types of findings include perceptual (Kahneman & Tversky, 1979), and motivational differences (Markman et al., 2007). Regardless of the underlying process, the existing literature supports the idea that promotion-focused people, compared to prevention-focused people, are better at discriminating gains, and prevention-focused people, compared to promotion-focused people are better at discriminating losses.

Recall that prospect theory predicts a curved rather than a straight value function because individuals' ability to discriminate a fixed difference decreases rapidly as the amounts increase. People would be risk-neutral if they were to show no diminishing

sensitivity in the discrimination of gains (losses). That is, if people were equally good at discriminating between $1010 and $1020 as they were discriminating between $10 and $20, then they would be risk-neutral. In other words, the greater one's sensitivity in discriminating gains, the greater is one's tendency to take risk in the domain of gains. The reverse holds in the losses domain, i.e., the greater the sensitivity in the discrimination of losses is, the lesser the degree of risk-taking. Prospect theory states that value function is concave above the origin, and convex below the origin, i.e., people are risk-averse under gains, and risk-seeking under losses (Figure 2). For the gains domain, a concave value function means that the value derived from further money decreases as the money increases. In other words, people are less willing to take risks in the gains domain because the value they derive from additional money is less than the expected value of a prospect. That is, as shown in Figure 2, for gains the incremental increase along the Y-axis is never proportional to the increase along the X-axis. Instead, while the amount of money increases in increments of $250 on the X-axis, the value derived from such increases gets lower and lower. For losses, people are more willing to take risks because the disutility that people get from losing money is less than the expected value of a prospect due to the convex nature of their value function. That is, in Figure 2, the incremental decrease along the Y-axis is again not proportional to the decrease along X-axis.

If promotion-focused people, compared to prevention-focused people, are better at discriminating gains, then their risk-aversion in the domain of gains should be less than that of prevention-focused people (see the upper-right quadrangle of Figure 3). That is, the value function of promotion-focused people is closer to linearity in the gains domain.

When faced with the sure option of receiving $8 and the fifty-fifty chance of winning $20 or receiving nothing, promotion-focused individuals would likely show a strong response to the opportunity of winning $20 rather than $8, whereas a similar response would be much weaker on the part of prevention-focused individuals. Likewise, if prevention-focused people, compared to promotion-focused people, are better at discriminating losses, then their risk-seeking tendency for the losses should be less than that of promotion-focused people (see the bottom-left quadrangle of Figure 3). For losses, the value function of prevention-focused people is closer to linearity. When faced with the sure option of losing $8 and the fifty-fifty chance of losing $20 or losing nothing, prevention-focused individuals would mostly likely abhor the possibility of losing $20 and thus prefer to assured loss of $8.

These hypotheses can be restated more formally by assuming value functions in Tversky and Kahneman (1992): Gains: $u(x) = x^{\alpha}$, Losses: $u(x) = -\lambda(-x)^{\alpha}$, where u is value, x is the money, α is the curvature of the value function, λ is the loss-aversion coefficient. When people are risk-neutral, α is equal to 1. When people are risk-averse under gains, the greater the concavity and the lower the α. When people are risk-seeking under losses, the greater the convexity and the lower the α. I suggest that α should be greater for promotion-focused individuals under gain, and it should be greater for prevention-focused individuals under loss.

Several studies are supportive of this notion, albeit without providing a direct test of the link between self-regulatory focus and prospect theory (e.g., Scholer et al., 2010), or financial risk-taking (e.g., Crowe & Higgins, 1997; Friedman & Förster, 2001, 2002; Levine et al., 2000; Markman et al., 2005; Sassenberg et al., 2003).

A similar prediction can be made with respect to certainty equivalent amounts. Recall that the certainty equivalent is the sure amount of money that people find equally attractive as a gamble with the same expected value. Assuming that prospect theory holds, the value function for gains would be closer to linearity for promotion-focused people than prevention-focused people. This would occur because promotion-focused people would tell apart the difference between gains more than prevention-focused people do. Therefore, the certainty equivalent of a gamble in the domain of gains would be higher for the promotion-focused people than for prevention-focused people. Likewise, because the value function for losses would be closer to linearity for the prevention-focused people than the promotion-focused people, the certainty equivalent of a gamble in the domain of losses would be higher for the prevention-focused people.

For example, consider the case in which a person is asked how much he would expect in return for giving up the opportunity to participate in a gamble in which the toss of coin decides if he receives $1000 or nothing. Promotion-focused people would be willing to forgo the opportunity at higher amounts, say at $450, whereas prevention-focused people may give up the same opportunity at $350. The opposite would hold for the losses. Prevention-focused-people would be willing to pay higher amounts in order to avoid playing a gamble that involves losing $1000 with a flip of a coin, whereas promotion-focused people may not be as sensitive to the prospect of losing the same amount of money.

Because people are risk-averse in the domain of gains, and risk-seeking in the domain of losses (Kahneman & Tversky, 1979), the higher sensitivity of promotion-focused people to gains should result in responses closer to risk-neutrality in the domain

of gains for the promotion-focused people. Correspondingly, the higher sensitivity of prevention-focused people to losses should result in responses closer to risk-neutrality in the domain of losses for the prevention-focused people. In general, risk-aversion in the domain of gains, and risk-seeking in the domain of losses should result in lower amounts of certainty equivalent of a gamble with the same expected value in the gains domain than in the losses domain.

Based on prospect theory and self-regulatory theory, I also predict that prevention-focused people would exhibit more loss aversion than promotion-focused people. Recent neuroscience finding suggests that the amount of pain from losses is about twice than the corresponding amount of pleasure from gains of the same amount (Tom, Fox, Trepel, & Poldrack, 2007). Hence, one may speculate that the certainty equivalent of the same amount in the loss domain would be, on average, two times larger than it is in the gain domain.

This concludes the review of the three building blocks at the top portion of the model proposed in Figure 1. The next chapter focuses on the lower portion of Figure 1, It explores how the fit between regulatory focus and self-construals on the one hand, and the fit between regulatory focus and decision context on the other hand, can influence the way financial decisions under risk and uncertainty are made.

Chapter 4 – Integration of Mode of Thinking, Self-Construal, Self-Regulatory Focus, Emotions, and Risk-Taking

Considering that self-construal, regulatory focus and decision context are interrelated factors in decision making, it is important to examine the mechanism through which those may influence decision processes. The central argument made in this chapter is that the fit between self-construal and SRF (incidental fit) as well as the fit between decision context and SRF (integral fit) influence the processing style of the individual. However, before elaborating on the implications of regulatory fit on the processing style, it is necessary to clarify what is meant by processing style.

Most modern theories of human information processing distinguish two different modes of thought. One is characterized as intuitive, requiring no or little conscious thought, and the other one as systematic, often equated with effortful reasoning (e.g., Chen & Chaiken, 1999; Epstein, 1994, Petty & Wegener, 1999; Sloman, 1996).

Mode of Thinking

The theories in psychology describing different modes of thinking are called dual-process theories of thinking because they suggest two qualitatively different modes of thinking. All dual-process models tend to agree that cognitive processes can be grouped as belonging to system 1 and system 2. System 1 processes are characterized as heuristic, intuitive, associative, low effort, rapid, automatic, evolutionarily old, and not constrained by ability and motivation. System 2 processes, on the other hand, are systematic, rule-based, high effort, slow, controlled, evolutionarily new, and constrained by ability and motivation. System 1 is the default mode, and system 2 is evoked in the sense that only if system 1 processes are not providing a solution to the satisfaction of the individual,

system 2 processes are employed. According to this categorization, some of the dual–process theories and their suggested modes classified under System 1 and System 2 can be seen in Table 1.

Although there are various dual-process theories in addition to those listed, cognitive-experiential self-theory has been employed in this dissertation. The Elaboration Likelihood Model (e.g. Petty & Wegener, 1999) and the Heuristic-Systematic Model (e.g. Chen & Chaiken, 1999) were developed within the attitudes context with specific applications in mind. In that sense they are not as general as the others. Sloman's theory of rule-based and associative reasoning is more general but an emphasis on emotions is lacking. The concept of the default mode of operation is present in all those theories. However, it is much more salient and central in cognitive-experiential self-theory, CEST (e.g., Epstein, Lipson, Holstein, & Huh, 1992; Epstein & Pacini, 1999).

Both CEST and Sloman's theory regard the default mode of operation as intuitive, and find that it is very hard to override it by the rational rule-based reasoning as evidenced by the findings that people often know what a rational response would be even though they prefer the intuitive mode of processing (e.g., Epstein et al., 1992). Unlike Sloman's model, in CEST emotions are directly included in the formulation of intuitive thinking. Sloman's model differs from CEST also in the emphasis that it puts on the principles that govern the computation in the two systems. Sloman suggests that both modes are computational but that the specific computations employed differ between the two modes. He emphasizes how similarities and probabilities govern the associative mode, and how causal, sequential and symbolic reasoning governs the rule-based. CEST, on the other hand, puts greater emphasis on the developmental and evolutionary aspects

of the two modes, and is grounded in theories of personality. Most of the dual-process models in psychology, either covertly or openly, conceive of system 1 processes as inferior to system 2 processes. CEST, on the other hand, along with Sloman's model, explicitly states that system 1 is quite efficient and underlies the most of everyday activities. If anything, CEST assumes that system 2 is auxiliary to system 1.

Despite the differences among the dual-process models, all refer to system 1 and system 2 processes. Therefore, when reviewing the relation of mode of thinking to the regulatory fit, it is important to keep in mind that despite the plethora of the various terms the different theoretical traditions all share the common grounding in system 1 and system 2 processes. CEST particularly suits the theory development in the present chapter for the following three reasons. It is more general than attitude theories. Second, both CEST and the regulatory-focus theory were developed with particular reference to developmental aspects (Higgins, 1997). Most importantly, CEST puts emphasis on emotions in explaining intuitive thinking and focuses on why and how two systems of thought develop.

Does Regulatory Fit result in Intuitive or Systematic Processing?

For the most part, it is not clear to what extent regulatory fit effects are the result of systematic or intuitive thinking. As explained earlier, self-construals and SRF are linked such that, when independence is paired with promotion and interdependence is paired with prevention, a fit between the two occurs (Elliot et al., 2001; Lee et al., 2000; Lockwood et al., 2005). Note that neither self-construal nor SRF alone seem to be related to systematic or intuitive thinking (e.g., Aaker & Maheswaran, 1997; Pham & Avnet, 2004). Still, the interaction of self-construal and SRF may give rise to different modes of

thinking.

It is important to understand if regulatory fit results in intuitive or systematic thinking because it influences the way decisions are made. The available literature is ambiguous in the sense that it provides evidence for both. According to dual-process models of social cognition, the default mode of thinking is intuitive (e.g., Chen & Chaiken, 1999, Epstein et al., 1994; Epstein et al., 1992). Systematic thinking is evoked primarily when an observer is highly motivated or when the situation requires it (e.g. Epstein et al., 1992). That is, systematic thinking is often the consequence of unexpected events or the emergence of a problem that cannot be solved with intuitive means alone. Under various circumstances, internal signals might also serve as a prompt for the person to engage in more effortful, systematic processing. Schwarz (2002) argued that affective states may serve as a proxy to challenges that individuals face in their environment. Because of the association between the experience of negative affect and the presence of challenges or "problems" in the individual's environment, negative affect itself takes on a signal function that motivates the person to pay close attention to the environment (see also Frijda, 1986).

Schwarz's (2002) insight into the signal function of feelings has implications for the processes that occur under regulatory fit. Just as any other kinds of feeling can be informative, feeling right, one of the hypothesized consequences of regulatory fit, can be informative. It can be argued that the misalignment of motivation and self-concept is experienced aversively. In other words, if self-regulatory focus and self-construals are not compatible, the result is inner tension or mild negative affect. The latter is likely to activate greater attentional resources, thus making it more likely that individual operates

in the systematic mode of thinking (e.g., Storbeck & Clore, 2005). Conversely, when there is fit between SRF and self-construal, which is conceived by Pham and Avnet (2009) as a pleasant state, individual can rely on the default mode of intuitive processing. Indeed research on motivation found that when there is alignment between internal states and external circumstances, people have greater emotional well-being; however, when there is misalignment, they suffer from more negative affect (Baumann, Kaschel, & Kuhl, 2005). Since promotion-focus fits with independent self-construal, and prevention-focus fits with interdependent self-construal, one would expect that people would be processing intuitively under conditions of regulatory fit.

Alternatively, regulatory fit may give rise to processing fluency. Lee and Aaker (2004) found that under conditions of fit people reported greater ease of processing, were more successful in a subliminal task, and were able to generate more arguments. In the context of persuasion, Lee and Higgins (2009) suggested that the fluency resulting from regulatory fit can intensify the existing reactions. In other words, if people's evaluation of a target is positive, it becomes more positive under regulatory fit, and if it is negative, it becomes more negative under fit.

Further, Pham and Avnet (2009) suggested that regulatory fit should result in greater strength of engagement if someone is already involved in the task. However, this proposal contrasts with Hong and Lee's (2008) demonstration that task involvement decreases the regulatory fit effects, implying that regulatory fit and task involvement are incompatible. One possible resolution to this discrepancy may reside in considering the diverse effects of processing fluency. Working on the modes of processing, Briñol, Petty, and Tormala (2006) found that people are more intuitive if they believe ease is good, but

more systematic if they believe ease is bad. If regulatory fit results in a feeling of subjective ease of processing (as defined by Schwarz, 2002), the processing mode that would result from this subjective feeling of ease depends on the value associated with that context. In other words, fit can result in intuitive or systematic processing depending on the decision context. In an amiable context, increased processing fluency due to fit may be regarded as good and result in intuitive processing, whereas in a threatening context, the ease of processing due to fit may be regarded as bad and result in systematic processing. Indeed, Vaughn and colleagues found that regulatory fit can result in stronger engagement and greater sense of feeling right, when the focus is on enjoyment of the task or when there is no explicit rule on how long to continue a task (Vaughn, Malik, Schwartz, Petkova, & Trudeau, 2006). The decision context may dominate the processing mode, and fit may intensify the existing processing mode.

Yet, at present the evidence is still inconsistent. One line of research suggests that the fit between self-construals and SRF results in systematic processing (e.g., Aaker & Lee, 2001; Hamamura et al., 2009), whereas another line of research suggests that it results in intuitive thinking (e.g., Briley & Aaker, 2006; Pham & Avnet, 2009; Üskül et al., 2009). And, as summarized above, yet another line of research suggests that fit does not necessarily result in one mode of thinking or another (e.g., Vaughn et al., 2006). Specifically, Aaker and Lee (2001) found in a persuasion study that, when the self-construal and SRF were compatible (i.e., independent self-construal/promotion focus, interdependent self-construal/prevention focus) strong arguments were more persuasive than weak arguments. Conversely, when self-construal and SRF were incompatible (i.e., independent-prevention, interdependent-promotion) weak arguments were more

persuasive than strong arguments. Earlier research established that, when people employ system 2 processes, strong arguments increase the persuasiveness of a message, whereas weak arguments decrease its persuasiveness (Petty & Wegener, 1999). When, on the other hand, people employ system 1 processes, argument strength has little or no effect on attitudes (Haugtvedt, Petty, & Cacioppo, 1992). Based on this widely accepted finding, Aaker and Lee (2001) proposed that in the compatible conditions people process systematically, whereas in the incompatible conditions people tend to process information intuitively.

If Aaker and Lee's (2001) interpretation of their findings is correct, one would expect that people with independent self-construals would be more persuaded by promotion-focused information especially when they are processing systematically. However, Briley and Aaker (2006) found that North Americans are persuaded more by promotion-focused information, and Chinese people are persuaded more by prevention-focused information only when the participants were more intuitive, but not when they were more systematic in their approach. Note that this result contrasts with Pham and Avnet's hypothesis that fit would result in greater strength of engagement when people are already more involved in the task at hand. Similar to Briley and Aaker (2006), Koenig, Cesario, Molden, Kosloff, and Higgins (2009) found that, under conditions of regulatory fit, people are susceptible to the effects of the expertise of source, an established heuristic cue in persuasion which people are more likely to rely on expert opinion to make judgments when they are not motivated or able to process information presented (e.g., Chen & Chaiken, 1999). However, under conditions of regulatory non-fit, people are more likely to base their decisions on argument strength, such that stronger

arguments are considered more persuasive than weaker arguments.

To reconcile these disparate findings, I suggest that one again needs to consider the two pathways through which regulatory fit effects may occur. As mentioned earlier, according to the regulatory fit theory (Avnet & Higgins, 2006a, 2006b) there are two driving forces behind the fit effects: one is the strength of engagement in the activity and the other is feeling right. I suggest that the strength of engagement has its effects through the systematic system because dual-process models of thinking show that when people are more engaged in the activity, they are processing more systematically (e.g., Chen & Chaiken, 1999, Petty & Wegener, 1999). Indeed, people pay more attention to the task at hand, and are more motivated when they experience regulatory fit (e.g., Hamamura et al., 2009)

Conversely, feeling right should have its effects through the intuitive system. Feeling right is separate from the valence of feelings (Avnet & Higgins, 2006a, 2006b; Cesario et al., 2004). Avnet and Higgins (2006b) also argue that feeling right is different from the arousal dimension of affect. Emotions can be characterized on many dimensions with valence and arousal being just two commonly used dimensions among many. Separate from the degree of positivity or negativity of emotions, people can feel certain or uncertain. Uncertainty is orthogonal to the valence of emotion (Smith & Ellsworth, 1985). It is positively related to both fear and surprise, and negatively correlated with both happiness and disgust. Further, uncertainty does not change the valence of existing emotions from positive to negative or from negative to positive (Bar-Anan, Wilson, & Gilbert, 2009). More importantly, feelings of uncertainty, regardless of the valence of emotions, result in systematic processing (Tiedens & Linton, 2001). Although Higgins

and coauthors spend a great deal of time on elaborating what feeling right is not (Avnet & Higgins, 2006a, 2006b), they are generally vague when it comes to the definition of "feeling right." Koenig et al. (2009) allude to the concept of certainty in arguing that feeling right would result in intuitive processing. Along these lines, I suggest that the concept of "feeling right" can be captured by the uncertainty dimension of emotions as a sense of certainty, and that feelings of certainty would result in intuitive processing.

The question emerges as to whether feeling right or strength of engagement would have stronger effects on decision making. Cesario, Higgins, and Scholer (2008) emphasizes that the two components are not necessarily in opposition to each other and sometimes occur simultaneously, generating parallel effects. Yet, without elaborating further, Cesario et al. also acknowledge that regulatory fit may result in more intuitive processing in some cases, and in more systematic processing in other cases.

Pham and Avnet (2009) suggest that when people are already psychologically involved in the task at hand, then the strength of engagement should produce stronger effects. If individuals are not as much involved or invested in the task at hand, then feeling right should have stronger effects. In contrast to Higgins and collaborators (e.g., Avnet & Higgins, 2006a), Pham and Avnet (2009) propose that feeling right is a pleasant state, i.e., it has a hedonic component. As a result, when people are not strongly involved in the task, then "feeling right" that occurs under fit conditions results in more favorable evaluations of the task. In contrast, when people are already highly involved in the task, then under regulatory fit the strength of engagement should result in an intensification of existing tendencies. Specifically, with regard to trends in evaluation, Pham and Avnet (2009) suggest that pre-existing negative evaluations should become more negative,

whereas pre-existing positive evaluations should lead to more positive attitudes. In support of this argument, Avnet and Laufer (2011) found that highly involved participants evaluated negative targets more negatively and positive targets more positively, whereas low involvement participants evaluated any target more positively.

However, according to regulatory fit theory (Lee & Higgins, 2009), feeling right is not only conceptually separate from the valence of feelings, it is also empirically separate from it. This occurs because prevention-focused people feel right when dealing with negative tasks, and promotion-focused people feel right when dealing with positive tasks (Avnet & Higgins, 2006a, Cesario et al., 2004). Furthermore, if involvement is a critical variable in determining which of the fit factors looms larger, one would expect that under conditions of high relevance, people would show strength of engagement effects, and when the task is not involving for them, they would not show strength of engagement effects. Yet, Appelt, Zou, Arora, and Higgins (2009) observed fit effects regardless of whether participants were dealing with a real situation that involved money (which tends to promote personal engagement) or whether participants were just responding to hypothetical scenarios. Likewise, Koenig et al. (2009) found that under regulatory non-fit, people were more systematic in their processing even under conditions of low involvement.

Higgins and colleagues (Cesario et al., 2008; Koenig et al., 2009) alternatively suggest that these disparate findings regarding fit effects can be explained by how the fit effects are created in the first place. They argue that if the fit effects come through the task situation itself, i.e., "integral fit" effects, then strength of engagement should occur. Arguably, this was the case for Aaker and Lee (2001). These authors manipulated self-

construals by appealing to either individual or family within the persuasive message itself. Likewise, they varied the promotion and prevention within the persuasive message. This manipulation of fit between SRF and self-construals within the task itself resulted in the hypothesized strength of engagement effects: more systematic processing under conditions of fit (cf. Koenig et al., 2009).

If, on the other hand, fit occurs outside the immediate task, i.e., through "incidental fit" effects, then feeling right effects should occur. Koenig et al. (2009) manipulated fit through an ostensibly unrelated experiment that preceded the critical experimental task. Koenig et al. found the hypothesized feeling right effects: more intuitive processing under conditions of fit. Such incidental effects are well established in the literature. Mood or emotions unrelated to the task at hand may influence the task through so-called carry-over effects. As discussed earlier, feelings can serve as an informational cue signaling that one's environment is safe or not, and that more cognitive resources need to be mobilized or not (e.g., Schwarz, 2002). Higgins and colleagues reason that feelings of rightness (under fit conditions) or wrongness (under non-fit conditions) serve as a piece of information, which serves as a proxy to signal the state of environment. However, such effects should only occur when fit occurs incidentally. If regulator fit occurs as part of the critical task itself, fit may strengthen the degree of engagement, and result in more systematic processing. Therefore, there exist multiple fit effects: ones that could occur outside the task, and ones that occur as an integral part of the task.

If the fit between self-construal and self-regulatory focus arises independently of the situation in which a person works on task, one would expect to see that incidental fit

would result in more intuitive processing. This is indeed predicted for the present line of research.

Yet, in addition to fit effects resulting from the compatibility of SRF and self-construals, i.e., incidental fit effects, I have also discussed the fit between SRF and the domain of the decision task as concerning losses or gains, i.e., integral fit effects. To recap, decision contexts involving gain outcomes fit the promotion-focus whereas decision contexts involving loss outcomes fit the prevention-focus. Arguably, in case of this second type of fit, regulatory fit arises from an integral property of the risk decision making task, which necessarily specifies the possibility of gain versus loss outcomes. Therefore, when promotion-focused people are making decisions pertaining to gains, and when prevention-focused people are making decision pertaining to losses, one should expect to see that strength of engagement effects loom large. Based on Cesario et al. (2008) this should increase the degree of systematic processing.

Feeling right and strength of engagement are not necessarily at odds with each other. In fact, emotion and reasoning are parallel processes, which inform and complement each other (e.g., Slovic, Finucane, Peters, & MacGregor, 2004). Cognition alone may not be able to compensate and vice versa. For instance, when the affective system is damaged, as may be the case in people with brain injury, people are unable to come up with the best response in all situations because they have no means of determining value. That is, when considering the extreme of just relying on reasoning, it is clear that decisions will be suboptimal as they are lacking an affective basis because affective reinforcement aids in learning (Bechara & Damasio, 2005; Bechara, Damasio, Tranel, & Damasio, 1997; Tranel, Bechara, & Denburg, 2002).

In the present research, the fit between self-construal and self-regulatory focus was created outside of the task itself, through an incidental manipulation. I suggest that, due to the incidental nature of feeling right in the fit between self-construal and self-regulatory focus, individuals with fitting self-construal and self-regulatory focus would be more intuitive in their processing.

At the same time, I do make different predictions for integral fit, i.e., for how decision making under gain and loss interacts with self-regulatory focus. When promotion-focused people are making decisions in the gain domain, or when prevention-focused people are making decisions in the loss domain, they should be more strongly engaged in the task, and would be processing more systematically. Normative-statistical responses are typically correlated positively with systematic thinking style (e.g., Shiloh, Salton, & Sharabi, 2002). In extension of these findings, I expect that when people are in a systematic processing mode, the more they would be taking into account objective factors pertaining to their risk decision making.

Recall that Hsee and Weber (1999) and Mandel (2003) found that participants' willingness to engage in risk-taking behavior was shaped by the financial network that would support them in case of financial catastrophe. Likewise, researchers found little or no difference in responses to hypothetical versus actual financial decisions (Beattie & Loomes, 1997; Camerer & Hogarth, 1999). Thus, real factors may constrain actual as well as hypothetical financial behavior. People cannot help but simulate the "meaning" of hypothetical sums of money that they win or lose in the context of their lives. As a result, people apply the same mindset they apply to consequential decisions to hypothetical decisions (e.g., Green, Myerson, Lichtman, Rosen, & Fry 1996). The present research

expands this set of realistic constraints on financial decision making beyond the size of one's network and includes current disposable income, number of dependents, source of living, and one's socioeconomic status as additional constraints. I measured these realistic factors in a person's life after the decision making process and examined to what extent they correlated with the relationship between regulatory fit and decision making. I hypothesize that the risk-taking behavior of systematically processing participants in the present studies would be shaped by their real-world constraints, including their income, number of dependents, leisure money and socioeconomic status. Specifically, I expect that both subjective and objective factors would be taken into account in making the risk decisions when the independent self-construal is paired with promotion-focus and the decision context is gains (or when the interdependent self-construal is paired with prevention-focus and the decision context is losses). However, when there is fit between the self-construal and SRF, but non-fit between SRF and the decision frame, I expect that people would be intuitive and emotions would be taken into account more than objective factors. When self-construal and SRF do not fit, but SRF and decision context fit, I expect that people would be systematic, and the riskiness of their decisions would reflect objective factors more than subjective emotional experiences.

Relations among Emotions, Mode of Thinking, and Risk-Taking

Emotions play an important role in decision making under risk (e.g., Loewenstein, Weber, Hsee, & Welch, 2001), and specific emotions have been linked to different risk preferences. Calmness results in risk-seeking in the domain of gains (Mano, 1994). However, beyond the valence of emotions, specific emotions with the same valence can give rise to different risk estimates. Fear increases relevant risk estimates whereas anger

does not (Fischhoff, Gonzalez, Lerner, & Small, 2005), or anxiety increases individuals' preference for low risk, whereas as sadness does the opposite (Maner, Gailliot, Butz, & Peruche 2007; Raghunathan & Pham, 1999).

Generally speaking, positive and negative moods result in increased likelihood estimates of future events fitting those states in valence (e.g., Johnson & Tversky, 1983). Happy mood results in slightly less concavity in the domain of gains, and significantly less convexity in the domain of losses, and the value function both in the domain of gains and losses is steeper than in control groups (Isen, Nygren, & Ashby, 1988). The lesser curvature in gains exhibits itself as more risk-taking tendency compared to control groups, and the lesser curvature in losses exhibits itself as less risk-taking tendency compared to control groups (Arkes, Herren, & Isen, 1988).

Positive moods and emotions are generally associated with heuristic processing, whereas negative moods and emotions are generally associated with systematic processing. According to Schwarz (2002), positive emotions and being in a good mood signals to the individual that the environment is safe and one can engage in effortless processing, whereas being in a bad mood does the opposite. Consequently, Schwarz and colleagues suggested that those in a happy mood tend to rely on general knowledge structures, such as stereotypes, scripts, and schemas (e.g., Schwarz & Clore, 1988, 2007; Schwarz, 2002; Bless & Schwarz, 1999). This results in simplified processing of the task at hand, but frees up resources to use on other tasks.

Tiedens and Linton (2001) suggested a general framework in which emotions associated with uncertainty result in systematic processing. However, as it is implicit in the research cited above regarding the influence of emotions on risk-taking, being in an

intuitive or systematic mode per se has not been associated with under- or overestimation of risk (but see Trumbo, 1999 for an exception). Therefore, I do not make any specific predictions about the degree of risk-taking as a function of intuitive or systematic modes of thinking.

In this dissertation, the focus is on specific emotions, i.e., cheerfulness and quiescence related emotions as described below, for which SRF theory posits specific relations with promotion- and prevention-focus (Higgins, Shah, & Friedman, 1997).

Relations among Emotions, Self-Construal, Self-Regulatory Focus and Risk-Taking

Self-construal and SRF have been shown to relate to change in distinct emotional states. Upon goal attainment, those with promotion-focus experience more of the dejection-cheerfulness related emotional change, i.e. along the axis of happy-sad. whereas those with prevention-focus experience more agitation-quiescence related emotional change, i.e. along the axis of calm-agitated (Higgins et al., 1997). Dejection-cheerfulness related emotions are sadness and happiness, whereas agitation-quiescence related emotions are tenseness and calmness. The differential change in emotions as a function of regulatory focus is theorized to occur because people experience happiness when they attain an ideal, but they experience frustration when they fail to fulfill an obligation (Higgins et al., 1997). Higgins et al. (1997) did not find a main effect of SRF on emotions per se, but there was an effect on the change in emotions pre- and post-goal attainment.

The relation of emotions to self-construals was similar to that of SRF in the sense that neither construct was found to be related to emotions per se. Although people from a collectivist culture report lower levels of happiness and satisfaction compared to those

from individualist cultures even after controlling for the influence of affluence (Diener, Diener, & Diener, 1995), the priming of self-construal and SRF does not relate to the valence of experienced emotions per se. Mandel (2003) demonstrated that priming independence versus interdependence did not lead to more positive or more negative experiences. Likewise, Friedman and Förster (2001) showed that priming promotion versus promotion is not linked to different affective valences.

In this research, I predict an interaction effect on the feelings of certainty as it pertains to the specific task at hand, but no parallel effect on a general sense of certainty devoid of an object. When there is a fit between self-construal and self-regulatory focus, people should feel more certain about the task they are doing. That is because specific feelings of certainty can capture the feeling right effect that would occur under incidental regulatory fit.

I also expect to find an interaction effect such that the fit and non-fit between self-construals, SRF, and decision context as gain versus loss would change the degree emotions predict risk decisions. Generally, under condition of incidental regulatory fit, respondents would show a greater tendency to rely on their emotions. Thus, emotions should mediate the effect of self-construals and SRF on decision making under risk.

In Chapter 4, the lower portion of the Figure 1 is explained, i.e. how regulatory fit can influence the way financial decisions under risk and uncertainty are made. In the next chapter, the full Figure 1 is presented in relation to particular hypotheses resulting from it.

Chapter 5 – The Present Research

Rationale for the Studies

This dissertation brings together theories of motivation, culture and cognition, and decision making under risk and uncertainty. In doing so, it relied on several assumptions that were previously confirmed in studies. Specifically, it is established that self-construals have a profound influence on judgment and behavior (e.g., Markus & Kitayama, 1991), as do regulatory focus (Higgins, 1997) and regulatory fit (e.g., Avnet & Higgins, 2006a). It is also known that people are more risk-seeking under loss, more risk-averse under gain, and loss-averse in mixed-gamble situations (Kahneman & Tversky, 1979). It is also known that emotions influence risk estimates (e.g., Loewenstein et al., 2001).

This dissertation also tackles a number of theoretical controversies, where previous research has made diverging assumptions or has arrived at different conclusions. It is an open question if interdependent selves are associated with more financial risk-taking than independent selves (e.g., Mandel, 2003) or if the opposite is the case (e.g., Hamilton & Biehal, 2005). If interdependent individuals are indeed more risk-taking than independent individuals this may be due to the size of their financial network (e.g., Hsee & Weber, 1999) or due to differences in probability perceptions (Lau & Ranyard, 2003; Weber & Hsee, 1998).

Similarly, it is still an open question if different motivational orientations entail different risk-taking tendencies. Specifically, to date it is unclear if promotion-focused people are financially more risk-taking than prevention-focused people, as suggested by Crowe and Higgins (1997), or if prevention-focused people are more risk-taking than

promotion-focused people, as demonstrated by Monga and Zhu (2005).

Scholars suggested that self-construals and regulatory focus can be combined to create regulatory fit (Cesario et al., 2008; Lee & Higgins, 2009). Although the previous research showed that self-regulatory focus and self-construals or culture are related to each other (Elliot et al., 2001; Lee et al., 2000; Lockwood et al., 2005; Zhang & Mittal, 2007), there are a few studies that actually examined the fit between self-construals and self-regulatory focus (e.g., Aaker & Lee, 2001; Chen, Ng, & Rao, 2005). To my best knowledge, none of these studies used chronic self-construals, i.e., individual difference measures of self-construal, to create incidental regulatory fit. However, given the affinity of promotion focus and independent self-construals, and the affinity of prevention focus and interdependent self-construal, the prediction of regulatory fit is straightforward. However, it has to be acknowledged that, at present, regulatory fit is not something that can be measured directly. Rather, it is conceptualized as the confluence of two variables (e.g., Appelt et al., 2007; Cesario et al., 2004). This complicates the matter in that regulatory fit is a construct that cannot be directly observed, but can only be inferred from its consequences.

Moreover, there is considerable controversy over whether regulatory fit results in feeling right or strength of engagement. As detailed in the previous chapter, Koenig et al. (2009) argue that it is critical if the source of fit is within the task or outside of it. When the source of fit is incidental, fit produces feeling right effects, but when the source is integral to the task, fit produces strength of engagement effects. However, Pham and Avnet (2009) posit that the consequences of regulatory fit depend on the initial level of involvement and have nothing to do with the source of fit. According to these authors

when the initial level of involvement in a task is high, regulatory fit should result in stronger engagement, and when the initial level of involvement is low, fit should result in feeling right. Still others (e.g., Vaughn et al., 2006) argue that fit, regardless of the source of fit, or the initial level of involvement, can result in both stronger engagement and feeling right when the focus is on enjoyment from the task. Therefore, it is an open question if, when, or how regulatory fit would result in stronger engagement or feeling more right.

Likewise, it is presently a matter of debate as to whether regulatory fit encourages intuitive thinking (e.g., Üskül et al., 2009) or systematic thinking (e.g., Aaker & Lee, 2001). The first line of argument highlights that the experience of fit signals the absence of problems, which allows individuals to rely on effortless intuitive processing. The second line of argument points to the possibility that regulatory fit mobilizes attentional resources and encourages more thorough elaboration of new material. Still, it is also possible that regulatory fit does not result in one or the other processing mode, but encourages both (e.g., Cesario et al., 2008). Relatedly, it is unclear what aspect of regulatory fit might evoke a particular processing style, that is, whether processing effects occur as a function of feeling right (e.g., Scholer et al., 2010), strength of engagement (e.g., Hamamura et al., 2009) or both (Avnet & Higgins, 2006a).

It is possible that intuitive thinking is associated with relying on feelings (e.g., Sloman, 1996), and systematic thinking is associated with relying on objective factors (e.g., Chen & Chaiken, 1999). However, people sometimes rely on emotions when processing systematically because emotions provide diagnostic information (e.g., Pham & Avnet, 2004). The effect of emotional messages can be mediated by both systematic

and intuitive thinking (Rosselli, Skelly, & Mackie, 1995). Likewise, there are multiple ways to gather objective information. For example, people learn associations between events in their environment and the acquisition of such knowledge typically occurs when processing intuitively. The resulting knowledge may be objective in the sense that it is ecologically valid; however, it does not provide any causal information about process in one's environment (Gigerenzer & Todd, 1999). Yet, reliance on emotions as opposed to objective factors generally increases when people process intuitively (e.g., Albarracin & Wyer, 2001; Petty & Wegener, 1999).

Intuitive (e.g., Schunk & Betsch, 2006) or systematic thinking (e.g., Kahneman & Tversky, 1973) can be associated with worse outcomes. It is often assumed that systematic processing leads to superior outcomes and in many instances in the judgment and decision making literature this is definitely the case (e.g., Shiloh et al., 2002). However, there are cases in which mode of processing seems irrelevant or where lack of intuitive processing even undermines the quality of the outcomes (e.g., Bechara & Damasio, 2005; Bechara et al., 1997; Tranel et al., 2002). Still, it is an open question to what extent different aspects of risk behavior are influenced by processing mode. There is evidence that systematic processing reduces loss aversion (Vieider, 2009), though it seems unclear if risk-aversion and risk-seeking are also influenced by processing mode.

Overall, the overarching goal is to reconceptualize the way that financial decisions under risk and uncertainty are made from the perspective of regulatory fit theory. An important consideration in doing so is to integrate what is known in psychology and economics in a way that renders them coherent within the same theoretical framework. This integrated framework is then used to make predictions on the

consequences of regulatory fit on financial decisions in an attempt to resolve what present themselves as controversies in existing literature.

Main Theoretical Model Proposed and the Hypotheses

I propose that regulatory fit helps shape how one is making decisions under risk and uncertainty. I test this proposal across two studies, one involving responses to hypothetical financial decisions under risk, and the other involving responses to financial decisions under uncertainty that have real monetary consequences. As can be seen in Figure 1, the theory I provide is a process model, which predicts a particular chain of events. Below, I discuss specific elements of the model, the hypothesized processes and their implications.

For the consequences of self-construal on financial decisions under risk and uncertainty, Mandel (2003), on the one hand, found people primed with interdependent selves to be more risk-taking than people primed with independent selves. As in Hsee and Weber (1999) greater risk-taking was found to be related to the size of participants' supportive network. However, Hong (1978) reported that, compared with Taiwanese, Americans were more likely to advise others to choose a risky option over a safer option. Hamilton and Biehal (2005) found when interdependence and independence is measured or manipulated, independent people are more risk-taking than interdependent people.

To reconcile these disparate findings, I suggest that the inconsistency of previous research can be reduced by adoption of a more refined analysis of risk-taking based on prospect theory. Prospect theory established that risk-taking depends on risk-aversion in the gains domain, risk-seeking in the loss domain, and loss aversion in the mixed situations as well as the probability weighing functions (Kahneman & Tversky, 1979).

Because Hsee and Weber (1999) and Mandel (2003) studied risk-taking solely in the context of gains or losses, but not in mixed situations where there is a comparison of gains to losses, I expect to explain their findings with risk-aversion and risk-seeking when decision domain pertains only to gains (Hypothesis 1a) or losses (Hypothesis 1b) (see Table 2 for a summary of all hypotheses discussed here). Similarly, because Hamilton and Biehal (2005) studied risk-taking in the context of a trade-off between gains and losses, I expect to explain their findings with loss aversion (Hypothesis 1c). These predictions should hold regardless of whether participants are responding to hypothetical scenarios, as in Study 1, or making financial decisions with real consequences, as in Study 2.

Second, integrating prospect theory and self-regulatory focus theory, I suggest that promotion-focused people should be more risk-taking than prevention-focused people across both gain (Hypothesis 2a) and loss situations (Hypothesis 2b). Yet, promotion-focused people should have steeper value functions in the gains domain, and prevention-focused should have steeper value functions in the loss domain. As a consequence, promotion-focused individuals should be less risk-taking than prevention-focused individuals when financial decision pertains to the trade-off between gains and losses (Hypothesis 2c).

Based on prospect theory (Kahneman & Tversky, 1979) I expected that, across all experimental variations, people would be risk-averse in the domain of gains (Hypothesis 3a), risk-seeking in the domain of losses (Hypothesis 3b), and loss-averse when deciding on a trade-off between gains and losses (Hypothesis 3c).

Agreeing with the suggestions of Cesario et al. (2008) and Koenig et al. (2009), I

hypothesize that the incidental fit between self-construal and self-regulatory focus, i.e., promotion-focus paired with independent self-construal and prevention-focus paired with interdependent self-construal, will result in feeling right about the task (Hypothesis 4a). Conversely, incidental non-fit would result in not feeling right about the task. The integral fit between the fit between self-regulatory focus and decision context (Study1), i.e., promotion-focus paired with gain and prevention-focus paired with loss, will result in an increased strength of engagement in the task (Hypotheses 4b). Integral non-fit will result in disengagement from the task. I further propose that feeling right can be captured by how certain and right participants feel about the task (Hypothesis 5a). Likewise, strength of engagement can be captured by how engaging and interesting participants report the task to be (Hypothesis 5b). Lastly, I make the assumption that feeling right and strength of engagement are separate constructs, and can be measured as such (Hypothesis 5c).

Higgins and colleagues (Cesario et al., 2008; Koenig et al., 2009) propose that feeling right is a result of incidental fit and strength of engagement is a result of integral fit. If the source of fit is incidental, that is, external to the task, the experience of fit may provide a clue as to the state of environment, consistent with Schwarz's (2002) account of the signaling function of feelings. If the source of fit is integral to the task, that is, it occurs as part of the task itself, then it may mobilize attentional resources, and possibly enhance systematic thinking. These hypotheses seem more plausible than the reasoning in Pham and Avnet (2009) that regulatory fit, regardless of the source of fit, was supposed to produce greater strength of engagement, if the individuals were strongly engaged. However, when they were not strongly engaged to start with, it was supposed to produce

greater feeling right. However, it remains also possible that fit creates a processing fluency in which the appropriate mode of thinking is called upon as necessary (e.g., Vaughn et al., 2006). Yet, because a precise mechanism of how processing fluency is translated into a particular processing mode is lacking, this dissertation tested the account of Higgins and colleagues as to the relation between motivational orientations and mode of processing. Integrating the preceding hypotheses with the effects of regulatory fit, I hypothesize that under regulatory fit between SRF and self-construal, i.e., when independence is paired with promotion-focus and interdependence paired with prevention-focus, people will be more intuitive than people in the non-fit conditions (i.e., Figure 1, 1st column compared to 2nd column) (Hypotheses 6a, 6b, 6c).

Feeling right, likewise, should lead to intuitive thinking (Hypotheses 7a, 7b, 7c). This prediction was motivated by Schwarz's (2002) insight into the signal function of positive feelings. If feeling right signals that there are no significant challenges or problems in the environment, individuals can rely on the default mode of intuitive processing. By implication, not feeling right should decrease the extent of intuitive thinking because negative affective states signal potential challenges to the individual, and are likely to evoke systematic thinking (e.g., Storbeck & Clore, 2005). Therefore, strength of engagement should foster systematic thinking (Hypotheses 7d, 7e, 7f), whereas disengagement should result in lesser systematic thinking.

I expect that regulatory fit influences which variables are taken into account in the decisions under risk (Study 1) and uncertainty (Study 2). Different theorists consider different factors to be taken into account under one mode of thinking versus the other (e.g., Gigerenzer & Todd, 1999). I propose that incidental regulatory fit results in taking

emotional factors more into account in financial decisions compared to conditions of incidental non-fit (Figure 1, 1st column compared to 2nd column) (Hypothesis 8a). As a corollary to the effects of incidental fit, when there is integral fit, i.e., fit between SRF and the decision frame (i.e., promotion-gain or prevention-loss pairs), as opposed to integral non-fit, I expect to see reality constraints to be more closely correlated with risk decision making. Specifically, size of the financial network, disposable income, number of dependents, and socioeconomic status one has, to be taken into account in making decisions compared to the conditions under integral non-fit (Figure 1, 3rd column compared to 4th column) (Hypothesis 8b). Integral regulatory fit should result in taking objective factors more into account in financial decisions, whereas integral regulatory non-fit results in taking objective factors less into account in financial decisions.

However, I theorize the incidental fit and integral fit to be independent. That is, they can be manipulated together or separately, and their effects might occur together or separately, and the effects of incidental fit are not necessarily altered by the presence of integral fit and vice versa. This assumption is motivated in part by the observation that people can engage in systematic and heuristic procession simultaneously (e.g., Epstein et al., 1994). This implies that, when there is both incidental and integral fit, then people can be both intuitive and systematic. When the fit between self-construal and SRF is accompanied by a non-fit between SRF and the decision frame (i.e., promotion-loss or prevention-gain pairs), participants should be only intuitive but not systematic. They should be more inclined to rely on their emotions than any other group, and they should be less inclined to base their decisions on the objective factors than any other group. When neither self-construal nor the decision frame fits with SRF, people should neither

be intuitive nor systematic. That is, they should not be basing their decision on emotions or the objective factors. That does not make the choices under those conditions random. It is just that the consideration of emotions and the objective factors should be less than the other conditions. Finally, when self-construals do not fit with the SRF, but SRF fits with the decision frame, people should be only systematic. They should take into account the objective factors more than other groups, and they should be taking into account their emotions less than other groups. The separateness of these processes is depicted in Figure 1 using different columns for each of state of the processes.

Experimental Paradigm

Manipulating incidental regulatory fit. To create incidental fit between self-construals and self-regulatory focus, previous studies used different methods. In some of the studies, self-construal was measured and self-regulatory focus was manipulated (e.g., Study 1 integral fit manipulation, Lee et al., 2000). In others, self-construal was assumed based on cultural membership in Eastern versus Western culture and self-regulatory focus was manipulated (e.g., Briley & Aaker, 2006; Hamamura et al., 2009). In still others, self-construal was manipulated and self-regulatory-focus was measured (e.g., study 2, Zhang & Mittal, 2007). Deviating from this standard approach, the goal in this research was to generate a paradigm that would enable me to manipulate self-construals and regulatory focus simultaneously because true experimental effects can be created only by random assignment of participants to different conditions. For this purpose, I ran a series of pilot studies, described in Appendix A, to develop manipulations for self-construals and self-regulatory focus that might allow for variations in those constructs independently. However, priming of one of them contaminated the priming of the other.

Therefore, a less ambitious approach was employed in the main studies. Specifically, chronic self-construal was measured as individual difference variable, and self-regulatory focus was manipulated experimentally.

Manipulating integral regulatory fit. In Study 1, I manipulated both the self-regulatory focus and the decision frame as loss vs. gain to create integral fit. In Study 2, I again manipulated self-regulatory focus; however, because the framing of the much more involving experimental task was not varied, Study 2 did not manipulate integral regulatory fit.

Assessing decision making under risk and uncertainty. In Study 1 I assessed the responses to hypothetical scenarios under risk, and in Study 2 I assessed the responses with real monetary consequences under uncertainty. In particular, participants responded to gain, loss, or loss aversion scenarios in Study 1. This approach allowed me to estimate degree of risk-aversion, risk-seeking, and loss aversion separately. Hypothetical decision making scenarios are notoriously under suspicion of not being realistic, or at least as realistic as the situations with real monetary consequences. This suspicion of invalidity occurs even though researchers who varied the presence of material incentives in risky gambles found little or no systematic effects on choices (Beattie & Loomes, 1997; Camerer & Hogarth, 1999). Therefore, in Study 2, I employed a task that involved real monetary consequences, the Balloon Analogue Risk Task (BART; Lejuez et al., 2002). In this task, the risk is unknown and there is diminishing marginal rate of return paralleling the many decisions made in the real life.

Chapter 6 – Study 1: Financial Decision Making under Risk

The goal of Study 1 was to test the effects of regulatory fit on financial decision making under risk. Study 1 assessed individual differences in self-construals using the measure by Singelis (1994). Subsequent to the assessment of self-construals, promotion and prevention were primed using the method by Pham and Avnet (2004) who adopted a classic manipulation by Higgins and colleagues (e.g., Higgins et al., 1994; Liberman, Idson, Camacho & Higgins, 1999). Participants were asked to describe either two of their past and two of their current hopes, aspirations and dreams (promotion prime), or two of their past and two of their current duties, obligations, and responsibilities (prevention prime). Incidental regulatory fit occurred when a chronically salient independent self-construal coincided with a temporarily salient promotion-focus. Likewise, incidental regulatory fit occurred when a chronically salient interdependent self-construal was paired with an experimentally induced salient prevention-focus.

The second type of regulatory fit, namely, that between SRF and task occurred as a function of whether temporary difference in prevention and promotion-focus was paired with gain or loss framing of the decision task. Thus, the conditions of integral regulatory fit were met when prevention-focus primed participants work on decisions under loss, and when promotion-focus primed participants work on decisions under gain.

Whereas most cells of the designs served the purpose of examining risk-aversion/risk-seeking, a minority of participants received mixed-gamble tasks to assess loss aversion. This type of task cannot be used for the creation of integral fit, because the task involves both gains and losses. Thus, loss aversion data were analyzed separately. In the present paradigm, decision frame varied between participants, such that a participant

encountered only gain tasks, loss tasks, or mixed tasks.

Study 1 also allowed a comparison of different modes of administration of the experiment. Specifically, Study 1 was conducted in two different formats: as a paper-and-pencil study and as an online study. The promotion-prevention priming manipulation employed here has been successfully used in online format (e.g., Tam, Bagozzi, & Spanjol, 2010; van Noort, Kerkhof, Fennis, 2008). Likewise, previous research by Silvia and Eichstaedt (2004) confirmed that the priming of an individualist mindset can be accomplished in an online procedure. For neither of these paradigms have the responses of online participants been previously contrasted with offline participants. Typically, research does not find any differences with regard to administration mode (e.g., Riva, Teruzzi, & Anolli, 2003). Still, the equivalence of the priming of self-regulatory focus and the experimental manipulation of regulatory fit remains to be established.

Method

Overview. Employing a median-split procedure with chronic self-construals, the present study used a 2 (chronic self-construal) x 2 (SRF priming) x 3 (decision context: loss vs. gain vs. mixed) between-groups factorial design (see Appendix A for a discussion of median split). Incidental fit was created when promotion-focus was paired with independent self-construal, and prevention-focus was paired with interdependent self-construal. Integral fit was created when promotion-focus was paired with gain, and prevention-focus was paired with loss. Individual differences in self-construal were measured, and SRF (promotion vs. prevention) was primed between participants. Gain, loss, and mixed context of the decision tasks were also varied experimentally between groups. Task perception, mode of thinking, emotions, size of financial network and

demographic variables were measured after the decision tasks. Mode of thinking was assessed through self-reports, through a behavioral measure, and through a derivational measure.

Participants and recruitment. Based on previous studies I estimated the effect size of self-construal or self-regulatory focus on degree of risk-taking to be $d = 0.3$. When entered into a power calculation for the present study, this suggested a required sample size of 276 participants, assuming a β-error of 0.2 and significance level (α) set at .05. Whereas this sample size was quickly reached, one additional consideration of Study 1 was to attract potential participants in Study 2 (described below). That is, once they had completed Study 1, participants were asked whether they would like to be contacted later to participate in an additional research study of a similar kind. Recruitment for Study 1 continued until there were 150 potential volunteers for Study 2, thus allowing a possible comparison of Study 1 and Study 2 responses.

There were a total of 629 participants in Study 1 (405 females, 216 males; 8 did not report sex), which were recruited by one of two approaches, i.e., students at University of Nevada, Reno, or workers at Amazon MechanicalTurk. University of Nevada, Reno students participated in one of two modes, i.e., online or offline, whereas Amazon MechanicalTurk workers participated exclusively online.

Offline administration. There were a total of 195 students of University of Nevada, Reno (103 females, 92 males). The participants were either part of subject pool or recruited via consent of course instructors in the Departments of Psychology and Sociology. Students participated in exchange of course credit.

Online administration. Also, 219 University of Nevada, Reno students

participated online (153 females, 58 males, 8 did not report sex). They were recruited via the subject pool or through announcements in various departments. All UNR students participated in exchange of course credit

An additional 215 participants were U.S. residents with at least some college education who participated in exchange of money via Amazon MechanicalTurk (149 females, 66 males). Amazon MechanicalTurk, also referred to as MTurk, is a web portal maintained by Amazon.com which allows researchers, marketers and others to post online tasks to volunteers all over the world. Requesters post tasks including research studies on the site indicating how much MTurk volunteers (also called "workers") would be paid upon successfully completing the task. To make a task visible to workers, requesters make pre-payments to Amazon.com that determine the amount workers would get for completing the task, plus a 10% fee to MTurk. Workers choose tasks that they wish to complete from a list of tasks, which have been made available to them based on criteria previously specified by the requesters. When the requesters accept the submission of completed tasks by workers, MTurk issues payments to the workers. MTurk workers who completed Study 1 received 50 cents. They were older than the student volunteers (M_{MTurk} = 32.7 vs. M_{students} = 22.5, $p < .001$) but they had similar incomes (M_{MTurk} = \$52, 893 vs. M_{students} = \$49,657, $p = .797$).[2] There were slightly more Caucasian and Asian Americans but less African Americans and Hispanics in the MTurk sample ($\chi^2 = 19.34$, $p = .007$) as well as slightly more females (69 % female MTurkers, and 62% female

[2] The results reported below were similar when controlling for age. New developmental literature suggests that the areas of the brain that control decision making, impulse control and ability to fully think through consequences are the last ones to mature (e.g., Casey, Tottenham, Liston, & Durston, 2005).

students, $\chi^2 = 6.64$, $p = .036$) Socioeconomic status of MTurk participants was lower than that of student participants ($\chi^2 = 23.62$, $p < .001$). They were more likely to have dependents ($\chi^2 = 31.81$, $p < .001$), to work for living ($\chi^2 = 64.81$, $p < .001$), and less likely to rely on financial support of friends and relatives, to use loans, scholarship or grant money (all $\chi^2 > 10.63$, all ps $< .001$)

Procedure. As mentioned above, all parts of the experiment were conducted in two different formats: as an offline study with 195 participants, and as an online study, including 434 participants (see Appendix B and C for all materials).

All participants first completed the independence and interdependence scales by Singelis (1994) (Cronbach's $\alpha = .743$ and .764). The two scales were not correlated, $r = .039$, $p = .330$. In line with the regulatory fit literature (e.g., Koenig et al., 2009; Lee & Aaker, 2004), the interdependence score was subtracted from the independence score. Based on the resulting score, participants were divided such that 50% were classified as having interdependent self-construals, and 50% as having independent self-construals. Subsequently, half were assigned to the promotion-focus condition, and half were assigned to the prevention-focus condition. Following Pham and Avnet (2004), participants were asked to type in either two of their past and two of their current hopes, aspirations and dreams (promotion prime), or two their past and two of their current duties, obligations, and responsibilities (prevention prime).

Next, participants responded to one of three decision contexts: gain, loss, or mixed gambles. Based on random assignment, 40% of participants responded to gain questions, 40% of participants responded to loss questions, and the remaining 20% responded to mixed questions. After the financial decision task, participants answered, in

this order, questions, intended to tap into feeling right and strength of engagement, self-reported mode of thinking, emotions, size of financial network, demographics and financial situation. Each of the measures is described below.

Measures.

Risk aversion/risk-seeking task. Participants were presented with one of three types of financial decision tasks involving risk, which were modeled after similar tasks in the economics literature (e.g., Hershey & Schoemaker, 1985). There were two main versions of this task (see the additional third version for the loss aversion task below). The gain-tasks involved choosing between two options of gaining money, whereas the loss-tasks involved choosing between two options for losing money. All participants were asked to choose between a sure option and a risky option. The tasks were similar to those used in pilot studies except that all tasks were presented as gambles without any stories preceding the tasks (see Appendix A).

Offline mode. There were seven iterative scenarios that each offered two options, i.e., a sure option and a risky option. The risky option was always the same, e.g., the person would gain (lose) $0 or $1000 with equal probability. Under the sure option it was certain that the person would gain (lose) money. The same risky option was always presented with varying sure options that steadily increased from 20% to 80% of the maximum amount in the risky option in steps of 10%. For example, the first alternative for a $1000 gamble was a sure $200, and then the next alternative a sure $300, and so on up to $800 as the final sure alternative. Regardless of whether they had been assigned to the gain, loss or mixed-gambles condition, participants were presented with seven questions pertaining to each of the following amounts, $1000, $2000 and $4000, with

each amount being part of a risky option vis-à-vis seven different sure options. The order in which questions pertaining to the different gamble amounts were presented was counterbalanced across experimental conditions as to control for order effects. Choices made on these questions, whether they were risk-averse or risk-seeking served as main outcome variable of the present experiment.

Online mode. For the online variation of the task, I adapted the computer task by Abdellaoui, Bleichrodt, H., and L'Haridon (2008). These authors used an iterative approach with the goal to identify with greater precision at what participants would switch from preferring risky options to sure options, i.e., the certainty equivalent. Originally, Abdellaoui et al. (2008) asked five questions for gain and loss contexts, and six questions for mixed gambles. However, the present study used six successive questions across all decision contexts in order to keep the number of questions constant (see Table 3, second column, for an illustration of the iterative method).

Specifically, participants were first presented with a question in which the expected value of the gamble was same as the expected value of the sure option. Depending on the choice made, the certain outcome was increased or decreased. For example, initially participants were presented with a choice between gaining $500 for sure and a gamble involving gaining $1000 with a probability of .5 and gaining nothing with the same probability. If a participant chose the sure option, the next iteration presented a choice between $250 for sure and the gamble of $1000 with a probability of .5 and receiving nothing with the same probability. If a participant chose the gamble over the sure option in this second case, she was next presented with a choice between $375 for sure and a gamble involving $1000 with a probability of .5 and gaining nothing with

the same probability. This continued for a total of six iterations. This method resulted in an interval within which the certainty equivalent should lie. The midpoint of this interval was then taken as the certainty equivalent. Appendix C shows screen shots for both the gain and the loss condition at the end of the six iterations. Appendix C also illustrates that a new scenario was added to the page as soon as the participant indicated choice on the previous one, such that at the end of all six iterations, the participant saw all scenarios including their own choices on screen.

In all tasks, the presentation of the six scenarios pertaining to amounts of $1000, $2000 or $4000 was counterbalanced across participants. Because order of presentation did not have any effect on the degree of risk-taking, this variable is not considered in any of the subsequent analyses.

Calculation of the risk-aversion/risk-seeking (α). Risk aversion and risk-seeking were measured by determining for each participant the curvature of the value function that was estimated based on their choices (see also Appendix A, Pilot Study 3). In all decision tasks, I used this choice-based elicitation procedure because previous studies have found that inferring indifferences from a series of choices leads to fewer inconsistencies than asking subjects directly for their certainty equivalents (Bostic, Herrnstein, & Luce, 1990). The estimation of curvature was based on a power function, $u(x) = x^{\alpha}$, where x is money and α is the curvature of the value function.

The meaning of this raw α is different under gains and losses: In the domain of gains, raw $\alpha < 1$ indicates that participants are risk-averse and $\alpha > 1$ that they are risk-seeking. In the domain of losses, raw $\alpha < 1$ indicates that participants are risk-seeking and $\alpha > 1$ that they are risk-averse. Only when $\alpha = 1$, the interpretation of α is the same under

gains and losses: the utility function is linear, i.e., participants risk-neutral. In order to generate a consistent meaning for α under gains and losses, here a linear transformation was applied to α under losses: first, the risk neutral value, 1, was subtracted from the raw α for the losses, and multiplied by -1 to create a reflection of the values on the corresponding axis. Then the risk-neutral point was added back to keep the reference point of risk-neutrality (value of 1) constant across losses and gains. This modified α was the main risk variable of interest, i.e., the coefficient that distinguishes risk-aversion and risk-seeking. The meaning of different values were now the same for the gains and losses, such that $\alpha < 1$ indicated risk-aversion and $\alpha > 1$ indicated risk-seeking, with $\alpha = 1$ indicating risk-neutrality.

Note that the elicitation of certainty equivalents was somewhat different in the offline and online administration modes. Because the computer program was more flexible in the offer of the changing amount, the certainty equivalents were smaller bisections, i.e., more precise certainty equivalents. Yet, for the same reason, there was greater range and more variation in the online version compared to offline version thus requiring the α to be analyzed separately for offline and online modes.

Loss aversion task. The mixed gambles involving both loss and gain were included to measure loss aversion. Just like the gain or loss task above, participants were asked to choose between a sure option and a risky option. However, different than in the gain or loss tasks above, the sure option was 0, which stayed constant across iterative scenarios (see Table 3, third column, for an illustration). The risky option had two components: a gain component and a loss component. The gain component always stayed the same (e.g., $1000) whereas the loss component on the other hand steadily decreased

(e.g. from $1250 to $125). This way, it was possible to compute the amount of loss that made people indifferent as to whether they would get 0 or receive the gain component, i.e., the point where expected value of the gamble is 0.

Calculation of loss aversion measure. For participants (n = 131) who had received the mixed gambles, I divided the fixed gain amounts by the corresponding value of the loss that should make people indifferent between the gamble and the sure option. That is, the fixed gain amounts were divided by the certainty equivalent amounts. The resulting values were log-transformed because the distribution of responses was positively skewed. The resulting score was used as the index of loss aversion. It was not possible to compute the loss aversion coefficient λ proposed by Tversky and Kahneman (1992) because it requires knowledge or estimation of α for both gains and losses for each participant. Since the manipulation was a between-groups design, and each participant was only exposed to either a gain condition or a loss condition, this was not possible. Therefore, the log of the average of dollars per certainty equivalents was used as the dependent variable for loss aversion without any further functional estimation.

For example, if a participant was indifferent to gaining or losing $1000 (or $2000 or $4000), then the fixed gain amount of $1000 ($2000, $4000) was divided by the certainty equivalent amount, $1000 ($2000, $4000), resulting in 1, the logarithm of which is 0. Thus, 0 represented loss-neutrality. If, for example, a participant was indifferent to gaining $1000 ($2000, $4000) and losing $50 ($100, $2000), then the fixed gain amount $1000 ($2000, $4000) was divided by the certainty equivalent amount, $50 ($100, $200) resulting in an average of 10, the log of which is 1. Numbers above 0 represent loss aversion, and numbers below 0 represent loss-seeking. The greater the log of the average

of dollars per certainty equivalents is, the greater is the loss aversion.

Because the elicitation of loss aversion in online and offline modes results in different variances, the loss aversion coefficient is calculated separately for online and offline modes.

Feeling right and task engagement. Regardless of the experimental condition, following the decision making task, all participants indicated on a seven-point Likert-scale to what extent the task felt right, how certain they felt while answering the financial decision questions, how engaging the task was, and how interesting it was. The first two questions were intended to serve as an indicator of "feeling right" to the extent that the first two questions correlates highly. The second pair of questions served as a measure of strength of engagement. Since there was no established measure of feeling right or strength of engagement, I needed to establish that the measures were reasonable. Also, it had to be established that feeling right is distinct from strength of engagement. For that purpose I ran a correlation analysis and also calculated the reliabilities of the respective scales. As expected, items that assessed how right participants felt right about the task and how certain they were about their approach were highly correlated with each other, $r = .741$, as were how interesting and engaging participants rated the task to be, $r = .785$. The across-scale item correlations were comparatively small and ranged between $r = .209$ and .293. When these four items were subjected to a factor analysis with varimax rotation, two orthogonal factors emerged explaining 88% of the variance with all loadings greater than .92 in their respective factors. Therefore, both the measures' internal consistency and the hypothesis about their distinctness were confirmed.

Processing mode. To assess whether participants were processing in systematic or

intuitive mode, three different measurements were employed: a self-report measure, a behavioral measure, and a derivational measure.

Self-reported mode of thinking. The items were generated based on the REI's questions on general preferences concerning systematic and intuitive thinking (Epstein, Pacini, Denes-Raj, & Heier, 1996). Specifically, I applied the content of some general items to how participants had just worked on the task at hand. There were three items assessing systematic thinking on the decision task: "How much mental effort did you invest in the task?," "To what extent did you evaluate the options in a systematic step-by-step manner?," and "To what extent did you do any numerical calculations while making your decisions on this task?" There were also three items assessing reliance on intuition: "To what extent did you pick up an option based on its intuitive appeal?," "To what extent did you just pick an option based on your hunches?," and "To what extent did you pick up the option that comes to your mind first?" Again, participants recorded their responses on a seven-point Likert-scale, with 1- not at all to 7- a great deal. This assessment served as self-report measures of systematic and intuitive thinking. The reliabilities of the two scales were lower than desirable, Cronbach's $\alpha = .544$ and .550, for systematic thinking and intuitive thinking, respectively. However, with the face validity of the items being high, the lower reliability mainly indicated the presence of error variance, which reduced the chance of detecting an effect, thus, only allowing for a conservative test of any hypotheses involving systematic and intuitive thinking styles on the risk decision task. The correlation between the two dimensions was $r = -.089$, $p = .027$.

Response time. The self-report measures of mode of thinking were complemented

by a behavioral measure: for the online participants, time spent on decision task as measured in seconds served as a measure of mode of thinking with the assumption being that systematic processing would require more time than intuitive processing (e.g., Gigerenzer & Todd, 1999; MacLeod, 1991). The time measure started when participants hit the next button to see the first question in the decision task, and it ended when they hit the next button to move to the questions following the decision making task.

The response times were available for the online sample only. I calculated the mean number of seconds spent on the decision making task. Because the study took place online, there were inevitable problems with the website sometimes rendering excessive response times. Therefore, I screened the response time data and eliminated outliers that were at least three standard deviations above the mean, 68 seconds or greater. Because the resulting distribution was still skewed, response times were log-transformed (e.g., Fazio, 1990; Förster, Friedman, Özelsel, & Denzler, 2006).

Deviation from linearity. The deviation from linearity of the utility function was calculated as the absolute difference between 1 and raw α. This measure served as an assessment of how optimal the choices were in terms of the monetary outcomes associated with them. Only when $\alpha = 1$, i.e., in case of a linear value function, the choices are risk-neutral and the expected value is maximized under the rational choice model of microeconomics (Frank, 1994). This measure is used to assess how optimal the financial decisions were as another indicator of systematic thinking.

Emotions. Emotions were assessed based on measures previously employed by Higgins and colleagues (1997, Study 3) and Idson et al. (2000). Three adjective ratings were combined to assess cheerfulness (happy, discouraged, sad; Cronbach's $\alpha = .745$) and

three items assessed quiescence (tense, relaxed, agitated; Cronbach's $\alpha = .718$.). Scores were coded such higher valued indicated more positive emotions. Participants recorded their responses on a seven-point Likert-scale, with 1- not at all to 7- extremely. Means were calculated only for participants who responded to all emotion items.

Certainty. A single item was used to inquire about participants' general feelings of certainty. Again, participants recorded their responses on a seven-point Likert-scale, with 1- not at all to 7- extremely.

Size of financial network. Based on Mandel (2003), the size of participants' social network was assessed by asking participants to list (a) the number of people whom they could count on to help them if they needed financial help or material support (financial network question), and (b) people whom they could count on to console them when they were very upset (psychological network question). Participants provided the number of individuals in their respective networks using an open format. The presentation of these social network questions was counterbalanced.

Demographics and financial situation. Finally, participants provided demographic information about themselves including age, sex, nationality, and ethnicity. This part of the questionnaire also assessed potential reality constraints in financial decision making. Their self-perceived socioeconomic status was one variable from 1-upper class to 5-lower class. Total yearly income before taxes was also assessed, as well as the amount of leisure money participants had available on average per week. Both figures were combined to estimate the portion of income that participants spent on leisurely activities (disposable income share). Because this proportion estimate was heavily skewed, it was log-transformed.

In addition, participants provided the number of their dependents. For clarity this question was asked in two steps. In the first step, participants indicated whether they had any dependents or not. If yes, then they reported the number of dependents for whom they were responsible.

Lastly, participants' means of supporting themselves were assessed. Participants indicated whether they worked for living, relied on financial support of parents or relatives, relied on scholarship or grant money, of if they funded themselves through loans. In the coding phase, this last set of variables was combined so that a 1 indicated that they supported themselves by working for a living, a 3 indicated that they solely rely on external sources of funding (regardless of source), and a 2 indicated that they were both working and relying on external sources of income for living.

Results

Preliminary analysis.

Data screening. First, participants who did not respond to the SRF task were removed from further analysis (n = 16).

Next, I examined the distribution of raw α separately for the gains and losses for offline and online modes. In the offline mode, it appeared that under gain a raw $\alpha > 1.35$ and under loss a raw $\alpha > 1.61$ were extreme values in the sense that there were 3 *SD* above the mean of their respective distributions. For the online mode, values of raw $\alpha >$ 1.45 under gain, and values of raw $\alpha > 2.04$ were considered extreme values by the same criterion. Therefore, cases with extreme values (33 cases) were removed, leaving 449 cases in the dataset for gains and losses (297 females, 149 males, 3 did not report sex). A greater percentage of MTurkers, 95.3%, were selected into the analysis than the student

sample, 90.6%, $\chi^2 = 4.48$, $p = .034$).

Similarly, I screened the distribution of the index of loss aversion separately for offline and online modes. There did not appear to be any extreme cases, thus I retained all 131 cases in the sample.

Comparability of samples. Recall that the elicitation of certainty equivalents was somewhat different in offline and online administration modes. Therefore, I analyzed offline and online modes separately for risk-aversion/risk-seeking as well as loss aversion. Since the dataset in the online mode came from different samples, I analyzed α and loss aversion in the online mode as 2 (sample: online volunteers, online MTurk) x 2 (chronic self-construal) x 2 (SRF priming) x 2 (decision context: loss vs. gain) factorial design. Because this analysis revealed that Sample sometimes had significant effects, I kept the Sample as a variable in the analyses to reduce error variance.

General analytic strategy. For purposes of analysis of risk-taking, the decision context part of the previously described 2 (chronic self-construal) x 2 (SRF priming) x 3 (decision context: loss vs. gain vs. mixed) design was further broken down into two sub-designs because choices on mixed gambles were not comparable to the choices on loss only and gain only tasks, and because I held separate hypotheses for loss only and gain only frame on the one hand, and mixed gambles on the other.

The first design relied on a 2 (chronic self-construal) x 2 (SRF priming) x 2 (decision context: loss vs. gain) factorial analysis. In other words, it excluded the experimental condition in which participants worked on a mixed gamble task. This design allows for the focused test of any predictions concerning integral fit, i.e., the match between SRF and decision context, on risk-aversion/ seeking.

The second subdesign was exclusively concerned with mixed gambles, i.e., the task frame did not vary. The result was a 2 (chronic self-construal) x 2 (SRF priming) factorial design in which hypotheses concerning the influence of incidental fit on loss aversion could be tested. (As mentioned before, a test of integral fit was not possible in this part of the design). The means reported for all analysis are the estimated marginal means, which represent the nature of a particular effect net of all other effects in the model.

Analysis of risk-seeking/risk-aversion. (Hypotheses 1a, 1b, 2a, 2b, 3a, 3b). The first analysis focused on the effects of regulatory fit on the risk-taking tendencies in loss and gain situations. Specifically, I tested the hypothesis that independent self-construals would be linked to greater risk-seeking regardless of whether the task centered on gains or losses (Hypotheses 1a & 1b). Similarly, I tested the notion that promotion focused would be associated with greater risk-seeking irrespective of the gain or loss frame of the tasks (Hypotheses 2a & 2b). Further, I expected to replicate the prominent finding of research under prospect theory that participants would be risk-seeking in a loss context, but risk-averse in a gains context (Hypotheses 3a & 3b). I also explored the implications of regulatory fit for risk-seeking/risk-aversion, although I did not have any specific predictions. Recall that transformed $\alpha < 1$ is risk-aversion, $\alpha > 1$ is risk-seeking and $\alpha = 1$ is risk-neutrality.

Offline mode. The analysis centered on a 2 (chronic self-construal) x 2 (SRF priming) x 2 (decision context: loss vs. gain) factorial design. A main effect of decision context, $F(1, 110) = 203.78$, $p < .001$, $\eta_p^2 = .649$, showed that participants were risk-averse in the domain of gains ($M_\alpha = 0.633$) and risk-seeking in the domains of losses (M_α

= 1.242). This finding supports Hypothesis 3a and 3b by replicating the predictions of prospect theory.

There was also an unexpected decision context x SRF x chronic self-construal interaction, $F(1, 110) = 7.46$, $p = .007$, $\eta_p^2 = .063$. As can be seen in Table 4, under the gains, incidental fit resulted in less risk-aversion, i.e., greater risk-taking, whereas under loss, incidental fit resulted in lesser risk-seeking, i.e., lesser risk-taking (see Figure 4).

Hypothesis 1a and 1b implied a main effect of chronic self-construal on α such that interdependent self-construal, compared to independent self-construal, should result in greater values of α. However, the predicted main effect was not significant ($M_\alpha = 0.97$ vs. $M_\alpha = 0.91$), $F(1, 110) = 1.82$, $p = .180$, $\eta_p^2 = .016$. Likewise, Hypotheses 2a and 2b implied a main effect of SRF prime such that promotion priming, compared to prevention priming, should result in greater values of α. Yet, this hypothesis did not receive any support either, $F(1, 110) = 2.50$, $p = .117$, $\eta_p^2 = .022$, even though means trended in the predicted direction ($M_\alpha = 0.97$ vs. $M_\alpha = 0.90$).

Online mode. Likewise, I subjected the combined online volunteers and MTurk sample to a 2 (sample: online volunteers and online MTurk) x 2 (chronic self-construal) x 2 (SRF priming) x 2 (decision context: loss vs. gain) factorial design. This design allowed direct comparison between student volunteers and MTurk sample. The analysis revealed a main effect of decision context, $F(1, 310) = 265.85$, $p < .001$, $\eta_p^2 = .462$; as in the offline mode participants were risk-averse in the domain of gains ($M_\alpha = 0.531$) and they were risk-seeking in the domains of losses ($M_\alpha = 1.188$), thus confirming Hypothesis 3a and 3b. As before, individuals with independent self-construals did not differ from those with interdependent self-construals ($M_\alpha = 0.82$ vs. $M_\alpha = 0.89$), $F(1, 310) = 2.45$, $p = .118$,

η_p^2 = .008, even though means went in the predicted direction. The other predicted effect, i.e., a main effect for SRF predicted by Hypothesis 2a and 2b, was not supported, $F(1, 310) = 2.83$, $p = .093$, $\eta_p^2 = .009$, with participants in the promotion-prime condition being surprisingly slightly less risk-taking ($M_\alpha = 0.82$) than participants in the prevention-prime condition ($M_\alpha = 0.89$). The unexpected decision context x SRF x chronic self-construal interaction, which emerged for the offline mode, was not significant in the online mode, $F(1, 310) = 1.09$, $p = .298$, $\eta_p^2 = .003$, though it was in the same direction. Likewise, there was no difference between the student sample and the MTurk sample, $F(1, 310) = 0.50$, $p = .823$, $\eta_p^2 < .001$, and no interaction involving sample was significant, all Fs < 1.72, ps < .191, $\eta_p^2 < .006$.

***Summary*.** Overall, these data clearly confirm the predictions of prospect theory (Hypothesis 3). There was no support for Hypothesis 1, the notion that chronic self-construal predicts risk-taking, and Hypothesis 2, the idea that promotion focus would be linked to greater risk-seeking, though for Hypothesis 1 means trended consistently in the expected direction.

Analysis of loss aversion. (Hypotheses 1c, 2c, 3c). In the subsample that had received the mixed gamble task, the same factorial design as in the analysis of risk-seeking/risk-aversion was used for online and offline modes. No effect was significant for offline mode, all Fs < 0.974, ps < .329, $\eta_p^2 < .017$.

For the online mode, Sample main effect was significant, $F(1, 64) = 4.64$, $p = .035$, $\eta_p^2 = .068$. Online student participants were more loss-averse than the MTurk sample ($M = 0.808$ vs. $M = 0.485$). Recall that numbers above 0 represent loss aversion, and numbers below 0 represent loss-seeking. Because the mean for all samples was

greater than 0, the Hypothesis 3c that people are loss-averse received support. However, the effect of SRF priming predicted under Hypothesis 2c did not reach significance, $F(1, 64) = 1.32$, $p = .254$, $\eta_p^2 = .020$, even though means were in the expected direction with people primed with prevention-focus being more loss-averse than people primed with promotion-focus ($M = 0.73$ vs. $M = 0.56$).

Also, the prediction of Hypothesis 1c, that people with interdependent self-construal are more loss-averse than people with independent self-construal, did not materialize, $F < 1$. All other effects were not significant for online mode, all Fs < 2.901, ps < .094, $\eta_p^2 < .043$.

Regulatory fit and motivational experiences. (Hypotheses 4a, 4b) I examined the effects of regulatory fit on motivational orientations through self-reports of feeling right and task engagement as well as general feelings of certainty. Hypotheses 4a predicted that, under conditions of incidental regulatory fit, people would feel more right about the task compared to conditions of incidental non-fit. Hypotheses 4b stated that, under conditions of integral regulatory fit, people would feel more strongly engaged in the task compared to conditions of integral non-fit. Because there was no substantive difference in how these self-report measures were assessed, there was no reason to analyze the online and offline mode separately.

Feeling right and strength of engagement. Recall that Higgins and colleagues (Cesario et al., 2008; Koenig et al., 2009) suggested that different types of regulatory fit have differential implications for feeling right and strength of engagement. Incidental fit should primarily increase feeling right, whereas integral fit should increase one's engagement in a task. To test this hypothesis directly, I added these two dependent

variable as a repeated-measures factor to the 3 (sample) x 2 (chronic self-construal) x 2 (SRF priming) x 2 (decision context: loss vs. gain) between-groups design, which resulted in a 3 x 2 x 2 x 2 x 2 mixed-factorial design. Not surprising, there was a decision context main effect, $F(1, 414) = 70.93$, $p < .001$, $\eta_p^2 = .146$, such that people gave higher ratings on both measures under gain than loss ($M = 5.11$ vs. 4.10). Decision context interacted with the repeated-measures factor (feeling right vs. strength of engagement), $F(1, 414) = 26.15$, $p < .001$, $\eta_p^2 = .059$. Participants were more likely to feel right under gain than loss ($M = 5.41$ vs. 3.93), $p < .001$, while the reverse was true for strength of engagement ($M = 4.82$ vs. 4.26), $p < .001$.

There was a also a significant effect of sample, $F(1, 414) = 7.87$, $p < .001$, $\eta_p^2 = .037$. The offline student sample was more likely to feel right than the online student sample ($M = 4.90$ vs. $M = 4.43$), $p = .015$, with the MTurk sample ($M = 4.67$) falling in between these two, without being significantly different from either, $p = .231$ and $p = .167$. Yet, the MTurk sample was higher in strength of engagement than the online student sample ($M = 5.19$ vs. $M = 4.50$), $p < .001$, which was, in turn, higher than the offline student sample ($M = 3.92$), $p = .003$. Sample also interacted with the repeated measures factor such that the MTurk sample felt more strongly engaged than right ($M = 5.19$ vs. $M = 4.67$), $p < .001$, whereas the offline student sample felt more right than strongly engaged ($M = 4.90$ vs. $M = 3.92$), $p < .001$. Only the online student sample did not show any difference between feeling right and strength of engagement ($M = 4.43$ vs. $M = 4.50$), $p = .637$. Finally, there was a significant four-way interaction of Sample x chronic self-construal x Decision Context x Repeated Measures, $F(1, 414) = 4.36$, $p = .013$, $\eta_p^2 = .021$. This finding highlighted that the effect of decision context described

above was much more prevalent for offline student sample under both gain and loss and for the MTurk sample under loss compared to the online student sample and the MTurk sample under gain.

In this analysis, the hypothesized effects for incidental fit was not significant, $F(1, 414) = 0.019$, $p = .891$, $\eta_p^2 < .001$. Likewise, the hypothesized effect for integral fit was not significant either, $F(1, 414) = 0.59$, $p = .441$, $\eta_p^2 = .001$. Further, interaction of repeated measures with neither SRF x self-construal nor SRF x decision context was nonsignificant, $F(1, 414) = 1.39$, $p = .240$, $\eta_p^2 = .003$ and $F(1, 414) = 0.419$, $p = .518$, $\eta_p^2 = .001$. No other effects were significant.

Contrary to Hypothesis 4 that regulatory fit predicts motivational experiences, these findings suggest that feeling right and strength of engagement and the question of which one will loom larger does not depend on the regulatory fit. Instead, it depends on the domain of the decision. When the decisions pertain to gains, although both feeling right and strength of engagement effects are larger, feeling right effect is the dominant one, whereas when the decision pertains to losses strength of engagement effects are larger than the feeling right effects.

Certainty. Recall that incidental fit is hypothesized to relate to feelings of certainty. The "feeling right" variable above included an item about specific certainty pertaining to the performance of the task. The certainty in the present analysis pertains to feelings of general certainty. To test if incidental fit led to an increase of general certainty, I relied on a 3 (sample) x 2 (chronic self-construal) x 2 (SRF priming) x 2 (Decision Context: loss vs. gain) four-way design. Results revealed a main effect of chronic self-construal, with independent individuals showing higher levels of certainty

than interdependent individuals (M = 4.98 vs. M = 4.69), $F(1, 414) = 4.26$, $p = .040$, $\eta_p^2 = .010$. Also, certainty was greater in gain contexts than loss contexts (M = 5.01 vs. M = 4.66), $F(1, 414) = 5.94$, $p = .015$, $\eta_p^2 = .014$. No other effects were significant, in particular not the predicted SRF x chronic self-construal interaction, $F(1, 414) = 0.03$, $p = .874$, $\eta_p^2 < .001$. Thus, general feelings of certainty did not seem to be related to incidental fit.

Regulatory fit and the processing mode. (Hypotheses 6a, 6b, 6c, 6d, 6e, 6f)

The effects of regulatory fit on the processing mode were assessed using three distinct measures. First, there was a self-report measure of how participants said they approached the task. Second, a response time measure assessed how long participants took to complete the task, with the assumption being that systematic processing would require more processing time (e.g., Gigerenzer & Todd, 1999; MacLeod, 1991). This was also confirmed in the present data: the correlation between self-reported intuitive thinking and the log of mean time spent on decision task was significantly and negatively correlated, $r = -.114$, $p = .040$, and there was a non-significant positive correlation with self-reported systematic thinking, $r = .035$, $p = .524$. Third, the deviation from linearity indicated the quality of participants' choices by indicating how closely participants' certainty equivalents matched the expected values of the gambles. This number was significantly and negatively correlated with self-reported systematic thinking, $r = -.093$, $p = .051$, and there was a non-significant positive correlation with self-reported intuitive thinking, $r = .027$, $p = .569$. The correlation between deviation from linearity with response time was, as expected, negative, though only at the trend level, $r = -.088$, $p = .109$.

Hypotheses 6a, 6b and 6e specified that under incidental fit participants should be

more intuitive than under incidental non-fit, thus predicting a chronic self-construal by SRF interaction effect. And according to Hypotheses 6c, d, and f, parallel effects of regulatory fit on processing proclivities were expected as a function of a fit between SRF and decision context (integral fit), resulting in a SRF x decision context two-way interaction. Specifically, I expected that, when promotion was paired with gains and prevention was paired with losses, people should be processing more systematically, and in the remaining two combinations of conditions they should be processing less systematically.

Self-reported processing mode. (Hypotheses 6a, 6b) First, I examined the effects of regulatory fit and non-fit on self-reports of systematic and intuitive thinking using a mixed-measures ANOVA. The intuition and systematic thinking scales were being treated as repeated measures, and sample, self-construal, SRF, and decision context as between-groups factors. In line with the idea that intuitive reasoning is the default mode of thinking (e.g., Chen & Chaiken, 1999; Epstein et al., 1992), participants reported relying more heavily on intuitive than systematic processing (M = 4.61 vs. M = 4.12), $F(1, 415) = 25.40$, $p < .001$, $\eta_p^2 = .058$. This effect was qualified by sample, $F(2, 415) = 7.15$, $p = .001$, $\eta_p^2 = .033$, such that the MTurk sample did not show the default mode effect (M = 4.50 and M = 4.50, for intuitive and systematic thinking, respectively), whereas the offline student sample (M = 4.45 vs. M = 3.79), $p < .001$, and the online student sample (M = 4.85 vs. M = 4.07), $p < .001$, both showed the effect.

Decision context also somewhat qualified the above repeated measures effect, $F(1, 415) = 2.88$, $p = .091$, $\eta_p^2 = .007$. Though the simple comparisons were not significant, participants reported being somewhat more systematic in their reasoning

under a loss than a gain context (M = 4.23 vs. M = 4.02), p = .119, with the reverse being true for intuitive thinking (M = 4.54 vs. M = 4.66), p = .332.

Pertaining to Hypothesis 6a, there was also a trend of a three-way interaction showing that self-reported processing mode (systematic vs. intuitive) to interact with both chronic self-construal and SRF, $F(1, 415) = 3.08$, $p = .080$, $\eta_p^2 = .007$. This interaction simply showed that intuitive thinking, compared to systematic thinking, became more dominant under conditions of incidental non-fit. That is, people became even more intuitive and less systematic when there was a non-fit between SC and SRF (see Table 5). This finding was the direct opposite of my Hypotheses 6 that incidental fit leads to more systematic thinking and integral fit leads to more intuitive thinking. Recall that Higgins and colleagues (e.g., Avnet & Higgins, 2006a, 2006b) had suggested that incidental fit results in greater feeling right; with feeling right giving rise to intuitive thinking, this may imply that incidental fit also results in more intuitive thinking. For integral fit, on the other hand, Higgins et al. (Cesario et al., 2008; Koenig et al., 2009) suggested that stronger engagement would result with the implication that integral fit also results in more systematic thinking compared to incidental fit. Instead, it appeared that participants were more intuitive than systematic and more so when there was incidental non-fit. No other effect was significant, all Fs < 2.33, all ps >.10.

Response time. (Hypotheses 6c, 6d) I examined response times as an objective measure of systematic thinking. Recall that these hypotheses could only be tested in the online versions of the present study. In general, the faster a person is, the less systematic she is (e.g., Gigerenzer & Todd, 1999; MacLeod, 1991). I subjected the log of the mean time spent on gamble also to the 2 (sample) x 2 (chronic self-construal) x 2 (SRF

priming) x 2 (decision context: loss vs. gain) factorial design. There were several significant effects. First, MTurk participants were significantly faster than online student volunteers, $F(1, 274) = 6.84$, $p = .009$, $\eta_p^2 = .024$. This main effect was moderated by decision context, $F(1, 274) = 7.55$, $p = .006$, $\eta_p^2 = .027$, such that the MTurk sample spent more time on loss contexts than gain contexts ($M = 30.20$ vs. 25.70 seconds, $p = .002$), but there was no effect of decision context for online student participants ($M = 30.20$ vs. 30.90 seconds, $p = .410$).

While independent self-construals seemed to be associated with slower response times than interdependent self-construals ($M = 33.11$ vs. 28.84), $F(1, 274) = 3.28$, $p = .071$, $\eta_p^2 = .012$, there was a chronic self-construal by sample interaction, $F(1, 274) = 5.49$, $p = .020$, $\eta_p^2 = .020$. The above difference was significant for the MTurk sample, $p = .003$, but not for the online student sample, $p = .709$. Finally, and of greatest interest here, the sample x chronic self-construal x SRF interaction approached significance, $F(1, 274) = 3.01$, $p = .084$, $\eta_p^2 = .011$. As summarized in Table 6, student participants seemed to spend more time on the task under incidental fit than non-fit, though pairwise comparisons were not significant. The effect was reversed only for participants in the MTurk sample who were primed with prevention, $p = .001$. This three-way interaction finding that people spent more time under incidental fit than non-fit was consistent with the above findings that suggested incidental fit leads to more systematic thinking, and incidental non-fit leads to more intuitive thinking.

Deviation from linearity. (Hypotheses 6e and 6f) Deviation from linearity was a measure derived from α. In the analysis of α, the error variances across the administration modes were not equal, necessitating separate analyses of offline and online modes.

However, the Levene's test of equality of error variances for deviation from linearity was not significant, $F(23, 420) = 1.42$, $p = .094$, i.e., consistent with the assumption of variance homogeneity. Therefore, the two administration modes were combined for the present analysis.

Deviation from linearity was submitted to a 3 (Sample: online volunteers, offline volunteers, online Amazon Mechanical Turk) x 2 (chronic self-construal) x 2 (SRF priming) x 2 (loss versus gain context) ANOVA. A main effect for Sample was significant, $F(2, 420) = 9.41$, $p < .001$, $\eta_p^2 = .043$. Pairwise comparisons revealed that offline volunteer group showed the least deviation from linearity compared to the other two samples, presumably because the range of possible responses was more restricted in the offline measure, $M_{deviation} = .339$, both pairwise $p < .001$. The sample of online volunteers and the sample of MTurk participants did not vary ($M_{deviation} = .433$ vs. $.457$), $p = .352$. Decision context was also significant, $F(1, 420) = 15.15$, $p < .001$, $\eta_p^2 = .035$, with participants' responses being closer to linearity under loss ($M_{deviation} = .366$) than under gain ($M_{deviation} = .453$). Finally, there was a SRF prime x chronic self-construal interaction that approached significance, $F(1, 420) = 2.82$, $p = .094$, $\eta_p^2 = .007$. Though simple comparisons were not significant, people primed with promotion-focus deviated less from linearity for people with independent self-construals than for people with interdependent self-construals ($M_{deviation} = .394$ vs. $.438$), $p = .155$, while people primed with prevention-focus deviated less from linearity for people with independent self-construal than for people with independent self-construal ($M_{deviation} = .418$ vs. $.388$), $p = .340$.

Summary. Results for the three indicators of intuitive and systematic thinking did

not support any of my hypotheses. To the extent that relevant effects were approaching significance, they all converged in showing that, contrary to the original predictions, people are more systematic under conditions of incidental fit.

Motivational experiences and the processing mode. (Hypotheses 7a, 7b, 7c, 7d, 7e, 7f) Implicit in the feeling right versus strength of engagement discussion (e.g., Koenig et al., 2009: Pham & Avnet, 2009) is the supposition that feeling right is associated with being intuitive, whereas strength of engagement is associated with being systematic in one's thought processes. To test this Hypothesis 7 I used a correlational approach to examine to what extent self-reported motivational experiences were associated with any of the three different indicators of the processing mode (self-report, response time, deviation from linearity).

Association with self-reported processing mode. (Hypotheses 7a, 7d) I employed a repeated measures ANOVA with intuition and systematic thinking scales serving as repeated dependent measures and feeling right and strength of engagement as IVs in a regression model. In line with cognitive experiential self-theory (e.g., Epstein et al., 1992), participants were more intuitive than systematic (M = 4.66 vs. 4.18), $F(1, 439) = 12.18$, $p = .001$, $\eta_p^2 = .027$. Also, the interaction between the repeated measures factor (intuitive vs. systematic thinking) and strength of engagement was significant, $F(1, 439) = 14.52$, $p < .001$, $\eta_p^2 = .032$ such that strength of engagement was more strongly associated with systematic thinking, $b = .295$, $p < .001$, than with intuitive thinking $b = .070$, $p = .062$. Conversely, there was no difference in the extent to which feeling right was associated with intuitive and systematic thinking, $F(1, 439) = 1.43$, $p = .233$, $\eta_p^2 = .003$, though each one of these association was in the expected direction, $b = .052$, $p =$

.148 and b = -.016, p = .669, respectively. These findings did not support Hypotheses 7a that feeling right is associated with intuitive thinking but confirmed Hypotheses 7d that strength of engagement is associated with systematic thinking.

Response time. (Hypotheses 7b, 7e) Because feeling right likely reflects an intuitive decision making approach (Hypothesis 7b and 7e), which is not cognitively taxing, I expected feeling right to be associated with shorter response times.

When response time was regressed on feeling right and strength of engagement, a greater sense of feeling right was associated with less time spent on the decision task, β = -.293, p < .001, whereas stronger engagement was associated with more time spent on the decision task, β = .139, p = .020. These findings confirmed Hypotheses 7b and 7e.

Deviation from linearity. (Hypotheses 7c and 7f) Similarly, when regressing Deviation from Linearity on the two motivational experience variables, feeling right was associated with greater deviation from linearity, β = .188, p < .001, consistent with the notion that an intuitive approach to the risk decision problems would be linked to less normative decision making. At the same time, the association between strength of engagement and deviation from linearity was not significant, β = .073, p = .133. These findings confirmed Hypotheses 7c, but did not support Hypotheses 7f.

Regulatory fit and correlates of financial decisions. (Hypotheses 8a and 8b) According to Hypotheses 8a and 8b, people take into account emotional factors more in financial decisions when they experience incidental fit, whereas they take into account reality constraints more when they experience integral fit. This should lead to a higher association between risk-taking, i.e., α, and emotional responses under incidental fit compared to incidental non-fit, and a higher association between risk-taking and reality

constraints under integral fit compared to integral non-fit. Note that Hypotheses 8a and 8b are nondirectional; that is, these hypotheses do not specify whether the predicted associations are negative or positive.

The emotional responses were cheerfulness and quiescence, whereas the reality constraints were socioeconomic status, number of dependents, means of living, disposable income share, and size of financial and psychological network. Because these variables were employed as continuous predictors in a linear model involving interaction terms, they were centered. Analyses were run separately for offline and online administration modes because of heterogeneous error variances. Because the emotion and reality constraints variables were added as predictors to previously discussed factorial models, only results for the newly added variables and their interactions with the experimental factors are reported below.

Incidental fit and emotions. Hypothesis 8a stated that when people experience incidental fit, emotional experiences are more strongly correlated with financial decisions than when people do not experience incidental fit. In order to test this hypothesis, I employed a regression model in which the risk-seeking/risk-aversion coefficient α was regressed on Decision Context, SRF prime, chronic self-construal as categorical predictors, and cheerfulness and quiescence as continuous predictors. Preliminary analysis indicated that the MTurk sample did not differ from the online student sample; therefore, sample was not included in the actual analysis in order to simplify interactions in the regression model.

In the model I included all main effects and interaction effects for the two emotion variable, except those terms that would have implied an interaction between the

two. As before, because of the differences in the distribution of alpha, offline data were analyzed separately from online data. Data exploration made clear that, for the present purpose, the modeling differences between the online student sample and the MTurk sample was not necessary; hence, these two samples were collapsed here.

Offline mode. There was a decision context x SRF x cheerfulness interaction approaching significance, $F(1, 93) = 3.30$, $p = .072$, $\eta_p^2 = .034$. For the gain condition, cheerfulness was not associated with α for people primed with prevention-focus, $b = .029$, $p = .664$, but it was negatively related to risk-taking for people primed with promotion-focus, $b = -.186$, $p = .002$. For the loss condition, cheerfulness was not reliably associated with α for people primed with prevention-focus, $b = -.065$, $p = .238$, and for people primed with promotion-focus, $b = .022$, $p = .794$. Therefore, contrary to the expectations, there is some indication that, under integral fit, there is an association between risk-taking and emotional experience.

The SRF x chronic self-construal x quiescence interaction was also approaching significance, $F(1, 93) = 3.21$, $p = .077$, $\eta_p^2 = .033$. For interdependent individuals primed with prevention, quiescence was not associated with α, $b = -.007$, $p = .910$, though there was a positive association for such individuals under a promotion prime, $b = .115$, $p = .043$. For people with independent self-construal, quiescence was neither linked to α for the prevention prime, $b = .046$, $p = .485$, nor the promotion prime, $b = -.089$, $p = .269$. Therefore, there was some weak evidence against the Hypothesis 8a that incidental fit is associated with taking emotions account. Instead, incidental non-fit was somewhat associated with taking emotions into account in risk-decisions.

Online mode. There was a SRF x cheerfulness interaction, $F(1, 284) = 4.19$, $p =$

.041, η_p^2 = .015. Cheerfulness was associated with α for the promotion-prime, *b* = .126, *p* = .059, but not with the prevention prime, *b* = .032, *p* = .701. A related interaction for quiescence, *F*(1, 284) = 3.90, *p* = .049, η_p^2 = .014, however, showed that quiescence was positively associated with α for the prevention-prime, *b* = .124, *p* = .030, but not the promotion-prime, *b* = .036, *p* = .499.

The final effect was a decision context x chronic self-construal x cheerfulness interaction, *F*(1, 284) = 4.24, *p* = .040, η_p^2 = .015. For the gain condition, cheerfulness was not associated with α for people with interdependent self-construals, *b* = .032, *p* = .701, and for people with independent self-construals, *b* = .030, *p* = .667. However, for loss, cheerfulness had a negative effect on α for people with interdependent self-construal, *b* = -.173, *p* = .012, but had no effect for people with independent self-construal, *b* = -.035, *p* = .523.

Overall, there did not appear to be any support for the Hypothesis 8a. In one instance of incidental fit, emotional experiences were more strongly related to financial decisions than when people did not experience incidental fit. If anything, there was only very weak evidence in the offline mode in favor of the incidental fit hypothesis which was accompanied by a similarly weak evidence for integral fit. Because the offline sample was quite small for this type of analysis, these weak effects are hard to interpret. Findings for the online mode did not provide any support for the hypothesis either.

Integral fit and reality constraints. Hypothesis 8b stated that when people experience integral fit, reality constraints are more strongly correlated with financial decisions than when people do not experience integral fit. This is because participants cannot help but base their decision concerning the hypothetical risk task on their general

frame of mind outside of the experiment.

To test this hypothesis, I carried separate analyses not only for the online and offline samples. For each of these samples I tested a total of three different models. In the first model, risk-seeking/aversion (α) was regressed on Decision Context, SRF prime, and chronic self-construal, and means of living as categorical predictors, and socioeconomic status, and number of dependents as continuous predictors. In the second model, I eliminated the means of living variable and replaced the three reality constraint variables with disposable income share, largely because the predictor was only available for a subset of participants. The third model then tested the impact of financial and psychological network size in order to test Mandel's (2003) claim that differences in financial network size account for the different risk preferences of independent and interdependent individuals. In all three models, all main effects and interaction were included in the same model except interactions between the respective reality constraint variables. Again, to avoid redundancy, only effects involving reality constraint variables are reported here.

Offline mode. There was a SRF x means of living interaction, $F(2, 84) = 4.15$, $p = .019$, $\eta_p^2 = .094$, such that prevention-prime, compared to promotion-prime, resulted in people taking more risks when they rely on external sources of income ($M = .962$ vs. .761), $p = .011$, but not when they also, or solely work for living, $p = .550$, and $p = .289$, respectively.

The decision context x chronic self-construal x number of dependents interaction was also significant, $F(1, 84) = 3.84$, $p = .053$, $\eta_p^2 = .046$, as well as the decision context x chronic self-construal x socioeconomic status, $F(1, 84) = 8.27$, $p = .005$, $\eta_p^2 = .094$.

When the decision context was loss or gain, the risk-taking tendencies of people with interdependent self-construal was somewhat related to the number of dependents they had, b = .002, p = .449, and b = .189, p = .097. The risk-taking tendencies of people with independent self-construal under the loss or gain condition, on the other hand, was not related to the number of dependents they had, b = -.040, p = .884 vs. b = -.109, p = .141. This interaction reflected the different direction of the influence of number of dependents on risk-taking for people with different self-construals.

Likewise, when the decision context was loss or gain, the risk-taking tendencies of people with interdependent self-construal was related to their socioeconomic status, b = .164, p = .414, vs. b = .164, p = .059. The risk-taking tendencies of people with independent self-construal under the loss condition, on the other hand, was not related to the socioeconomic status they had, b = -.046, p = .770, whereas under the gain condition it was reliably related, b = -.328, p = .010.

None of the effects involving disposable income share in the regression model was significant, Fs < 1.18 and ps > .289. Likewise, there were no significant effects of size of financial network, psychological network or of their interactions with other variables, all Fs < 1.46 and ps > .218.

Online mode. In the first model, the effects for the model involving socioeconomic status, means of living, and number of dependents were not significant, Fs < 2.65 and ps > .126. In the second model the SRF x chronic self-construal x disposable income share interaction was reliable, $F(1, 186) = 6.45$, p = .012, η_p^2 = .034. When individuals with interdependent self-construals were primed with prevention focus, disposable income share was positively associated with risk-taking, b = .023, p = .027,

but not when they were primed with promotion-focus, b = -.010, p = .552. For people with independent self-construal, when they were primed with prevention focus, disposable income share was negatively associated with risk-taking, b = -.030, p = .031, but somewhat positively associated when they were primed with promotion-focus, b = .019, p = .093. Broadly speaking, when there was incidental fit, disposable income share was positively associated with risk-taking, but when there was incidental non-fit, disposable income share was negatively associated with risk-taking.

In the third model, decision context interacted with the size of one's psychological network, $F(1, 228) = 4.55$, p = .034, η_p^2 = .020. Participants who reported to have a bigger psychological network tended to be less risk-taking under losses, b = -.340, but more risk-taking under gains, b = .350, though neither of the coefficients differed significantly from 0, p = .159 and p = .386. There were no other significant effects involving size of financial or psychological network, all Fs < 1.39 and ps > .241.

Discussion

The Study 1 tested the full model depicted in Figure 1. Of the three cornerstone theories, prospect theory received unequivocal support: participants were risk-averse under gains, risk-seeking under losses, and loss-averse under mixed gambles.

However, the prediction that SRF influences risk-taking did not receive any confirmation.[3] Apparently, motivational orientations are not as strong predictors of risk-taking as the decision contexts of gain and loss (see also Lin, Chang, & Lin, in press). In

[3] Findings of Study 1 seem to diverge from the Pilot Study 3. However, direct comparison is impaired by Study 1 being a between subjects design, and Pilot 3 a within subjects design.

this sense, the application of prospect theory to SRF theory, the predictions of which were as shown in Figure 3, did not materialize. The curvature of the value functions did not differ as a function of SRF in Study 1.

The slope of the value functions was in the expected direction, as the prevention-prime was associated with greater loss aversion. Yet, perhaps due to small sample size for the mixed gambles, the difference attributable to SRF manipulation was not significant. There were 59 cases in the offline mode, and Cohen's *d* was .06. However, in the online mode, there were 72 cases and Cohen's *d* was .29. In order to detect an effect size of .29 with an a priori power of .80 would require about 160 participants per condition. Put differently, if the same values found in online mode were to occur among 320 participants rather than 72, it would have likely been a significant effect.

Likewise, neither the findings of Mandel (2003) were replicated nor the hypothesis that people with interdependent selves are more loss-averse than people with independent-selves were supported, although means trended in the expected direction. The lack of significance for risk-aversion and risk-seeking was surprising given the statistical power brought to bear in Study 1 by virtue of the sample size. Yet, the lack of effects cannot be explained by this research using also an online mode of administration whereas previous research used an offline approach. Regarding the effects of SRF and chronic self-construals on risk-taking, there was little or no difference between the online and offline mode in terms of the direction of the effects. The method used in online and offline mode for elicitation of risk coefficients was slightly different, with the online mode being a more iterative and flexible method and thus resulting in greater variances. Yet, the means were almost always in the same direction.

Differences in the nature of the samples appear to be more promising as a potential explanation for the non-replication of previously established effects. Indeed, there were sometimes marked differences between the student samples and the MTurk sample. On the other hand, sample resulted primarily in main effects and hardly ever interacted with other experimental variables. Therefore, the difference between findings of Study 1 and that of Mandel (2003) or Hsee and Weber (1999) cannot be explained by mode of administration or the difference in samples.

Yet, an alternative account is possible. Specifically, the estimation of risk-taking was different between Study 1 and those of Mandel (2003) or Hsee and Weber (1999). The latter authors employed the term "risk-taking" in the psychological sense. They analyzed risk-taking behavior by creating a Risk Preference Index (RP) that indicated the frequency (plus 1) with which participants chose risky options across seven different scenarios each involving a risky and a sure option (see Appendix A, Pilot Study 3 for a critique of RP method). Study 1, on the other hand, relied on a theoretically and statistically precise definition of risk-taking by decomposing it into risk-aversion/seeking and loss aversion. To examine if the discrepancy between the present results and those reported by Hsee and Weber (1999) and Mandel (2003) was due to the different treatment of the data, I re-analyzed the present data using the method used by these authors. A direct comparison was possible only for Study 1's offline sample where the format of the answer structure to questions was the same as those used by these other authors.

Indeed, a reanalysis of risk-taking by using their transformation yielded a *p* value of .069 for self-construals and comparable mean differences: Hsee and Weber's (1999) Chinese participants were more risk-taking than American participants, RP = 4.23 versus

3.41, whereas, in Study 1, people with interdependent selves were more risk-taking than people with independent selves, RP = 4.30 and 3.69.[4] Therefore, it seems possible that the difference in analytical approaches at least partially explains the difference between Study 1 and Hsee and Weber (1999).

Further, neither Mandel (2003) nor Hsee and Weber (1999) were interested in self-regulatory focus. However, self-regulatory focus and self-construals are related constructs and can influence each other (e.g. Zhang & Mittal, 2007). In Study 1, after measuring self-construals, self-regulatory focus was manipulated. Such a manipulation likely influences self-construals temporarily because there is evidence of cross-construct priming both in my pilot studies (see Appendix A) and previous literature (e.g., Aaker & Lee, 2001; Lee et al., 2000; Zhang & Mittal, 2007). Therefore, some of the participants who had chronic interdependent self-construals presumably became less so temporarily when primed with promotion-focus and some of the participants who had chronically independent self-construals presumable became less so when primed with prevention-focus, i.e., cross-over effects. If the experimental manipulation of SRF influences also individual differences in self-construals, this has implications for the occurrence of regulatory fit. By focusing on those participants that had compatible primes, it is possible to test the association of self-construals with risk-taking, albeit magnifying the effects of

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[4] Hsee and Weber (1999) reported an *F* value which, under normal circumstances, enables calculation of Cohen's *d*. Yet according to their third footnote on page 169, their analysis sample can vary between 129 and 177. The corresponding sample sizes for Chinese and American samples cannot be calculated with the given data. Their study was a within subjects design with 3 IVs, and not all *F*s were listed. Therefore, it is unclear what the *F* value for self-construals in their study represents in terms of effect size. Another approach in calculation effect sizes requires the exact standard deviations or errors. Although Hsee and Weber (1999) did not report standard deviations or standard errors, assuming that their standard errors were same as those in Study 1, the difference between their RP means correspond to an effect size of Cohen's *d* = .44, whereas the difference between the RP means of Study 1 correspond to Cohen's *d* = .32.

self-construals due to their fit with self-regulatory focus. Indeed, a reanalysis of sample in Study 1 with participants experiencing incidental regulatory fit and excluding participants who experienced incidental regulatory misfit reproduces the results of Mandel (2003). Although this approach reduces the sample size drastically to 239 participants, the effect of self-construal on α is significant, $F(1, 227) = 4.30$, $p = .039$, $\eta_p^2 = .019$, with interdependent self-construals being associated with greater risk-taking than independent self-construals.

Departing from Hsee and Weber (1999), who found that size of social network partially explained individual differences in risk-taking, I did not find any association between size of social network and risk-taking regardless of the any of the possible reanalysis. These authors suggested that the greater size of financial network found in collectivist societies provides a cushion against financial difficulties. The discrepancy between Study 1 and Mandel (2003) or Hsee and Weber (1999) was not likely due to the way social network questions were asked, because the questions in Study 1 were taken from these other authors. Yet, in Study 1, people with chronic interdependent selves reported to have smaller networks than people with chronic independent selves. This pattern was reversed in Mandel (2003), who manipulated the temporary self-construals, and Hsee and Weber (1999), who examined cross-cultural differences. The findings of these two studies along with Study 1 suggest that the relation of self-construals or culture to size of social network can be complex. More specifically, acute differences in self-construals experimentally created by Mandel (2003) in the U.S. or the differences found between individualist and collectivist countries may have quite separate dynamics compared to the chronic self-construal differences in the U.S. in Study 1. A self is

embedded within a social context. To the extent that individuals are prototypical members of their groups, they are valued as group members and have a wider social network (e.g., Hogg, 2006). Given that the normative self in US is independent (e.g., Markus & Kitayama, 1991), it may not be surprising that people with chronic independent selves reported to have a larger social network than people with chronic interdependent selves. Therefore, the size of social network cannot explain the difference in risk-taking between people with chronic independent versus interdependent selves living in the same culture.

Though the present research did not reveal any strong main effects for self-construals, the difference in size of financial network is only one explanation for the greater risk-taking tendency of interdependent people compared to independent people. Indeed, Weber and Hsee (1998) themselves found that the difference between individualists' and collectivists' risk-taking tendency stems partially from the differences in perceptions of risk, where collectivists showed a lesser discrimination of probabilities compared to individualists. This finding was later confirmed by Lau and Ranyard (2005). Since Study 1 did not measure or manipulate the perceptions of probability, it is impossible to tell whether this was the reason for the differences in risk-taking; thus, differences in the perceptions of probability cannot be excluded as a viable explanation.

Yet, despite the lack of any main effects of SRF and self-construals, there was an unexpected interaction of these two variables with decision context on risk-aversion/risk-seeking: under incidental fit people were less risk-averse under gains and less risk-seeking under losses compared to incidental non-fit. The decrease in risk-aversion and risk-seeking corresponds to being closer to risk-neutrality, which is the preference

structure that maximizes financial profit. This result suggested that people may approximate economically optimal choices when they experience incidental fit.

Unlike the suggestions of Higgins and colleagues, regulatory fit experience did not appear to govern motivational experiences. In Study 1, motivational experiences were governed by the decision context: feeling right was larger under gains, and strength of engagement was larger under losses. It may be that regulatory fit is secondary to influences of environmental cues. In other words, people's motivational experiences may be foremost responsive to the surrounding environment, and to regulatory fit only if the environment is lacking any cues as to the appropriate approach. From an evolutionary point of view, people should be more concerned about the potential losses than gains regardless of whether they experience regulatory fit or not. The data of Study 1 are consistent with this account. If fit effects are to emerge when there are no environmental cues as to the nature of gain and loss, then they should be more easily detectable when one is studying persuasion.

An alternative explanation focuses on the nature of motivational experiences. Although Higgins and colleagues spent a great deal of time explaining what feeling right is not (e.g., Avnet & Higgins, 2006a, 2006b; Higgins et al., 2003), they were much less clear on what feeling right is or how feeling right and strength of engagements are related to or are different from each other. Moreover, these concepts have never been measured by Higgins but rather were employed conceptually to explain findings. In the present study, feeling right and strength of engagement, when assessed directly through self-report measures, appeared as distinct constructs. Feeling right tapped how the participants felt during the task they were carrying on: the extent they felt right and the extent they

felt certain during that particular task. Importantly, feeling right was not related to general sense of certainty, but was rather specific to the task at hand. This suggests that regulatory fit changes the feelings of certainty pertaining to the task at hand, as hypothesized, but not the general sense of certainty devoid of an object. Strength of engagement was, on the other hand, captured by the extent participants found the task engaging and interesting. Therefore, I was able to establish some conceptual as well as methodological clarity to the meaning of feeling right vis-á-vis strength of engagement.

I hold that Higgins and associates (Avnet & Higgins, 2006a, 2006b) themselves were unclear about what feeling right is and how it is related to or different from strength of engagement. Therefore, it is possible that the present use of these concepts and their operationalization is slightly different from the one originally intended. Being a relatively new theory, regulatory fit theory is a work-in-progress for Higgins and colleagues, with some elements being added and others being replaced (e.g., Higgins et al., 2003 vs. Koenig et al., 2009). Therefore, it is possible that regulatory fit influences motivational experiences but these experiences are not exactly feeling right and strength of engagement. Indeed, there is ongoing debate as to whether level of involvement can explain the findings resulting from regulatory fit. Pham and Avnet (2009) argue that, if people are highly involved in a task, strength of engagement effects should be larger than feeling right effects. Correspondingly, when the level of involvement is low, feeling right effects should be larger than strength of engagement effects. However, given the lack of data or assessment tool for feeling right and strength of engagements, such debates inevitably rest on indirect inferences rather than precise assessments of concepts of feeling right and strength of engagement.

Despite the absence of effects on motivational experiences, regulatory fit seems to have an influence on the processing mode. In the present study, there were three indicators of processing mode: self-reported processing mode, response time, and deviation from linearity. Although differences only approached significance for each of those indicators, findings overall pointed in the same direction, namely, that incidental fit results in more systematic processing, and incidental non-fit results in less systematic processing. This finding was unexpected. According to Figure 1, if anything, one would expect to see incidental fit to be related to intuitive rather than systematic processing. Apparently, my attempt to account for contradictory findings in regulatory fit literature by providing an integrative theory failed.

First of all, it seems that the distinction between incidental fit vs. integral fit is not useful in explaining the present findings. Indeed, the idea of incidental vs. integral fit is relatively recent (Koenig et al., 2009) which has been suggested as a conceptual explanation but not tested directly by any published studies. The lack of any significant effects pertaining to the interaction of SRF with decision context in the present study, despite the big sample size, further supports the contention that integral fit may not be an appropriate distinction to account for inconsistent findings in literature. As alluded to above, the debate as to the motivational consequences of regulatory fit also disputes the existence of incidental vs. integral fit as distinct phenomena (Pham & Avnet, 2009). Indeed, the present findings are consistent with the view that such a distinction is unnecessary.

Although I was able to demarcate feeling right from strength of engagement, and show that both incidental regulatory fit as well as these motivational experiences were

somewhat related to mode of thinking, evidence for a link between the regulatory fit and motivational experiences was conspicuously absent. In other words, while it seems that both the incidental fit and the motivational experiences have similar effects on modes of thinking, the two did not seem to be causally related. Put differently, the effects of regulatory fit cannot be explained by motivational experiences. Both incidental fit and strength of engagement were related to systematic thinking, and both incidental non-fit and feeling right were related to intuitive thinking. Yet, incidental fit was not related to either feeling right or strength of engagement. Furthermore, integral fit had no influence on any of the variables used to assess motivational response or processing mode. Therefore, the third and fourth columns of Figure 1 were not supported, i.e., no evidence for the existence of integral fit. At the same time, for the first and second column of Figure 1, there was a reversal such that incidental fit was related to systematic thinking, and incidental non-fit was related to intuitive thinking.

Corroborating the finding that incidental fit effects govern the right side of the Figure 1 was the lack of support for the contention that when people experience incidental fit they should be taking into account their emotions more in making financial decisions, whereas under integral fit they should be taking into account reality constraints more. This is not likely due to people responding to hypothetical financial scenarios differently than gambles with real consequences since researchers varying the presence of material incentives found little or no systematic effects on choices among risky gambles (Beattie & Loomes, 1997; Camerer & Hogarth, 1999). Indeed, although taking emotions into account was not satisfactorily explained by fit experience, it was explained by regulatory focus. As a first demonstration in literature, promotion-prime led to

cheerfulness related emotions to be taken into account and prevention-prime led to quiescence related emotions to be taken into account in financial decisions. The association of reality constraints with risk-aversion/risk-seeking, on the other hand, was related to whether participant experienced incidental fit or non-fit. When there was incidental fit, disposable income share was positively associated with risk-taking, but when there was incidental non-fit, disposable income share was negatively associated with risk-taking. However, what these associations mean remains open to alternative interpretations. Regarding the disposable income, the interpretation is rather straightforward. Since disposable income cannot be a consequence of responses to hypothetical risk-taking, it is relatively uncontroversial that higher disposable income leads to higher risk-taking under incidental fit, and lower risk-taking under incidental non-fit.

Emotions can shape how someone responds to a hypothetical gamble, and thus cause a particular response. However, emotions may also be a response to the individual's interacting with the gamble, and thus be a consequence of the gamble. What remains important is the association of emotions with risk-taking was causally dependent on the experimental manipulations of self-regulatory focus, whereas that of disposable income was causally dependent on incidental fit and non-fit. In other words, the results show that experimental manipulation of regulatory fit does not affect whether and how emotions are related to risk-taking, but it does affect how some reality constraints are related to risk-taking.

Overall, it appears that there is some influence of incidental fit, but not integral fit, on financial decisions under risk. The next study, therefore, focuses exclusively on the

experience of incidental fit. As a further iteration over the previous literature, Study 2 attempts to examine effects of incidental fit on financial decisions under uncertainty, i.e., when the probabilities are unknown.

Chapter 7 – Study 2: Financial Decision Making under Uncertainty

Study 1 used hypothetical scenarios to examine the consequences of regulatory fit for decision making under risk and uncertainty. One important characteristic of this experimental paradigm was that the level of risk was known because it was clearly specified as part of the decision task. However, in many financial decisions that individuals have to make every day, whether it is about investing their money or gambling, the level of risk is not typically known very well. Moreover, real-world investment or gambling decisions are repeated and previous outcomes often influence subsequent investment or gambling behavior. Thus, the goal of Study 2 was to expand the findings of Study 1 to situations in which the overall level of risk was unknown to the decision maker. Further, the intent was to raise the stakes and have participants of Study 2 make decisions involving real money with feedback. These characteristics rendered Study 2 more realistic.

Study 2 was in many respects similar to Study 1. It used the same experimental manipulation of SRF, measurement of chronic self-construals followed by a decision task, after which participants reported their mode of thinking, emotions, size of network and reality constraints that may relate to risk decision making. However, Study 2 differed from Study 1 in that it utilized the Balloon Analogue Risk Task (BART) as a measure of risk-taking behavior (Fecteau et al., 2007a, 2007b; Lejuez et al., 2002; Maner, et al., 2007). The BART is a behavioral index of risk-taking. Participants' goal in the BART is to fill a balloon with as many puffs of air as possible without overfilling and thus exploding the balloon. Critically, participants are presented with a variety of balloons, which vary randomly in how many puffs they can take before they explode. For each puff

of a balloon, participants earn a small amount of money; however, if a puff results in the explosion of the balloon, all funds earned inflating the balloon are lost. This means that, after each puff, participants have to decide if they want to stop puffing and collect their reward, possibly forgoing greater monetary gains. Alternatively, participants may wish to continue puffing and earn additional funds. When participants decide to stop puffing and collect their money, or when the balloon explodes, the next balloon is presented, until participants have worked on a total of 15 balloons. This task is modeled after many real world situations in that there is a diminishing marginal return for each additional puff. As a dynamic assessment tool that involves feedback, the BART has been shown to predict many real life behavior such as gambling, stealing (Lejuez et al., 2002), smoking (Lejuez et al., 2003) and alcoholism (Fein & Chang, 2008).

The BART has been used as a measure of risk-taking behavior without any explicit or implicit elaboration on the relevant component of the risk-taking behavior in terms of risk-aversion, risk-seeking or loss aversion. To the contrary, in the interpretation of their results, previous authors used the terms risk-aversion and risk-seeking loosely to denote cautious behavior vs. risky behavior in the psychological sense rather than using those terms as defined in economics (Fecteau et al., 2007a, 2007b; Lejuez et al., 2002). The looseness with the terms even extends to using loss aversion and risk-aversion interchangeably (Maner et al., 2007). Because these concepts have precise and distinct definitions in economics, laxness in the use of these terms produces great conceptual difficulty in interpreting any findings obtained with the BART.

The nature of BART is such that there is a possibility of a loss as well as gain, even though the net return at the end of the task is always non-negative. The key to

understanding losses in BART is prospect theory, which shows that the reference point can and does shift (see Chapter 3 for a more detailed discussion of loss aversion). A person who has already performed multiple puffs on the same balloon always faces the situation of possibly gaining more money by adding another puff, or by losing all the money accumulated thus far—money that would be hers if she only stopped now. In other words, the fact that the earnings in BART are always non-negative does not necessarily make it a gain task from the perspective of the prospect theory.

The realization that, from the second puff onward, the person has to decide between a possible gain and a possible loss has important theoretical implications. It means that the BART is, strictly speaking, not a pure measure of risk-aversion or risk-seeking. Because it involves both gains and losses relative to a reference point, it is also a measure of loss aversion. Complicating the matters more is the fact that reference point is constantly changing, and that previous outcomes provide feedback for the subsequent behavior. Therefore, it is hard to confine the BART to any single concept from prospect theory. This has two implications for testing Hypotheses 1a, 1b, and 1c. Whereas Hypotheses 1a and 1b predict that people with interdependent selves, compared to those with independent selves, should be more risk-taking when considering financial decisions under gains or losses, Hypothesis 1c predicts that the former should be less risk-taking than the latter when the decision involves a trade-off between gains and losses. Because in the BART there is a gain component, and a loss component due to the shifting reference point, there is undoubtedly a trade-off between the gains and losses as well. Therefore, Hypotheses 1a, and 1b become rivals for Hypothesis 1c when predicting risk-taking in BART.

However, as explained earlier in this dissertation, if a bridge between different disciplines is to be formed, the language of the respective disciplines should be aligned. Therefore, rather than using the terms risk-aversion/risk-seeking and loss aversion of the prospect theory, this chapter interprets the BART and what it measures as consistent as possible with economic theories by referring it as a tool to assess risk-taking under uncertainty. At the end of the results section, I also explore what components of prospect theory might be pertinent in BART.

Note that for the purposes of isolating the effects of incidental regulatory fit, I did not vary the decision context of gain versus loss in BART, even though such a manipulation was possible (see Benjamin & Robins, 2007). Because Study 1 showed little or no contribution of integral fit in explaining psychological processes involved in financial decision making, the main focus here is on incidental fit, i.e., the congruence of self-construals and self-regulatory focus external to the task.

Method

Overview. Employing a median-split procedure with chronic self-construals, the present study used a 2 (chronic self-construal) x 2 (SRF priming) between-groups factorial design. As in Study 1, individual differences in self-construal were measured, and SRF (promotion vs. prevention) was primed between participants. This manipulation followed by the BART. Task perception, mode of thinking, emotions, size of financial network and demographic variables were measured after the BART. Mode of thinking was measured both through self-reports and through a behavioral measure.

Participants. There were a total of 257 participants in Study 2, who were either students at University of Nevada, Reno participating in exchange for course credit and

the possible money that can be earned in BART (*n* = 115, 78 females, 37 males), or members of the general population recruited via Amazon MTurk participating in exchange for BART earnings (*n* = 142, 98 females, 43 males; 1 did not report sex). The entire study was carried out on the Internet.

Procedure. The procedure was similar to that of Study 1. The primary change was the focus on incidental fit. Because the BART is a task that includes the possibility of both gains and losses, there was no variation in the decision context, i.e., no integral fit. After measuring self-construal and manipulating SRF as described in Study 1, participants were presented with the BART (Lejuez et al., 2002). Following this task, Study 2 was same as Study 1. There was one additional question to measure the way in which participants approached the BART. Specifically, participants responded to "What was your strategy in the preceding balloon task?" on a seven-point scale with 1- losing as little as possible and 7- gaining as much as possible (see Appendix D for screenshots of the parts of Study two that were different from Study 1).

Measures.

Measure of risk-taking. As part of the BART, the participants were presented with 15 balloons with randomly varying thresholds for explosion ranging from 1 (balloon explodes at first puff) to 128 (balloon explodes at 128th puff), with an average of 64 puffs. Participants earned 2 cents per unexploded balloon. As in previous studies (e.g., Lejuez et al., 2002; Maner et al., 2007), the average number of puffs per unexploded balloon served as the main dependent measure (Puffs). Lejuez et al. argued that exploded balloons should be excluded from the analysis because some of the balloons are bound to have very low pop points thus not giving any information on the actual preference of

participants. The higher the Puffs are, the higher the risk-taking under uncertainty.

Two additional measures were also explored (e.g. Maner et al., 2007): the total number of balloons each participant popped (Pops), which averaged 4.31 balloons, ranging between 0 and 10, and the total amount each participant earned (Earning), which averaged $6.47 and ranged from $0.40 to $15.00. The three measures of risk-taking were correlated, with Puffs and Pops, r = .719, Puffs and Earnings, r = .865, and Pops and Earnings, r = .361.

Additional measures. All questionnaire measures were the same as in Study 1. As before, the internal consistency of the independent and interdependent self-construals scale was high, Cronbach's α = .740 and .753, respectively, r = -.008, p = .896. Likewise, the items of the two-item feeling right and the two-item strength of engagement scales was substantial, r = .613 and r = .816, whereas the correlation between the two scales was comparatively low, r = .215, p = .001. The reliabilities of self-report measures of intuitive processing and systematic processing were similar to the ones in Study 1, Cronbach's α = .601 and α = .560, respectively, as were the reliabilities for the cheerfulness and quiescence scales, Cronbach's α = .755 and .759, respectively. As Study 1, Study 2 also employed a response time measure, which assessed how long it took participants to work through all 15 balloons starting from the presentation of the first balloon ending by the completion of the 15th balloon.

Results

The data analysis was very similar to the analysis in Study 1 except that there was no loss versus gain variation in the decision task and that the main dependent measure was now the "Puffs."

Data screening. As in Study 1, participants who did not follow instructions by not providing any response to the SRF manipulation were removed (16 participants). Next, I examined the distribution of Puffs, which was normal without any extreme cases. The resulting sample consisted of 243 participants.

Analysis of risk-taking. (Hypotheses 1a, 1, 1c, 2a, 2b, 2c) Because the behavior on the BART might be shaped by both risk-aversion/risk-seeking and loss aversion, the predictions as to how chronic self-construals may affect risk-taking behavior on the BART is two-fold. On the one hand, Hypothesis 1a and 1b predict that people with interdependent self-construals are more risk-taking than people with independent self-construals because the former are less risk-averse for gains and more risk-seeking for losses. On the other hand, according to Hypothesis 1c, people with interdependent selves should be less risk-taking on BART than people with independent selves because the former are more loss-averse. For the main effect of SRF, Hypotheses 2a, 2b, and 2c all predict that promotion-focused people would be more risk-taking than prevention-focused people since the former, compared to the latter, is not only less risk-averse for gains and more risk-seeking for losses but also less loss-averse in the comparison between gains and losses.

To test these predictions, I submitted Puffs to a 2 (Sample: online student sample vs. MTurk sample) x 2 (chronic self-construal) x 2 (SRF prime) factorial design. There was a main effect of sample, $F(1, 235) = 55.98$, $p < .001$, $\eta_p^2 = .192$, with the MTurk sample taking less risk than the student sample ($M = 26.30$ vs. $M = 41.87$). Parallel factorial analyses with Pops and Earnings as dependent variables showed the same result, both ps < .001. There was also a main effect of chronic self-construal on Earnings, F(1,

235) = 3.70, p = .056, η_p^2 = .016. Independent people were taking more risks than interdependent people as evidenced by greater Earnings (M = 6.94 vs. M = 6.26). This result supports Hypothesis 1c that people with interdependent selves are more loss-averse than people with independent selves, but it does not support Hypotheses 1a and 1b, which made the opposite prediction. The same self-construal effect, although indicating the same interpretation, was not significant for Puffs, F(1, 235) = 2.37, p = .125, η_p^2 = .010, or Pops, F(1, 231) = .367, p = .551, η_p^2 = .002.

The main effect of SRF reached significance neither for Puffs, F(1, 235) = 0.60, p = .439, η_p^2 = .003, nor for Pops, p = .200, or Earnings, p = .674, giving no support for Hypotheses 2a, 2b, or 2c. All other effects were not significant, all Fs < 1.55, ps > .214.

Regulatory fit and motivational experiences. (Hypotheses 4a, 4b) I examined the effects of incidental regulatory fit on motivational orientations through self-reports of feeling right and task engagement as well as general feelings of certainty.

Feeling right and strength of engagement. Study 2 again tested the contention by Higgins and colleagues (Cesario et al., 2008; Koenig et al., 2009) that incidental fit increases a sense of feeling right, whereas the reverse is true for integral fit. If this is so, then a mixed-model ANOVA with feeling right and strength of engagement scales serving as repeated measures and the sample, chronic self-construal, and SRF as between – groups factors should find that that feeling right effects should be larger than the strength of engagement effects when there is incidental fit.

The analysis revealed that participants reported a higher strength of engagement than they reported feeling right (M = 5.80 vs. M = 4.96), F(1, 228) = 55.78, p < .001, η_p^2 = .197. This main effect was moderated by a sample by variable interaction, F(1, 228) =

4.38, $p = .037$, $\eta_p^2 = .019$, which revealed that the above difference occurred for the MTurk sample, $M = 6.47$ vs. $M = 5.39$, $p < .001$, but was less pronounced, though still significant, in the student sample, $M = 5.14$ vs. $M = 4.54$, $p < .001$. The sample main effect was also significant, $F(1, 228) = 81.74$, $p < .001$, $\eta_p^2 = .264$.

The chronic self-construal by repeated measures interaction approached significance, $F(1, 228) = 2.74$, $p = .099$, $\eta_p^2 = .012$, such that people with interdependent self-construal reported somewhat stronger engagement than the people with independent self-construals, $M = 5.88$ vs. $M = 5.72$, $p = .310$, whereas the reverse was true for feeling right, $M = 4.86$ vs. $M = 5.07$, $p = .221$.

There was also a sample x chronic self-construal x SRF interaction approaching significance, $F(1, 228) = 2.82$, $p = .095$, $\eta_p^2 = .012$. For the student sample, both dependent variables appeared to be somewhat higher when independent self-construal was paired with promotion-prime than when paired with prevention-prime, combined means $M = 4.94$ vs. $M = 4.70$, $p = .375$, and when interdependent self-construal was paired with prevention-prime rather than with promotion-prime, combined $M = 5.02$ vs. $M = 5.72$, $p = .310$. For the MTurk sample, however, the effects were reversed: the combined ratings (average of the two dependent variables) were slightly lower when independent self-construal was paired with the promotion-prime than when paired with the prevention-prime, $M = 5.87$ vs. $M = 6.07$, $p = .347$, and when interdependent self-construal was paired with promotion-prime rather than the prevention-prime, $M = 5.91$ vs. $M = 5.86$, $p = .839$. This pattern does not allow any conclusions about the effects of incidental fit on feeling right and strength of engagement. Moreover, the three-way interaction predicted based on Higgins (Cesario et al., 2008; Koenig et al., 2009), that is,

the SRF x chronic self-construal x variable interaction, was not significant, $F(1, 228) = 0.72$, $p = .39$, $\eta_p^2 = .003$. Therefore, Study 2 yielded no evidence in support of the notion that incidental fit had any distinct motivational consequences.

Certainty. Next, I used the 2 (sample) x 2 (chronic self-construal) x 2 (SRF priming) three-way design to check for the presence of any effects of incidental regulatory fit on feelings of general certainty. Participants in the MTurk sample felt more certain than the student sample ($M = 5.10$ vs. $M = 4.61$), $F(1, 226) = 7.23$, $p = .008$, $\eta_p^2 = .031$. Also, people with independent self-construal reported slightly greater certainty than people with interdependent self-construal ($M = 5.00$ vs. $M = 4.70$), $F(1, 226) = 2.81$, $p = .095$, $\eta_p^2 = .012$. Because the predicted SRF by chronic self-construal interaction was not significant, $F(1, 226) = 0.002$, $p = .962$, $\eta_p^2 < .001$, the notion that people would feel more certain under incidental fit was not supported.

Regulatory fit and the processing mode. (Hypotheses 6a, 6b, 6d, 6e) I assessed the effects of regulatory fit on the processing mode using two different measures: self-reports and response time.

Pham and Avnet (2009) suggest that when people are involved with the task to start with, strength of engagement should loom larger, whereas when prior involvement with the task is low, feeling right effects should loom larger. If one makes the plausible assumption that monetary gains foster high involvement, then the BART should be classified as high-involvement situation. If Pham and Avnet (2009) are correct, one would not only expect that any regulatory fit increases involvement, but, based on the established association between personal involvement and processing (e.g., Chen & Chaiken, 1999), one would expect participants also to process more systematically under

regulatory fit. Recall that Pham and Avnet (2009) do not distinguish between different types or sources of fit; rather, these authors' model gives rise to the expectation that when there is initial involvement, any type of regular fit increases systematic processing compared to the non-fit conditions.

These predictions diverge from those by Higgins and colleagues (Cesario et al., 2008; Koenig et al., 2009). These authors predict that one has to distinguish incidental and integral fit, and with the confluence of self-construals and SRF producing situations of incidental fit and non-fit, one has to expect corresponding consequences. In the case of incidental fit, Higgins et al. (Cesario et al., 2008; Koenig et al., 2009) argued for a greater preference for intuitive thinking styles. Hence, based on their framework, incidental fit, as it was created in Study 2, should increase intuitive processing compared to non-fit conditions. Note that, in spite of their diverging predictions with regard to the incidental regulatory fit, Higgins et al. make similar predictions with Pham and Avnet concerning the processing implications of integral fit. However, this type of regulatory fit was not investigated in Study 2.

Self-reported mode of thinking. I employed a mixed-model ANOVA with intuition and systematic thinking scales serving as repeated measures factor, and sample, chronic self-construal and SRF as between-groups factors. In line with the idea that default mode of thinking is intuitive (e.g., Chen & Chaiken, 1999; Epstein et al., 1992), people reported to be more intuitive than systematic when dealing with BART (M = 4.97 vs. M = 4.07), $F(1, 228) = 50.24$, $p < .001$, $\eta_p^2 = .181$, thus replicating the pattern obtained in Study 1. The MTurk sample did not differ from the student sample in terms of self-reported intuitiveness, M = 4.99 vs. M = 4.96, $p = .828$, but they were higher on

self-reported systematic thinking, M = 4.34 vs. M = 3.80, p = .003, interaction $F(1, 228) = 4.97$, p = .027, η_p^2 = .021. No other effects reached significance, all Fs < 1.55, ps > .362.

Response time. I also examined response times as another objective measure of systematic thinking. In general, the less systematic a person is, the faster s/he is (e.g., Gigerenzer & Todd, 1999; MacLeod, 1991). Because there were sometimes inevitable problems with Internet connection, there were extreme cases: people who spent more than 776 seconds on the BART were removed from the analysis. Because the distribution of response time was still skewed, raw response times were log-transformed. However, there was one caveat: participants who earned more money necessarily spent more time on the task because they puffed more, r = .321, p < .001. Also, self-reported intuitive thinking was not related to quality of decisions as measured by Puffs, Earnings, or Pops, all ps > .13, whereas self-reported systematic thinking was negatively associated with Puffs, r = -.195, p =.004, Earnings, r = -.165, p =.014, and Pops, r = -.194, p =.004. In other words, the usefulness of response times as objective measure of systematic thinking was greatly limited in Study 2 because responding, i.e., Puffs, were confounded with the time spent on task. Therefore, I submitted response times to a 2 (sample) x 2 (chronic self-construal) x 2 (SRF priming) factorial design while controlling for Puffs. None of the effects was significant, all Fs < 1.93, ps > .16. Specifically, the anticipated two-way interaction involving SRF priming and chronic self-construal did not materialize, $F(1, 218) = .009$, p = .924, η_p^2 < .001.

Taken together, Study 2 does not show that mode of thinking is influenced by incidental regulatory, contrary to what Higgins and colleagues (Cesario et al., 2008;

Koenig et al., 2009), as well as Pham and Avnet (2009) suggested.

Motivational experiences and the processing mode. (Hypotheses 7a, 7b, 7d, 7e) To test Hypotheses 7 that the motivational experiences predict processing mode, I again used the two different indicators of the processing mode, self-report and response time.

Self-reported mode of thinking. (Hypotheses 7a, 7d) Hypothesis 7a asserted that feeling right results in greater intuitive thinking, and Hypothesis 7d stated strength of engagement results in greater systematic thinking. To test these propositions, I employed a mixed general linear model ANOVA in which self-reported intuitive and systematic processes was simultaneously regressed on feeling right and strength of engagement. As previously reported, people reported greater intuitive than systematic processing, $F(1, 233) = 11.28$, $p = .001$, $\eta_p^2 = .046$. More importantly, between subjects effects revealed that strength of engagement was more reliably related to both self-reported systematic thinking, $\beta = .283$, $p < .001$, and intuitive thinking, $\beta = .135$, $p = .020$, $F(1, 233) = 31.68$, $p < .001$, $\eta_p^2 = .120$, compared to the feeling right, $\beta = .178$, $p = .005$ and $\beta = .076$, $p = .186$, respectively, $F(1, 233) = 11.81$, $p = .001$, $\eta_p^2 = .048$.

Response time. (Hypotheses 7b, 7e) To test the idea that feeling right is negatively associated with processing time (Hypothesis 7b) and that strength of engagement is positively associated with it (Hypothesis 7e), I regressed processing time on these two variables controlling for Puffs since Puffs and time spent on task is by necessity correlated. In line with the predictions, greater strength was related to more time spent on BART, $\beta = .133$, $p = .037$, and although not significant, greater sense of feeling right was negatively linked to processing time, $\beta = -.016$, $p = .804$. These

regression coefficients were significantly different from each other, $p = .01$ suggesting that strength of engagement is associated with spending more time on tasks compared to feeling right.

Overall, although participants were strongly engaged in the task, and strength of engagement, compared to feeling right, was associated with spending more time on task, strength of engagement was related to both self-reported systematic thinking and intuitive thinking. Therefore, the evidence found in Study 2 is inconclusive as to whether feeling right is associated with intuitive processing and strength of engagement with systematic processing.

Regulatory fit and correlates of financial decisions. (Hypotheses 8a)[5]

According to Hypothesis 8a, when people experience incidental fit, emotional experiences are more strongly correlated with financial decisions than when people do not experience incidental fit. In order to test this hypothesis, I regressed Puffs on SRF prime, and chronic self-construal as categorical predictors, and cheerfulness and quiescence as continuous predictors. Preliminary analysis indicated that the MTurk sample did not differ from the student sample, therefore, sample was not included in the actual analysis in order to simplify interactions in the regression model. All interactions were included in the model with the exception of interaction terms that included both cheerfulness and quiescence. I also included the third order and below interactions between emotional experiences and the factors of Decision Context, SRF prime, and

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[5] Because Study 2 exclusively focused on incidental fit, but not integral fit, a test of Hypothesis 8b is not reported. An exploratory analysis, which explored if the association between the reality constraint variables, and Puffs, Pops and Earnings varied with incidental fit, did not produce any significant results.

chronic self-construal in the model. These continuous variables were centered. To avoid redundancy, only results involving the continuous variables are reported.

A main effect for quiescence, $F(1, 218) = 4.18$, $p = .042$, $\eta_p^2 = .019$, was further moderated by a SRF x chronic self-construal x quiescence interaction, $F(1, 228) = 3.91$, $p = .049$, $\eta_p^2 = .018$. For people with interdependent self-construals who were primed with prevention-focus, quiescence was not associated with risk-taking, $b = -1.93$, $p = .328$, whereas for those who were primed with promotion-focus, quiescence was negatively associated with risk-taking, $b = -5.48$, $p = .031$. For people with independent self-construal who were primed with prevention-focus, quiescence was not associated with risk-taking, $b = -3.56$, $p = .141$. The direction of association of quiescence with risk-taking was different for those who were primed with promotion-focus, i.e., it was positive, though not significantly different from 0, $b = 1.77$, $p = .392$. Put differently, under conditions of incidental fit there was no association between risk-taking and emotional experience, whereas under one of two conditions of incidental non-fit, there was evidence of an association between one of the emotion variables and risk-taking. No other effects were significant. Results were similar for Pops and Earnings. Therefore, the hypothesis that incidental fit strengthens the association between emotional factors and the level of risk-taking is rejected.

Analysis of the nature of BART. BART is a task that results in net gains in the end. However, during BART there is a possibility of a loss as well as gain. However, the how the components of prospect theory can relate to BART is not known. The purpose of the analysis of the nature of BART is to discern which component of the value function is relevant for BART: risk-aversion under gains, risk-seeking under losses, or loss-aversion

for mixed situations.

To explore the nature of BART in relation to prospect theory, I merged the data from the 162 participants (114 females, 47 males, 1 did not report sex) who participated in both Study 1 and Study 2. Next, I eliminated those cases that were identified as outliers in Study 1, leaving data from 159 participants. The majority (129; 81%) had participated in Study 1 via MTurk, and only a minority (30; 19%) was University of Nevada students who had participated online. (Students who participate in Study 1 using the offline format had been invited to be contacted again for a Study 2, but none of them volunteered for Study 2). Because the number of online student volunteers was so small, the data were not analyzed separately by sample.[6] There were 63 people who were assigned to the gain condition in Study 1, 68 people who were assigned to the loss condition, and 28 people who were assigned to mixed gamble condition.[7]

Risk-taking tendencies of people change as a function of the domain (e.g. Hsee & Weber, 1999) even though there is considerable intertemporal stability of particular risk-preferences. That is, an individual's general level of risk-aversion/risk-seeking and loss aversion, as it pertains to specific decision domains and contexts, is quite stable over time (e.g., Sahm, 2007). For example, across stocks, risk and choices are systematically related such that the investors reveal same preferences as long as they concern decisions in the same domain at two different points in time (gain-gain, or loss-loss) (Weber & Milliman, 1997).

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[6] Separate analysis by Sample resulted in similar correlations.
[7] The contingency coefficient was not significant, CC = .043, p = .868, indicating that participants from different samples were equally distributed across decision contexts.

In Study 2 as well as in Study 1 the decisions pertained to financial risk-taking keeping the domain of the decision the same across studies. At the same time, because decisions also vary as a function of decision context, I calculated correlations between Puffs, Pops, and Earnings in Study 2 and risk-taking tendencies of people as a function of decision context in Study 1.[8] Recall that in Study 1, after re-coding, a larger risk preference coefficient α indicated higher risk-taking with values above 1 denoting risk-seeking and values below 1 denoting risk-aversion. Higher values of the loss aversion coefficient λ reflected greater loss aversion, which may translate into greater or lesser risk-taking depending on the decision situation (e.g., Coval & Shumway, 2005; Thaler & Johnson, 1990).

As summarized in Table 7, the three risk-taking indicators on the BART were positively linked to risk preference under gains (α_{gain}), though only one of three BART was reliably associated with risk preference under losses (α_{loss}). This is consistent with the notion that the BART is gain framed and that the performance on the BART is at least in part driven by risk-aversion under gains.

But presumably because the BART involves a trade-off between gains and losses, all three indicators of risk-taking on the BART were strongly associated with loss aversion on the mixed loss-gain task of Study 1. However, surprisingly, this association was positive, meaning greater loss aversion was associated with greater risk-taking on the BART. I performed a series of comparisons of corresponding correlations. First, I

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[8] The correlations did not significantly differ for participants that were assigned to the same vs. different self-regulatory focus prime across the two studies, Fisher *Z* tests, *p*s > .31.

focused on the correlations between risk-taking on the BART and risk preference under gain in Study 1 (Table 7, first column), and the correlations between risk-taking on the BART and loss aversion in Study 1 (Table 7, third column). Based on a series of Fisher's Z tests for independent coefficients the correlations involving the same risk-taking measure on the BART were statistically indistinguishable, $p > .17$. Similar pairwise comparisons revealed no reliable differences in the correlations of the BART risk-taking indicators with risk preference under gain in Study 1 (Table 7, first column), and risk preference under loss in Study 1 (Table 7, second column), $p > .15$. Only when BART correlations with risk preference under loss in Study 1 (Table 7, second column) were compared with BART correlations with loss aversion (Table 7, third column), there were statistically meaningful differences in the strength of association, all $p < .10$, with two coefficients differing at $p < .04$.

With regard to the strategy used on the BART, 70.4 % of participants reported that they were trying to avoid losses as well as trying to gain money in BART, whereas only 29.6 % of them said they employed a strategy of purely attaining gains or purely avoiding losses in BART. This did not vary as a function of the decision context participants were assigned to in Study 1, $F(2, 150) = 0.541$, $p = .583$, $\eta_p^2 = .007$. Taken together with the correlations above, these results suggest that BART is a task that taps into loss-aversion foremost and risk-aversion under gains.

Discussion

Study 2 attempted to isolate the effects of incidental fit and extend findings of Study 1 to uncertain situations that involve real monetary consequences. The only support for the model summarized in Figure 1 pertained to the distinctness of feeling

right and strength of engagement. Yet, those motivational experiences were not influenced by the experience of regulatory fit. As in Study 1, the motivational experiences seemed to be governed mainly by the decision situation. In Study 1, when participants were responding to hypothetical situations, feeling right loomed larger than strength of engagement under gains whereas strength of engagement loomed larger under losses. In Study 2, presumably because real money was involved, strength of engagement effects loomed always larger. On the surface, this finding appears to be consistent with the argument of Pham and Avnet (2009) that strength of engagement effects should loom larger than feeling right effects when the initial involvement is high (assuming that monetary rewards increase involvement). However, the fact that there was no effect of incidental fit vs. non-fit on this motivational experience provides evidence against both Pham and Avnet (2009) and Higgins and colleagues (e.g., Cesario et al., 2008; Koenig et al., 2009). Because my own hypotheses were based on their theorizing, my own model did not receive any support as well.

Further, mode of thinking was not influenced by incidental regulatory fit or motivational experiences although the means trended in the expected direction for the latter. Instead, the default mode of thinking was always intuitive as suggested by dual-process models in psychology (e.g., Chen & Chaiken, 1999; Epstein et al., 1992). Likewise, the hypothesis that incidental fit strengthens the association between emotional factors and the level of risk-taking was rejected. Instead, there was some evidence that incidental non-fit may strengthen this association in under one of two conditions of incidental non-fit in which quiescence was negatively associated with risk-taking.

Overall, Study 2 did not provide any evidence for the validity of the model

summarized in Figure 1. Whereas Study 1 supported a modified version of Figure 1 as it pertains to incidental fit, the findings of Study 2 lead to the conclusion that the model does not apply when financial decisions have real monetary consequences and occur under uncertainty.

One may argue that the monetary reward paid in Study 2 was too low to motivate participants. In other words, had Study 2 promised a higher payout to participants, many more of the predicted effects would have materialized. However, the fact that Study 1 obtained at least some incidental fit effects, but not Study 2, challenged this assertion. Rather, it is more plausible that the uncertain nature of the decision task prevented a replication of Study 1 findings that is because MTurk participants were paid also in Study 1, and at a lower amount, but there were fit effects Still, there is no reason as to why decision behavior observed under risk should not easily generalize to decision behavior under uncertainty (Kahneman & Tversky, 1992). Therefore, the suggestion that lack of any significant findings can be attributed to uncertainty has to be treated with suspicion as well.

With neither task realism nor the nature of the decision task being able to account for the observed differences between Study 1 and 2, one is tempted to argue that motivational experiences are primarily influenced by environmental cues and only secondarily by incidental fit, if they are influenced at all. The null findings of Study 2 cast the predictions of Figure 1 to an auxiliary role: there were decision context effects on motivational experiences in both Study 1 and 2, but not incidental fit effects on motivational experiences. In the present case, the task involved real money. Accordingly, participants were much more strongly engaged than feeling right. However, the financial

decisions did not consistently vary as a function of the mode of processing decisions are arrived at suggesting that the quality of decisions does not necessarily depend on the mode of thinking. Indeed, the earnings were less the greater the systematic thinking was. In other words, while there was evidence that the more involving task of Study 2 did increase the self-reported importance of task engagement compared to Study 1, this had no implications for actual risk-taking, nor were there any implications for the observed processing mode. Instead, motivational experiences were driven by the nature of the decision context: when there was no money involved, as in Study 1, participants were feeling right if the decisions pertained to gains, and they were strongly engaged if the decisions pertained to losses. In Study 2, when there was actual money involved, participants were more strongly engaged. Incidental fit, on the other hand, only showed a marginal effect on motivational experiences. These findings suggest that decision context structures the decision environment, which in turn influences the motivational experiences, with incidental fit only having a weak effect.

An interesting contribution of Study 2 was rather for its implications as it pertains to BART. Following some participants from Study 1 through Study 2 helped to shed some light on the nature of dynamic decision making tasks. Specifically, the researchers who developed the BART (Lejuez et al., 2002) had in mind that this task would predict risk behavior in real life situations. Specifically, the BART was thought to predict decision making in dynamic contexts with recurring feedback to individual choices. Indeed, higher risk-taking in the BART was associated with greater risky behavior such as gambling, stealing (Lejuez et al., 2002), smoking (Lejuez et al., 2003) and alcoholism (Fein & Chang, 2008). Presumably because of this applied focus, which component of

prospect theory was relevant in the BART was not known. The results of the present study revealed that behavior in the BART is correlated with risk-aversion in the gains context and loss aversion in the mixed prospects. This is consistent with the prospect theory in that risk-taking behavior can be explained by a combination of risk-aversion, loss-aversion as well as probability weighting functions (Kahneman & Tversky, 1979). By extension, it is possible that the BART could be associated with risk-seeking under losses instead of risk-aversion under gains if it were to be framed as a loss task (see Benjamin & Robins, 2007). In either gain framing or loss framing, however, the correlation with loss-aversion should remain. That is not because loss-aversion, compared to risk-aversion, is more stable across time and contexts. To the contrary, loss-aversion can be dynamic (Barberis, Huang, & Santos, 2001). It is so volatile and depends on framing (Wakker, 2010). Some even discuss the existence of loss aversion particularly those from expected utility tradition that do not evoke a loss-aversion construct to explain risk-taking behavior (Gal, 2006). Yet, both risk-aversion/risk-seeking and loss aversion are quite stable over time that they permit predictions within the same decision domains and contexts (e.g., Sahm, 2007; Weber & Milliman, 1997)

In Study 2, participants were more likely to take risks in the BART if they were less risk-averse in the gains domain. Given that the reference point continuously shifts in BART as a function of earnings, and loss-aversion is defined by the relative slopes at the reference point (Kahneman & Tversky, 1979), it was not surprising that it was predicted strongly by loss aversion coefficient obtained in Study 1.

What was surprising, however, was the direction of that association: results indicated that greater loss aversion was associated with greater risk-taking in the BART

whether it is assessed by the number of puffs per unexploded balloon, total earnings or total number of balloons popped. One explanation stems from the fact that loss-averse individuals can be risk-taking when recovering losses (e.g., Coval & Shumway, 2005; Thaler & Johnson, 1990). They find previous losses to painful and try to compensate for them by taking more risks in future gambles.

Alternatively, it may be that because loss-averse individuals dislike losses extremely compared to their liking for the gains, subsequent to encountering a popped balloon they may be correcting their estimation of the likelihood of a balloon popping to a greater degree than less loss-averse individuals. In other words, the degree of loss aversion may influence the probability estimations. Indeed, sensitivity to losses in the BART has been found to be related to probability estimations in another gambling task (Bishara et al., 2009). The possible link between loss-aversion and probability estimates can be explained by the gambler's fallacy. People who exhibit the gambler's fallacy are more likely to think that the outcome of a current gamble will be the opposite of previous outcomes in a series of independent gambles (Croson & Sundali, 2005). For example, if the previous winning color in roulette was red, those exhibiting the gambler's fallacy are more likely to think that it will be black on the current round. Similarly, loss-averse people faced with a popped balloon may think that the upcoming balloon is less likely to pop, and therefore take greater real risks. This possibility, that loss-averse individuals are likely to fall prey to the gamblers fallacy, should be investigated in future research. Paradoxically, while such an approach increases the likelihood of popping another balloon, it also results in getting more money from the unexploded balloons, which more

than compensates the previous losses in BART. In other words, the strategy of taking more risks works well in minimizing the pain of loss-averse individuals.

Being such a dynamic model that involves risk-aversion, loss-aversion and possibly probability weights, it was hard to go any further with the current data which are limited by both the sample size and its primary focus. To better understand the dynamics involved in the BART, it might be useful to conduct a within-balloon analysis as well as a between-balloon analysis. In particular, participants providing successive estimates of the likelihood of their next puff popping the balloon may shed some light on whether the gambler's fallacy is driving risk-taking on the BART, and if such behavior is associated with loss-aversion. Future studies should investigate whether the predictive power of the BART for real-life risk-taking stems from the risk-aversion component or loss aversion component, and how much of it is related to probability perceptions. Since the BART simulates real life risk-taking very well, knowing what is involved in the BART or how loss aversion can have different influences for one shot games vs. games with feedback may also shed light on puzzling behavior in real-life.

Chapter 8 – General Discussion

The present dissertation attempted to test a theory of financial decision making under risk and uncertainty as depicted in Figure 1 and 3. While the Figure 3 was not supported, results provided some support for Figure 1 pending modifications as detailed below.

The Effects on Risk-Taking

The effect of self-construal. Recall that Hsee and Weber's (1999) and Mandel (2003) found that interdependent people are more risk-taking, whereas Hamilton and Biehal (2005) did find in their experiments that independent people were more risk-taking. In Study 1, the data pattern resembled that of Mandel's (2003), and in Study 2, my results supported Hamilton and Biehal's (2005) finding that people with independent selves are more risk-taking.

At the surface level, these results seem paradoxical. A closer look, however, reveals once again the importance of defining constructs properly. In particular, there is a need for psychologists to adopt a finer distinction of different types of risk-taking. Specifically, economists use three different terms to demarcate components of risk-taking: risk-seeking, risk-aversion, and loss aversion. Recall that risk-seeking and risk-aversion are defined in terms of the curvature of the value function (Figure 2). By contrast, loss aversion refers to the steepness of the value function, and amounts to exchange rate between gains and losses. In other words, risk-seeking and risk-aversion define risk-taking when one is deciding only in the domain of losses or only in the domain of gains. Loss aversion, on the other hand, plays into the risk-taking behavior when the decision involves a trade-off between gains and losses. Both Mandel (2003) and

Hsee and Weber (1999) investigated risk-taking behavior only in the domain of losses, or only in the domain of gains. Hamilton and Biehal (2005) adopted the risk definition in finance theory in which the amount of risk depends on the both the trade-off between gains and losses as well as the variance of those returns. Analytically, the conception of risk in finance involves both loss aversion of prospect theory as well as the probability function of expected utility theory. My focus in this dissertation was on the utility functions, not the probability functions. Therefore, I can only comment on the utility part. The decision task in my Study 2 was the BART, which had a substantial loss aversion component (see below for a detailed discussion of the nature of task in Study 2), and I replicated the findings of Hamilton and Biehal (2005) that independent people were more risk-taking clearly in Study 2.

To sum up, interdependent people, compared to independent people, seem to be less risk-averse, more risk-seeking, and more loss-averse resulting in different levels of risk-taking depending on the task. In that regard, both Hsee and Weber (1999), and Mandel (2003) on the one hand, and Hamilton and Biehal (2005) on the other, seemed to be correct in respectively saying that interdependent people are more risk-taking, and independent people are more risk-taking. It is only the lack of distinction across different types of risk-taking behavior that makes those results paradoxical. Once one adopts the fine conceptual distinctions of economics, there is no paradox.

The effect of SRF. Previous studies looking at the differences in risk-taking as a function of SRF (Crowe & Higgins, 1997; Friedman & Förster, 2001; 2002; Levine et al., 2000) were doing so indirectly, often without specifying whether tasks dealt with loss or gain. In the present studies, I examined financial decisions explicitly under risk for both

gain situations and loss situations. In contrast to my hypothesis following from the previous findings in other domains, I did not find any significant effects of self-regulatory focus on financial risk-taking in neither Study 1 nor Study 2.

It seems that promotion- and prevention-focus did not necessarily induce differential risk-taking when the decision context is financial even though it did in other non-financial contexts (Crowe & Higgins, 1997; Friedman & Förster, 2001, 2002; Levine et al., 2000). In one known case (Scholer et al., 2010), in which regulatory focus influences financial risk-taking behavior, the value function components are confounded with probability weights of prospect theory. Because Study 1 and Study 2 here did not provide any support for the argument that value function components are influenced by regulatory focus, it seems more likely that the discrepancy in my results and that of Scholer et al. (2010) are driven by probability perceptions-a contention consistent with findings that regulatory focus influences probability perceptions (Kluger, Stephan, Ganzach, & Hershkovitz, 2004)

The effect of decision context. I replicated previously effects of decision context (Kahneman & Tversky, 1979), and found that people were risk-averse under gains and risk-seeking under loss, and that they are generally loss-averse. The replication of the effect of decision context was indicative of the validity of my research paradigm because decision context effects has been established in literature for decades (Kahneman & Tversky, 1979) and has been replicated many times.

I also investigated of the nature of the BART and what type of decision context the BART pertains to. The BART has been being extensively used in literature on risk-taking in different domains (e.g., Fecteau et al., 2007a, 2007b; Fein & Chang, 2008;

Heilman, Crişan, Houser, Miclea, & Miu, 2010) as a measure of risk-taking in general rather than risk-seeking/risk-aversion or loss aversion. However, my results show clearly that it is a loss aversion task as well as a risk-aversion task. That means in all the previous studies utilizing BART as a measure of general risk-taking, what was measured were in fact risk-aversion in the gains domain and loss aversion in the mixed domains. In other words, the samples who were taking more risk were doing so not only because they were less risk-averse but also because they were loss-averse.

Interestingly, loss aversion in Study 1 was positively associated with risk-taking in the BART. Perhaps because loss-averse individuals dislike losses more intensely compared to their liking for the gains, subsequent to encountering a popped balloon they may be correcting their estimation of the likelihood of a balloon popping to a greater degree than less loss-averse individuals. Indeed, loss aversion is associated with greater risk-taking after incurring losses (e.g., Coval & Shumway, 2005; Thaler & Johnson, 1990). This would mean that a future analysis should find that loss-averse individuals would be more likely to take risks after a previous balloon has just popped.

This finding does have implications not only for theory but also for clinical practice. Since the BART predicts many real life behavior such as gambling, stealing (Lejuez et al., 2002), smoking (Lejuez et al., 2003) and alcoholism (Fein & Chang, 2008), if the BART is used as a diagnostic tool or as a preventive tool, one needs to know the processes involved in execution of BART (Bishara et al., 2009). Delineating the components of prospect theory can shed some light on the processes driving risk-taking. If a person is risk-taking because of loss aversion, the intervention would be quite different than risk-taking for the sake of risk-seeking. In the former case, a reduction in

loss aversion would provide ailment whereas in the latter case reduction in risk-seeking would be sought.

For example, in a screening effort, if populations that are more likely to become addicted are identified with the aid of the BART, the interventionist needs to know whether to decrease risk-seeking, or to decrease loss-aversion to help these people. If decreasing the risk-seeking is the goal, i.e., increasing the perceptual sensitivity as to the consequences of risky behavior, then people should be reminded of the benefits forgone by engaging in the risky behavior. Since the BART has little to do with risk-seeking in the domain of losses, it would be little use to remind people of the potential losses incurred by engaging in the risky behavior. If decreasing the loss-aversion is the goal, then a comparison between the gains of not engaging in the risky behavior coupled with the losses of engaging in the risky behavior is in order. Such a comparison, however, should not magnify the losses, because doing so would increase loss-aversion which seems to be associated with greater risk-taking at least in the BART. Especially for existing addicts, it might be more beneficial to trivialize the losses already incurred and instead to focus on the gains of not doing so anymore. To the extent that loss-aversion may be tied to probability estimates, it may also be useful to take advantage of gambler's fallacy. Recall that the gambler's fallacy reflects the tendency to think that the outcome of the next round will be the opposite of what has happened in the past even though the events are independent. Because the gambler's fallacy may be the underlying process that explains the positive relation between loss-aversion and BART, for therapeutic purposes the addicts can be trained in some particular way. Specifically, because nothing too serious has happened up to this point to them, they may be more likely to incur a greater

loss in the near future-irrespective of the actual degree of truth in this statement.

Also at the neurological level, the attempts to show brain regions associated with risk-seeking by using BART studies would be quite misleading without knowing the exact nature of BART. BART is primarily a measure of loss aversion, and secondarily risk-aversion, and the regions associated with loss aversion can be different than the regions associated with risk-aversion and risk-seeking (e.g., Trepel, Fox, & Poldrack, 2005). Since the BART predicts real life behavior (e.g., Lejuez et al., 2003) it is critical to understand the components that the BART is representative of. My Study 1 and Study 2 jointly provide the answer that the BART is about loss aversion and risk-aversion under gains but not risk-seeking under losses.

The effect of incidental and integral fit. This dissertation did not predict any fit effects on risk-taking, and indeed no such effects emerged in Study 2. In Study 1, however, I found under conditions of incidental fit a trend for people to be less risk-averse under gain, to be less risk-seeking under loss, and also to be less loss-averse. People seemed to behave in a way that would maximize their benefit and minimize their loss. In terms of the rational choice model, when experiencing incidental fit, participants seemed to behave more rationally. The reason for this shift in behavior is not entirely clear. It is clear that risk-taking behavior itself is not an immediate reflection of intuitive or systematic thinking per se (e.g., Bechara et al., 1997; Fischhoff et al., 2005; Maner et al., 2007; Raghunathan & Pham, 1999). People who experience fit, that is, independent self-construals primed with promotion-focus, and interdependent self-construals primed with prevention-focus, may differ in their risk-taking behavior either because their intuitive system is very much attuned to the task, or if they are devoting all their

attentional resources to systematic processing. The question of how regulatory fit influences mode of processing is fascinating and will be discussed below. Here, it should be emphasized that no one-to-one relationship between risk-taking and regulatory fit was predicted, neither for incidental nor integral fit. However, the observation that incidental fit might prompt more optimal risk-taking behavior highlights that research has to arrive at a better understanding of the cognitive and motivational processes that are being sparked by regulatory fit.

The implications for cross-cultural research on judgment and decision making. Based on the observation that people who experience incidental regulatory fit make better decisions it is possible to suggest ways to improve decisions for people with different self-construals. Arguably, the decision of people with independent self-construals can be expected to be superior when these decisions focus on their hopes, ideals, and aspirations, rather than duties, obligations and responsibilities. Conversely, the decision of individuals with interdependent self-construals can be expected to be better when their decision involve duties, obligations, and responsibilities, rather than hopes, ideals and aspirations. In brief, whenever there is a non-fit between individual self-construals and self-regulatory focus, the quality of decisions may be of lower quality than under regulatory fit conditions.

Applied to the mortgage crisis in the U.S. in the mid- to late-2000s, it may be suspected that it was partly the result of such a non-fit. On the one hand, people were motivated by the potential profit they expected from buying a house in seemingly ever buoying real estate market, i.e. a promotion-focus. On the other hand, the decision to buy a home for one's family may have evoked in many buyers the interdependent self, rather

than the independent self. It is possible that the situational non-fit between the regulatory focus and self-construal hindered the decision making capabilities of home owners, did not make them see the risk involved and, thus, contributed to the massive foreclosure crisis.

Incidental fit effects may have implications for marketing in different cultures as well. When a particular product is more attractive relative to competing products, then firms may increase their sales by creating advertisement messages that prime the type of self-regulatory focus that is consistent with the prevalent self-construal in a culture. If the product is marketed in China where interdependent self-construals are more salient than independent self-construal, it might be possible to improve sales when messages highlight duties, obligations, and responsibilities. Under these circumstances, it can be expected that people are best in their decision making and are more likely to recognize the superior qualities of the product. If the same product is marketed in the U.S., where independent self-construals are more salient than interdependent self-construals, sales might be improved when advertisement messages highlight hopes, ideals, and aspirations. Again, under conditions of non-fit consumer might be best in their decision making and more likely to choose a superior product. However, when a product qualitatively inferior, then a company might be better-off with messages that are inconsistent with the prevalent self-construal. Under these circumstances potential buyers might be less discerning and thus less focused on the objectively superior qualities.

Regulatory fit, motivational experiences and processing mode

In line with theorizing on feeling right and strength of engagement (e.g., Koenig et al., 2009: Pham & Avnet, 2009), I devised separate measures for feeling right and

strength of engagement. Those measures had very good reliabilities, and factor structures showing that they are indeed separate constructs. Higgins originally theorized that regulatory fit results in feeling right which then gives rise to strength of engagement (Higgins, 2000; Avnet & Higgins, 2006a, 2006b). My findings contrasted with that line of reasoning. Later, Higgins updated his theory by conceptualizing feeling right and strength of engagement as separate processes (Koenig et al., 2009; Higgins & Scholer, 2009). Results of this dissertation were supportive of this theorizing in the sense that both processes could be assessed as distinct constructs. Furthermore, the implicit presumption in theories pertaining to feeling right and strength of engagement that the former is associated with intuitiveness and the latter with systematic thinking was confirmed in my results.

However, regarding the effects of fit on feeling right and strength of engagement, the story was not so straightforward. Recall that Higgins and colleagues (Cesario et al., 2008; Koenig et al., 2009) suggested that the manner fit is induced matters in determining the effects on feeling right and strength of engagement, with feeling right effects looming larger under conditions of incidental fit, and strength of engagement effects looming larger under conditions of integral fit. Pham and Avnet (2009), on the other hand, predicted that people would be more strongly engaged in a task when they are already more involved to start with regardless of the manner fit is induced, and that feeling of rightness would intensify when they were not involved in the task to start with.

My results are more supportive for an alternative explanation that fit may be creating processing fluency. Lee and Aaker (2004) found that under conditions of fit, people reported greater ease of processing, were more successful in a subliminal task, and

were able to generate more arguments. Vaughn also (personal communication, 2010) suggested that fit effects results in fluency and, as a result, both feeling right and strength of engagement increase. Indeed, if fit results in a feeling of subjective ease, the processing mode that would result from this subjective feeling of ease depends on the value associated with that context (Briñol et al., 2006). That is, people are more intuitive if they believe ease is good, but more systematic if they believe ease is bad. Indeed, Vaughn and her students found that regulatory fit can result in stronger task engagement and greater feeling of rightness, when the focus is on enjoyment of the task or when there is no explicit rule on how long to continue a task (Vaughn et al., 2006). It seems that in an amiable context, the processing fluency due to fit can be regarded as good and result in intuitive processing, whereas in a threatening context, the processing fluency due to fit can be regarded as bad and result in systematic processing. In other words, the environment may signal the sufficient and necessary processing mode, and fit may intensify the existing processing mode. Indeed, this contention is consistent with recent research showing the influence of regulatory fit on persuasion varies as a function of situational factors (Lin et al., in press).

In Study 1, I found that the feeling of rightness and strength of engagement was dominated by the decision domain: people were primarily feeling right under gain, and primarily strongly engaged under loss. In Study 2, the decision task consisted of playing for real money, and strength of engagement was stronger than feeling right. These findings suggest that it is not the manner fit is induced that defines the experience of feeling right and strength of engagement but rather the nature of environmental cues as signified by the decision context that guides the primary mode of processing.

It seems that in both Study 1 and 2, the nature of the task can tell people about the current state of affairs. As Schwarz (2002) put it for feelings in general, the decision task can serve as an informational cue signaling that one's environment is safe or not, and that more cognitive resources need to be mobilized or not. In a sense, tasks evoke a mindset that is consistent with the task. When the decision domain is gains, then the result is feeling right. Yet, when people face the possibility of making real money or when the decision domain is losses, then it results in more strong engagement in the task. My results do not support Pham and Avnet's (2009) suggestion that whether fit increases one's strength of engagement depends on one's initial level of task involvement. Likewise, the findings do not support Higgins and colleagues' (Cesario et al., 2008; Koenig et al., 2009) suggestion that feeling right is a consequence of incidental fit, and strength of engagement a consequence of integral fit. Instead, it seems that the classic social psychological interaction of situation by person signals whether the environment is safe and incidental fit enables mobilizing the resources necessary for that particular type of environment.[9]

In that regard, fit effects can be called fluency effects as some other researchers suggested (Lee & Aaker, 2004; Vaughn, personal communication, 2010). As a refinement to this contention, my studies show that decision context influences motivational experiences: when the decision context is gains, the environment is safe and people feel right. When the decision context is losses, the environment is dangerous and

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[9] In the narrow sense, by "situation" I mean the decision context as specified by loss or gain as well as whether the decision task involves real money. By "person" I am referring to the chronic self-construal component of regulatory fit that is created with primes of regulatory focus.

people strongly engage in a task. Likewise, when there are real consequences of behavior, as in Study 2, people are more strongly engaged in the task. An implication of this finding pertains to the manipulation of regulatory focus. Regulatory focus is often experimentally manipulated by focusing participants' attention on either loss or gain (e.g., Higgins et al., 1997; Lee et al., 2000; Levine et al., 2000; Liberman et al., 2001). For example, below are two typical instructions used in manipulating promotion and prevention (Higgins et al., 1997):

> "although we have set the payment at $5 for completion of this part, it is possible to gain $1. If you score above the 70th percentile, that is, if you remember a lot of letter strings, then you will gain $1. However, if you don't score above the 70th percentile, that is, if you don't remember a lot of letter strings, then you will not gain $1." (p. 522).
>
> "although we have set the payment at $6 for completion of this part, it is possible to lose $1. If you score above the 70th percentile, that is, if you don't forget a lot of letter strings, then you won't lose $1. However, if you don't score above the 70th percentile, that is, if you do forget a lot of letter strings, then you will lose $1." (p. 522)

In the above manipulations, the pay-off amount remains equal across different experimental conditions, while only the payoff structure changes. My findings that mode of thinking changes as a function of decision context raises questions about the validity of manipulating SRF by emphasizing either gain or loss. Such manipulations may also manipulate mode of thinking; hence, any successful evocation of promotion-prime and prevention-prime might always be confounded with mode of thought.

Despite the general absence of effect on motivational experiences, regulatory fit seemed to have an influence on the processing mode. In line with dual-process models of social cognition (e.g., Chen & Chaiken, 1999; Epstein et al., 1992), participants in the present studies reported to be processing intuitively more than systematically. In Study 1, paralleling the effects on feeling right and strength of engagement, people appeared to be more intuitive under gain than loss, and more systematic under loss than gain. These findings are consistent with the notion that potential problems in one's environment, such as the possibility of a loss, trigger more effortful processing. Likewise, findings were consistent with a contention that people become even more intuitive under conditions of incidental non-fit. In Study 2, in which real money was involved, regulatory fit did not produce any effects.

I also examined the extent to which experimental effects on risk decisions were mediated by emotions, as well as real constraints on one's risk-taking behavior. Regulatory focus predicted which emotions were taken into account. Cheerfulness related emotions are taken into account under promotion-focus, whereas quiescence related emotions are taken into account under prevention-focus. Higgins et al. (1997) argued that cheerfulness related emotions are more closely related to promotion-focus and quiescence related emotions are more closely related to prevention-focus. My findings are in line with the implications of Higgins and colleagues work (Higgins et al., 1997).

Regarding the influence of regulatory fit, integral fit was not predictive of the degree emotions and reality constraints taken into account. Incidental fit, on the other hand, somewhat predicted the degree of emotions as in Study 2, and reality constraints as in Study 1, taken into account. However, contrary to expectations, the association of

emotions with risk-taking occurred under incidental non-fit, whereas the association of reality constraints occurred for incidental fit. Taken together, the evidence points to incidental fit mobilizing resources necessary for the appropriate process signaled by the decision context (Study 1) but it is not always so very influential when decisions concern real money (Study 2). Indeed, perceptual variations can override the influence of regulatory fit: when the perceived risk in a message is low, regulatory fit influences the persuasiveness of that message, but when the perceived risk is high, it has no influence (Lin et al., in press).

A theoretical framework based on the implications of the present findings is provided in Figure 5, which constitutes a revised model of Figure 1. The integral fit part of Figure 1 was not supported by the empirical evidence, whereas there was some evidence demonstrating effects of incidental fit. According to Figure 5, incidental fit influences both processing mode and the factors that matter in financial decisions. When regulatory fit occurs, people are more likely to process systematically and are more likely to take reality constraints into account in decisions under risk. On the other hand, under non-fit, people are more likely to process intuitively and are more likely to take their emotions into account. If the decisions are consequential, i.e. there is real money involved, then there are no fit effects on the processing mode or the level of risk-taking. Regardless of the presence and absence of real money, incidental regulatory fit does not seem to influence the motivational experiences captured by feeling right and strength of engagement. Feeling right and strength of engagement are, instead, influenced by decision context. When the decision context is gain or when there is no real money involved in the decision task, people tend to feel right and process intuitively. When the

decision context is loss or when there is real money involved in the decision task, people are strongly engaged in the task and they are more likely to process systematically. Overall, the decision context effects seem to be stronger than any incidental fit effects. Note that, while Figure 5 provides an integration of earlier theorizing as well as the findings obtained across the two studies, the specific predictions made by this revised model need to by confirmed in future research.

Limitations and Future Directions

In my studies, I manipulated the self-regulatory focus and measured the self-construals. It would be interesting to see if manipulating self-construals and measuring self-regulatory focus would produce similar results. For researchers interested in cross-cultural variation, it would be even more desirable to devise a measure which can manipulate both self-construals and self-regulatory at the same time. In my pilot studies, I attempted to devise such a tool (see Appendix A). I combined several classic manipulations of self-construal and self-regulatory focus throughout the pilots (Freitas, Liberman, & Higgins, 2002, Study 1; Liberman et al., 1999; Pham & Avnet, 2004; Trafimow et al., 1991, study 1 and 2). Although these techniques were established to produce the desired manipulations in their own domain, they did not work as intended when combined. This can be due to the fact that self-construals and self-regulatory focus are not entirely independent (Elliot et al., 2001; Lee et al., 2000; Lockwood et al., 2005).

People with independent selves are more likely to have a promotion-focus and less likely to have a prevention-focus, whereas people with interdependent selves are more likely to have a prevention-focus and less likely to have a promotion-focus. Therefore, manipulation of one of them can influence the other as well (Zhang & Mittal,

2007). There was, indeed, evidence of such cross-construct priming in the pilot studies. This can be a desirable property when one is interested in studying the relation between the two, but it leads to statistical problems when the interest is on interaction effects as well as the main effect of each one of them on other dependent variables. My approach in Study 1 and 2 of measuring one and manipulating the other is not immune to this statistical as well as conceptual difficulty. Although I speak about the fit between chronic self-construals and the manipulated self-regulatory focus, it is possible that the manipulation of self-regulatory focus leads to a temporary shift in the self-construals as well. Yet, because I measured self-construals before administering self-regulatory focus manipulations, I can speak about the fit between chronic self-construals and primed self-regulatory focus. To assess this possibility of the fit between temporary shifts in self-construals as well as regulatory focus, future studies can manipulate one construct first, and measure the other afterward. Yet, under such a circumstance the distinction between what is chronic and what is a temporary state blurs. In other words, if, by manipulating promotion-focus, we also lead to a temporary shift in self-construals, what we measure after the manipulation would reflect partly chronic self-construal and partly acute self-construal.

At a methodological level, measuring one construct and manipulating the other is a standard procedure in the regulatory fit literature (e.g., Lee, et al., 2000, Study 1; Zhang & Mittal, 2007, Study 2). Because the regulatory fit literature measures fit or non-fit without specification of the degree of fit (e.g., Koenig et al., 2009; Lee & Aaker, 2004), I split the participants into two groups based on median value for self-construal measures. I argue that because self-construals and SRF have a linear relationship (e.g., Lee et al.,

2000; Lockwood et al., 2005), a liberal bias, such as suggested by Maxwell and Delany (1993) is unlikely. However, the loss of information by condensing continuous variables into dichotomies poses a conservative bias threat such that some effects, although present, perhaps were not detected because of the decreased statistical power compared to employing a regression model with interactions (West, Aiken, & Krull, 1996). However, the state of regulatory fit theory is such that there is no antecedent theoretical development to date that would enable interpretation of degrees of fit. There is either fit or non-fit, but nothing in between (e.g., Appelt et al., 2007; Cesario et al., 2004). As a result, I employed the median split to keep up with the theory and practice in regulatory fit literature. Future research should explore how a degree of fit theory can be developed.

It would be interesting to see what the future holds for a theory of degrees of fit. Yet, until then, it can also be useful to make use of the continuous nature of the chronic self-construals and self-regulatory focus in regulatory fit research in a different way. Specifically, since the regulatory fit theory is still being developed, one can look at the lowest and highest 25^{th} percentile on these constructs in an attempt to obtain a clearer picture of what fit effects are precisely. Indeed, when self-regulatory focus is compatible with self-construals, the effects of either of them on the dependent variables should be strengthened. Although it is an artificial simplification, it may guide in the progress of regulatory fit literature.

A different question is whether we may be influencing the psychological states of interest simply by measuring them. It is quite possible that participants are constructing a picture of themselves while answering those questions. It is also possible that an item may have a primacy or recency effect thereby becoming the salient concept. The

particular words used in a question, the number of points on a rating scale, the labeling of those points with words or numbers, and many other question attributes can influence the distribution of responses and their reliability and validity (e.g., Krosnick, 1999; Tourangeau & Rasinski 1988). In physics, there is the concept of collapsing the wave function by observing it (Kaku, 2005): One creates reality by just observing it. If such a possibility exists in physics, it is conceivable that we may be changing psychological states by just measuring them. Fortunately, this limitation is not specific to my studies. It is not even specific to psychology. It is a measurement problem that pertains to all science. The only methodological remedy to it is replication in social sciences (e.g., Campbell & Fiske, 1959). Therefore, future studies should attempt to replicate the present findings using different manipulations, different measures, different tasks, or in other words using different paradigms.

Another area for future exploration can be utilizing different samples. Because the primary goal of the present experiments was to investigate causal mechanisms underlying decision making, the representativeness of my samples was of secondary concern. Nevertheless, it certainly limits the generalizability of the present findings. I cannot ascertain that other people having different living circumstances would respond in a similar fashion. In my studies, I had student samples as well as the more varied MTurk sample. I have found several differences between samples. Yet, without an additional controlled study it is impossible to tell whether the observed differences were due to MTurk sample being paid, or it possessing some other peculiarity. What one may conclude based on data, however, is that the differences between student samples and MTurk samples were not due to the latter answering randomly or due to not being

engaged in an online experiment. If anything, MTurkers seemed to take the tasks more seriously than student samples as evidenced their higher self-reported engagement in the task as well as the higher percentage of them responding to the SRF manipulations. Recall that Pham and Avnet (2009) suggested that regulatory fit results in greater strength of engagement when people were already involved in the task. In the present studies, MTurk sample always received money. To the extent that money increases involvement, sample effects found still sustains the possibility that initial degree of involvement may matter-though not with regards to the fit effects. Future studies using different samples and involvement manipulations besides money can answer those questions.

Across two studies, I tested financial decision making under gain, loss, and mixed situations. However, in only Study 2 and only for dynamic situations I tested my hypotheses using real money. It would have been interesting to see if similar conclusions would follow or would even be strengthened if my Study 1 could have been run with real money. Researchers varying the presence of material incentives found little or no systematic effects on choices among risky gambles (Beattie & Loomes, 1997; Camerer & Hogarth, 1999). Further, the findings in Study 2 were not vastly different from those in Study 1. Yet, it is still possible that different results would have been found if real money had been used in Study 1.

Because I was trying to create integral fit, I varied the decision context between participants. This limited the ability to estimate loss aversion as specified in prospect theory, i.e., λ (Kahneman & Tversky, 1979). To estimate λ I need to know the risk-aversion and risk-seeking tendencies separately for gains and losses, as well as the responses to the mixed gambles. That is, because, in a mixed gamble, the preferences

depend on all those three factors, even after controlling for the probability. In other words, to evaluate a mixed gamble in terms of the utility, one needs to estimate the utility of the gain component on the scale of gains, utility of the loss component on the scale of losses, and then convert gain scale into loss scale via loss aversion coefficient. Because I was interested in creating regulatory fit, I limited myself to between subjects design. If I were to use a repeated measures design, then all participants would be exposed to gain, loss, and mixed gamble excluding the possibility of investigating integral regulatory fit between SRF and decision context. When the focus is on loss aversion, it would be desirable to have a within subjects design to delineate the more precise effects pertaining to mixed gambles. Importantly, one has to acknowledge that actual behavior in the financial decision making under risk as a function of regulatory focus depends not only on risk-aversion, risk-seeking, and loss aversion but also probability weighting functions (Kluger et al., 2004). Self-construals, too, seem to change the perceptions of probability (e.g., Lau & Ranyard, 2005). It is a question whether fit effects would lessen differences in the distortion in probability perceptions as it did in value functions in my studies.

Although the self-regulatory focus primes did not produce any changes in risk-taking behavior in my studies, it is known that promotion-focus and prevention-focus entails differential sensitivity to gains and losses (e.g., Avnet & Higgins, 2006a, 2006b; Cesario et al., 2004; Idson et al, 2000). Therefore, the differential sensitivity of promotion and prevention-focused individuals to gains and losses can still be the underlying psychological mechanism behind dynamic loss aversion (Barberis et al., 2001). Dynamic loss aversion is an investor's tendency to become less loss-averse after a gain, and more loss-averse after a loss. We know that people's regulatory focus is temporarily

manipulated by emphasizing gains or losses (e.g., Higgins et al., 1997; Liberman et al., 1999). We also know that different investment opportunities trigger distinct promotion or prevention orientations (Zhou & Pham, 2004). It can be that the focus on newly acquired gains may shift investor's regulatory focus more toward promotion, and as a result make them more sensitive to gains and less sensitive losses. This increased sensitivity to gains coupled with decreased sensitivity to losses, in return, may make them less loss-averse than the previous state. Likewise, a focus on the newly experienced loss may shift people's regulatory focus more toward prevention, and as a result make them more sensitive to losses, and less sensitive to gains. The change in sensitivity to gains and losses may make them more loss-averse than before. Yet, as Study 1 results show, alluding to gain and loss also changes one's mode of thinking. It is for the future research to find out if it is indeed the change in promotion and prevention-focus or the shifts in processing mode that underlies the dynamic loss aversion.

In my studies, the financial decisions pertained to the self, i.e., they did not have repercussions for others. For the individual on his/her own, the fit seems to be beneficial in the sense that it leads to choices that maximizes the monetary outcomes. In other words, fit leads to organism pursuing its best interest. Yet, when individuals interact with each other or when they are making decisions that impact the society at large, it is doubtful that singularly focusing on self-interest would bring the best outcome. For example, if each of the players in a Prisoner's dilemma chooses what seems like the best option for themselves without any concern for the other, both players end up in less than ideal situations (e.g., Axelrod, 1984). The classic public goods problem or the tragedy of commons (Hardin, 1968) is laden with the same problem: if each individual tries to

maximize their own individual gain, the public resource they are sharing would be depleted. In my research, I found that fit brings out the best decisions for the individual. Whether fit would bring out the best decisions for all is a research question to be explored. Until then, I cannot say that when people experience fit, they choose the evolutionarily optimal solution. Based on my studies, I can only say that fit seems to bring out the best financial decisions for the individual in isolation.

A related question is how people would behave if they were making decisions for their ingroup, for example, their family? Would regulatory fit again lead to the financially most optimum solution? Likewise, how people would behave if they were making decisions for somebody else, i.e., they were agents? The agency problem in management stems from the fact that managers are agents pursuing their best interest which may not sync with the best interest of the shareholders. As an owner of a firm, would it be better to create an environment for managers in which they would experience regulatory fit, or regulatory non-fit? It is possible that because regulatory fit is a pleasant experience, as I found in my studies, people may be at their best in terms of prosocial organizational behavior (e.g., George, 1991). However, it is also possible that people, under fit, would be even better at pursuing their own interest sometimes at the expense of others.

At a more epistemological level, one needs to raise a critical question on the validity of dichotomizing intuitive and systematic thinking (e.g. Kruglanski & Thompson, 1999). Specifically, evidence supports that the default mode of thinking is intuitive, and the appropriate mode of thinking is signaled by the decision context. To some extent, the quality of decisions is positively influenced by incidental fit. Whereas systematic thinking sometimes resulted in better decisions as in Study 1, sometimes it

resulted in worse decisions as in Study 2. What is systematic or intuitive thinking then, besides being categories?

Reliance on intuitive mode of thinking does not necessarily result in bad choices (e.g., Bryant, 2007; Gigerenzer & Goldstein, 2011). Indeed, thinking too much can sometimes result in bad choices (e.g., Wilson & Schooler, 1991). Tests of the bounded rationality model of Gigerenzer (Gigerenzer & Todd, 1999) show that people learn via experience the associations which are not necessarily causal in any way but still have high ecological validity. It may be that fit enables one to choose the appropriate mode (that is, either necessary or sufficient mode depending on the demands of the situation) and draw on those ecologically valid associations as needed. People are adaptive decision makers and can rely on the optimal mode for processing under different conditions (Gigerenzer & Goldstein, 2011). Indeed, people do sometimes rely on their emotions not because they are intuitive per se but because they find their feelings more diagnostic (e.g., Pham & Avnet, 2004). What is deemed more relevant is weighted more heavily in judgment and choice (Tversky, Sattath, & Slovic, 1988). In fact, feeling and reasoning are parallel processes, which inevitably inform and complement each other (e.g., Epstein et al., 1996; Slovic et al., 2004). The brain does not seem to make a distinction between the two: the regions that are responsible for systematic thinking are also strongly connected with areas responsible for experience of emotions (Banich & Compton, 2011). When the brain does have the distinction between intuitive and systematic thinking, the owner of that brain suffers the consequences (Bechara & Damasio, 2005; Bechara et al., 1997; Tranel et al., 2002). Perhaps, the dichotomy of intuitive versus systematic thinking as the benchmark of good decisions is not as useful analytical tool as it once was thought.

Systematic or intuitive thinking can result in good or bad decisions depending on the context. A more useful approach in pursuing knowledge can be asking instead what leads to a good decision. Regulatory fit theory, albeit in its infancy, seems to be a promising candidate in future to shed some light on this enduring question.

Epilogue

The theoretical foundation on which I based my studies on rests on a variety of concepts. Some of these concepts were confirmed in previous studies focusing on the specific individual construct but they were not tested in a process model as I did. Some of them were only partially resolved, and some were only speculative based on other findings or theories as I described in detail in Chapters 4 and 5 while explaining the rationale for my studies. In my research, I was able to replicate what was known (e.g., people are loss-averse), suggest ways to reconcile some of those controversies (e.g., interdependent people being financially more risk-taking under gain or loss, but less risk-taking when faced with a mixed gamble because of differences in risk-aversion, risk-seeking and loss aversion), and provide new insights (e.g., feeling right incorporates feelings of certainty specific to the task and it is separate from strength of engagement). However, foremost, this dissertation added more controversies rather than definitive answers (e.g., incidental fit seem to create a fluency effect, whereas decision context may be govern the mode of thinking). The difficulty lies not only in developing a theory based on mostly unresolved conflicts in literature but also in testing the entire model. Specifically, both studies relied on priming self-regulatory focus and measuring everything else. A more refined approach would be to select different aspects of the model and conduct a specific test of this aspect rather than taking on the task of testing all

of the model at once.. For example, although I found correlational associations between feeling right and intuitiveness, it would be necessary to manipulate the feeling right itself to establish a causal relation between the two. In other words, future studies should perhaps take a step by step approach in testing different theories, and should launch a study on a component of a theory only after the preceding component is identified distinctly.

Nonetheless, risk-taking, even in academics, has its own allure. Undertaking this dissertation was risky for it was an attempt to account for many of the controversies laden in existing literature. Being a process theory that relies on a range of theoretical assumptions and findings from different literatures, it was a high risk project because if any one of the intermediary processes did not pan out, the theory in Figure 1 would not be supported. Yet, one may surmise that it is only this kind of risk-taking that allows big advances to emerge.

This project reminds me of a puzzle called Eternity back in the 1990s. Some of the pieces in Eternity may fit well to each other and perhaps form the correct parts of the big picture. However, it was only when all the pieces complement each other seamlessly Eternity could be solved. Trying to solve eternity was a very risky and laborious process in that most of the solutions tried were bound to fail. Still, something about Eternity (and perhaps the £1 million prize) motivated people to attempt to solve it. Eventually, two Cambridge mathematicians solved it. In the present project, not everything was supported and, alas, there was no £1 million prize attached to my theory. Yet, all in all, the challenge posed by the many controversies in diverse literatures across academic disciplines made it a worthwhile endeavor.

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Appendix A: Paradigm Development and Pilot Studies

Because previous research has not manipulated the incidental fit between SRF and self-construal simultaneously, the goal of the pilot studies was to develop a suitable method for doing so. By varying SRF (promotion versus prevention-focus) as well as manipulating self-construal (independent versus interdependent self) simultaneous, it should be possible create incidental regulatory fit for the combination of promotion-independence and prevention-interdependence as well as regulatory non-fit for the combinations of promotion-interdependence and prevention-independence.

The challenge in creating such a manipulation is that self-construals and SRF are empirically correlated. That is, people with independent selves are more likely to have a promotion-focus and less likely to have a prevention-focus, whereas people with interdependent selves are more likely to have a prevention-focus and less likely to have a promotion-focus (e.g., Lee et al., 2000; Lockwood et al., 2005). Therefore, a manipulation aimed at varying independence-interdependence might "spill over" into altering prevention-promotion-focus as well, and vice versa (Lee et al., 2000; Zhang & Mittal, 2007). A sequential approach to priming each of the two dimensions (e.g., priming prevention-promotion first before priming independence-interdependence) may thus not be sound. Given that priming always creates a temporary shift in mindset, it is possible that the last manipulation may simply override the initial one. Similarly, it is conceivable that the effectiveness of the second manipulation is altered by the first one. The result is cross-contamination of priming effects (Lee et al., 2000; Zhang & Mittal, 2007). To avoid these types of problems, I decided to manipulate self-construal and SRF simultaneously rather than sequentially (see also Aaker & Lee, 2001). That is, I created

experimental conditions that are specific to the four possible combinations of the independence-interdependence and prevention-promotion-focus. This simultaneous priming has a better chance at producing the desired effects. Indeed, this type of simultaneous priming approach has been used successfully by Aaker and Lee (2001) to induce integral fit versus non-fit.

There are various priming methods established in the literature to manipulate either self-construal or SRF. These methods can be generally classified according to the level of participation required from the subjects. One approach is passive: participants are asked to read different passages that are ostensibly part of a different study than the main study (e.g., Trafimow et al., 1991, Study 2) or researchers embed the manipulation within the instructions to the task (e.g., Higgins et al., 1997). The other approach is active: participants are asked to work on a task in which they themselves generate the prime, for example, by brining to mind relevant material (e.g., Brewer & Gardner, 1996; Freitas et al., 2002; Higgins et al., 1994; Trafimow et al., 1991, Study 1). The pilot studies combined both the passive and active methods to simultaneously prime both constructs.

In Pilot Study 1, I embedded the manipulations in the instructions, in a passage (passive approaches), and then the structure of the responses required (active approach). In Pilot 2 and 3, I embedded the manipulations in the instructions, and the structure of the task. In all pilot studies, I primed SRF (prevention versus promotion) and self-construal (independent versus interdependent) in a between-groups design.

Following the manipulations, I measured self-construal and self-regulatory focus to see if the manipulations produced a corresponding shift in self-reports of the primed constructs, as some other manipulations produced such effect son individual difference

measure of self-construals (e.g., Gardner et al., 1999; Trafimow et al., 1997). The goal was to generate a tool to create incidental regulatory fit that could be employed prior to the decision making task. Finally, I assessed the mode of thinking to see if self-construal and SRF primes produce shifts in self-reports of intuitive and systematic thinking. Self-report on these scales have been shown to be predictive of actual modes of thinking (e.g., Epstein et al., 1996). Yet, it was possible that actual modes of thinking to be not reflected in self-reported chronic preferences of mode of thinking.

Pilot Study 1

In the first pilot study, I asked participants to make factual judgment about a passage they read, and then circle the appropriate response. My goal was to combine both the active and passive approaches to manipulating self-construal and SRF, and create a single tool to manipulate the incidental fit that occurs between the two.

Method.

Participants. A total of 70 undergraduates at the University of Nevada, Reno (34 females, 31 males, 5 unreported) participated in the study in exchange of credit in various introductory psychology and sociology courses. Previous studies with similar manipulations of independence and interdependence (e.g., Trafimow et al., 1991) yielded an effect size of $d = .36$. The effect of SRF manipulations on self-report measures of SRF is roughly the same (cf. Pham & Avnet, 2004). In order to detect such an effect with the significance level set to $\alpha = .05$ (two sided) 246 participants are required. Yet, effect sizes depend on a number of different factors, including the sensitivity of the task and the population (e.g., Oyserman & Lee, 2008 for a review of the independence-interdependence priming literature). However, in this pilot study it was more important to

observe that the manipulations trended in the right direction, with statistical significance being only secondary. Therefore, a sample of 70 participants was considered sufficient.

Procedure. This pilot study took place in class at the end of class period. Participants completed a questionnaire on their own. Upon completion, they were provided with additional details about the purpose of the study.

The questionnaire first assessed participants' age, sex, and ethnicity. Following that, the questionnaires differed according to experimental conditions. Half of the participants were assigned to the promotion-focus condition, and half were assigned to prevention-focus condition. Likewise, and half were assigned to independent, and half was assigned to interdependent self-construal. Following the manipulations, the questionnaires were the same in both of the experiments: the participants filled out the measurements for SRF, self-construal, and mode of thinking measures.

Manipulations. In order to manipulate the self-construals and SRF, the Sostoras prime of Trafimow, Triandis, and Goto (1991) for self-construals was combined with that of Freitas, Liberman, and Higgins (2002, Study 1) for SRF. Specifically the instructions read:

> "Below you will read a passage about a warrior. Once you have read the passage you will be presented with a series of sentences on the next page. You will be invited to judge whether a sentence has appeared in the below text. You will be asked to *detect AUTHENTIC (COUNTERFEIT)* sentences and mark them for *ACCEPTANCE (REJECTION*). If a sentence *has* appeared in the below text, you will be asked to *ACCEPT* the sentence. Otherwise *do NOT accept* the sentence (If a sentence *has not* appeared in the below text, you will be asked to *REJECT* the

sentence. Otherwise *do NOT reject* the sentence)."

Following this, they were presented with the passage about a warrior from Trafimow, Triandis, and Goto (1991). The passage either presents individualist reasons or familial reasons for selecting a general. After reading the passage, participants were shown four sentences from the passage where two of them were slightly changed and asked to either detect counterfeit sentences and mark them for rejection or to detect the authentic sentences and mark them for acceptance. The specific sentences selected to be shown to participants are always those that vary according to the self-construal manipulations, not from the generic first part of the passage. By using both the SRF and the self-construal manipulation both in passive priming and active priming, I hoped to strengthen both of the manipulations.

Dependent variables. The participants first filled out the self-construal measure, measure, followed by the SRF measure.

Self-construals. Independent and interdependent self-construals were assessed by measure of Singelis (1994) which consists of a 12-item independence scale and a 12-item interdependence scale .The reliabilities were good: Cronbach's $\alpha = .783$ for interdependence and Cronbach's $\alpha = .762$ for independence. Pearson's r between the two scales was .146, $p = .225$. A sample item in Singelis for independent self construal is "I enjoy being unique and different from others in many respects," whereas for interdependent self construal is "It is important for me to maintain harmony within my group." The participants responded on a scale from 1-strongly disagree to 7-strongly agree.

Self-regulatory focus. The self-regulatory focus was measured by Higgins et al.'s

(2001) Regulatory Focus Questionnaire (RFQ). In contrast to a similar measure by Lockwood, Jordan, and Kunda (2002), its factor structure is explicitly reported by Higgins et al. (2001). Also the RFQ is widely used in the literature, enabling wider comparison across studies (e.g., Camacho, Higgins, & Luger, 2003; Semin, Higgins, de Montes, Estourget, & Valencia, 2005; Strauman et al., 2006). A sample item for promotion in Higgins et al.'s RFQ is "I feel like I have made progress toward being successful in my life," whereas that for prevention is "Not being careful enough has gotten me into trouble at times." Participants responded on a seven-point scale ranging from 1- not at all true of me to 7- very true of me just as they did for the Singelis scale. The reliabilities were again good: Cronbach's $\alpha = .722$ for promotion and Cronbach's $\alpha = .757$ for prevention. Pearson's r between the two scales was .115, $p = .338$.

Mode of thinking. Lastly, the differences in systematic and intuitive thinking styles were assessed using the short form of the Rational-Experiential Inventory (REI; Epstein et al., 1996). There five items each to tap system 1 and system 2 thinking. As sample item for system 2 thinking is "I prefer complex to simple problems," and a sample item of system 1 thinking is "I believe in trusting my hunches" on a scale from 1- completely false to 7- completely true. The Cronbach's α was .746 for system 2 thinking and .871 for system 1 thinking. The correlation was Pearson's $r = .120$, $p = .324$.

Results.

When individual differences measures of independence, interdependence, promotion and prevention were subjected to 2 (Self-construal prime: Independence versus Interdependence) x 2 (SRF prime: Promotion versus Prevention) ANOVA, none of the effects were significant, all Fs < 1.47, ps > .23, although the same individual

difference measures were shown to be sensitive to situational variation elsewhere (see e.g., Oyserman & Lee, 2008 for a meta-analysis).

Given the sample size, however, I was interested in whether the manipulations produced mean differences in the right direction regardless of whether they were significant. Self-reported promotion-focus was higher following the promotion manipulation than following the prevention manipulation (M = 4.67, SD = 0.94 vs. M = 4.41, SD = 1.02; η_p^2 = .015). Yet, self-reported prevention-focus seemed unaffected by the regulatory focus manipulation (M = 3.57, SD = 1.37 vs. M = 3.54, SD = 1.02; η_p^2 = 0).[10]

Experimental manipulations of self-construal produced unexpected effects. Self-reports of individual difference measure of interdependent self-construals were higher following the independence manipulation than the interdependence manipulation (M = 4.64, SD = 0.84 vs. M = 4.56, SD = 0.84; η_p^2 = .003). Conversely, self-reports of individual difference measure of independent self-construals were slightly higher following the interdependence manipulation than the independence manipulation (M = 4.93, SD = 0.76 vs. M = 4.88, SD = 0.84; η_p^2 = .001). Because this aspect of the manipulation did not support the validity of the priming procedure, no further analysis was carried including possible effects on mode of thinking.

There was also evidence for cross-construct priming with small effect size, such that the independence prime produced a greater promotion-orientation as measured by

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[10] A partial eta squared of .015 corresponds to a Cohen's d = .25. Applying Cohen's categorization of effect sizes, this is a small effect.

RFQ than interdependence prime (M = 4.57, SD = 1.06 vs. M = 4.52, SD = 0.90; η_p^2 = .001), and vice versa for prevention-orientation (M = 3.35, SD = 1.10 vs. M = 3.78, SD = 1.31, η_p^2 = .035). The SRF experimental manipulation caused medium amount of changes in the individual difference self-construal measures with promotion prime resulting in greater independence and interdependence measure than prevention prime (M = 5.08, SD = 0.75 vs. M = 4.70, SD = 0.81 for independence; η_p^2 = .059, and M = 4.65, SD = 0.87 vs. M = 4.54, SD = 0.80 for interdependence; η_p^2 = .006).

Pilot Study 2

Because the manipulations in Pilot Study 1 were not successful, it was necessary to try a different manipulation. The type of manipulation in Pilot Study 1 required participants to read a passage and then circle a response. In Pilot Study 2, I employed a different manipulation in which more involvement on the part of participants is required. Specifically, to generate a prime with construct validity, the manipulations required participants to think and write sentences in line with the instructions.

Method.

Participants. As in Pilot Study 1, because my goal was to explore if the manipulations work at the trend level, there were 62 participants. They were undergraduates from University of Nevada, Reno. They participated in the study in exchange of credit in various introductory psychology and sociology courses. No record with regard to identities of participants was kept in order to assure confidentiality.

Procedure. The experiment took place at the end of course sessions. Participants were distributed questionnaires, and filled them on their own. Upon completion, they were provided with additional details about the study.

The questionnaires began with asking their age, sex, and ethnicity. Following that, the questionnaires differed according to experimental conditions. Half of the participants were assigned to promotion-focus, and half was assigned to prevention-focus. Likewise, and half was assigned to independent, and half was assigned to interdependent self-construal. Following the manipulations, the rest of the experiment, including the dependent measures, was the same as the Pilot Study 1.

Manipulations. In order to manipulate the self-construals and SRF, this time another prime from Trafimow et al. (1991) was combined with that of Pham and Avnet (2004). Trafimow et al. (1991) asks participants to think about either what makes them different from their family and friends (independent self-construal prime) or what they have in common with their family and friends (interdependent self-construal prime). This manipulation has been shown to be effective both in Trafimow et al. study (1991), and in other studies (e.g., Kühnen, Hannover, & Schubert, 2001).

A classic manipulation for prevention and promotion-focus is asking participants to describe either their current hopes and goals and how they differed from their hopes and goals as they were growing up (promotion-focus manipulation), or their current sense of duty and obligations and how they differed from their sense of duty and obligations as they were growing up (prevention-focus manipulation) (e.g., Higgins et al., 1994; Liberman et al., 1999). In a successful variation of this task, Pham and Avnet (2004) ask participants to list two of their past and two of their current hopes, aspirations and dreams (promotion prime), or duties, obligations, and responsibilities.

In the present study, the prime of Trafimow et al. (1991) was combined with that of Pham and Avnet in an attempt to develop a tool to manipulate both the SRF and the

self-construals. Specifically, the participants were instructed to think about and list two of either their past and current hopes, aspirations and dreams (promotion prime) or their duties, obligations, and responsibilities (prevention prime) that are different from that of their families (independent prime) or that are common with their families (interdependence prime). For example, a participant in independent/prevention prime condition received the following instructions:

> "Please think about your duties, obligations, and responsibilities that are different from the duties, obligations, and responsibilities of your family and friends. In the space provided first list two of your past duties, obligations, and responsibilities, and then list two of your current duties, obligations, and responsibilities that are different from that of your family and friends."

Results.

When individual difference measures of Independence, Interdependence, Promotion and Prevention were subjected to 2 (Self-construal prime: Independence versus Interdependence) x 2 (SRF prime: Promotion versus Prevention) ANOVA, none of the effects were significant, all Fs < 1.18 ps > .40. Given the sample size, however, I was again interested in detecting trend level effects. This time, SRF manipulations resulted in opposite effects than intended, with promotion prime, compared to prevention prime, producing a lesser chronic promotion score as measured by RFQ (M = 4.64, SD = 0.72 vs. M = 5.34, SD = 2.41; η_p^2 = .037), and prevention prime, compared to promotion prime, producing a lesser chronic prevention score as measured by RFQ (M = 3.26, SD = 1.26 vs. M = 3.54, SD = 1.03; η_p^2 = .015). Independent self-construal prime, compared to interdependent self-construal prime, resulted in smaller score on chronic independent

self-construal measure (M = 5.01, SD = 0.71 vs. M = 5.14, SD = 0.77; η_p^2 = .009), and there were no effects on chronic interdependent self-construal measure (M = 4.65, SD = 0.64 vs. M = 4.68, SD = 0.22 for independence versus interdependence prime; η_p^2 = 0). Because the manipulations did not support the validity of the priming procedure, no further analysis was carried including possible effects on mode of thinking.

There was also evidence for cross-construct priming, such that the independence prime produced a greater chronic promotion-focus as measured by RFQ than interdependence prime (M = 5.24, SD = 2.37 vs. M = 4.72, SD = 0.81; η_p^2 = .022), and vice versa for chronic prevention-focus as measured by RFQ (M = 3.24, SD = 1.11 vs. M = 3.56, SD = 1.18, η_p^2 = .020). Likewise, the SRF experimental manipulation caused changes in the chronic self-construal measures. Promotion prime resulted in greater chronic interdependent self-construal score than prevention prime (M = 4.78, SD = 0.72 vs. M = 4.54, SD = 0.83; η_p^2 = .019) and vice versa for chronic independent self-construal score (M = 4.98, SD = 0.65 vs. M = 5.17, SD = 0.81; η_p^2 = .024). The finding that the effects were opposite of the predicted direction suggests that the effects were perhaps not random but the result of primes being too strong. In Pilot 3, a remedy to this possibility was explored.

Pilot Study 3

According to dual-process models, sometimes people overcorrect their responses when they become aware that they were unduly influenced (e.g., Petty & Wegener, 1999). In Pilot Study 2, the manipulations seemed to produce opposite effects than intended raising the possibility that participants may be correcting their responses to the regulatory focus questionnaire and individualism-collectivism questionnaire due to the

awareness of the influence of the preceding manipulations. Participants being asked about obligations (or ideals) that are different from (or same as) their friends and family might have experienced reactance when they were immediately asked again to provide answers pertaining to the same topic in the manipulation check phase. Therefore, in Pilot Study 3, the effectiveness of manipulations was not assessed right after the manipulations but after a delay during which participants worked on a financial decision-making task.

Method.

Participants. There were 66 participants (44 Females, 22 Males). Two of the participants did not complete the study, thus leaving 64 participants for analysis. The participants were undergraduates from University of Nevada, Reno. They participated in the study in exchange of credit in various introductory psychology and sociology courses. No record with regard to identities of participants was kept in order to assure confidentiality.

Procedure. The experiment took place in classes at the end of course sessions. Participants completed the questionnaires, and, if they so desired, learned additional details about the study.

The questionnaires began with asking their age, sex, and ethnicity. The manipulations were identical to those in Pilot Study 2. However, this time another task followed the manipulations: the decision making task. It took about 5 minutes to work on the decision task. The participants were presented with two types of financial decision tasks involving risk, which are modeled after Hsee and Weber (1999). One type of tasks represented a loss situation and one type of tasks a gain situation. Half of participants received first the loss-tasks and the other half received first the gain-tasks. Because order

did not produce any effects, it was not included in the analysis reported below. Following this, the differences in self-construals, regulatory focus and systematic and intuitive thinking styles were assessed.

Results.

First, individual difference measures of independence, interdependence, promotion and prevention were subjected to 2 (Self-construal prime: Independence versus Interdependence) x 2 (SRF prime: Promotion versus Prevention) ANOVA. None of the effects were significant, all *F*s < .99. Given the sample size, however, I was again interested in detecting trend level effects. Paralleling the results in Pilot Study 2, promotion prime, compared to prevention prime, producing a lesser chronic promotion score as measured by RFQ (*M* = 5.13, *SD* = 0.88 vs. *M* = 5.21, *SD* = 1.11; η_p^2 = .002), although this time prevention prime, compared to promotion prime, producing greater chronic prevention score as measured by RFQ (*M* = 4.28, *SD* = 1.37 vs. *M* = 4.12, *SD* = 1.22; η_p^2 = .003). Independent self-construal prime, compared to interdependent self-construal prime, resulted in greater score on chronic independent self-construal measure (*M* = 4.90, *SD* = 0.50 vs. *M* = 4.80, *SD* = 0.58; η_p^2 = .009), but also greater score on chronic interdependent self-construal measure (*M* = 4.78, *SD* = 0.69 vs. *M* = 4.54, *SD* = 0.71; η_p^2 = .031). Because the manipulations did not support the validity of the priming procedure, no further analysis of experimental effects was carried including those possible on mode of thinking. There was little evidence for cross-construct priming even with the liberal standard employed in pilot studies.

Individual Difference Analysis of Risk-Taking

As alluded to above, participants in Pilot Study 3 worked on a financial decision

making task that involves risk under gain and loss. I included these questions to test if self-construal and SRF has an effect on degree of risk-taking.

Recall that according to Hypotheses 1 and 2 both of self-construal and SRF should affect the risk-taking tendencies. The questions to assess risk-taking were taken after Hsee and Weber (1999). The gain-task is about money won in a lottery, and the loss task is about paying a fine for a traffic violation. The participants were presented with one set of gain and one set of loss questions, i.e., they were presented with both gain questions and loss questions in counterbalanced order. Specifically they were given the following instructions for the gain and loss sets of questions, respectively: "Suppose that you bought a lottery ticket a week ago. You are now informed that you have won and have been given two options of how to receive the money" and "Suppose that you violated a traffic rule and hurt somebody a week ago. You are now informed that you will be fined and have been given two options of how to pay the fine."

In each set, there were seven iterative scenarios each offering two options, a sure option and a risky option. Under the sure option it is certain that the person will gain (lose) money. Under the risky option the flip of a coin will determine if the individual will gain nothing (lose nothing) or if the individual will gain (lose) a sure amount. The probabilistic gain or loss amount is $1000. The order of gain and loss questions was counterbalanced.

Across the seven iterations the amount of money in sure option steadily increases: Participants first made a choice between gaining $200 for sure and gaining $1000 with a probability of .5, then on the second iteration they made a choice between gaining $300 for sure and gaining $1000 with a probability of .5. The sure

amount increased gradually in that way up to $800. The loss condition was the opposite: the sure amount started at $800 and decreased to $200 in increments of $100. Specifically, when responding to the gain task, participants read; “You bought a lottery ticket a week ago. You are now informed that you have won and have been given two options of how to receive the money: Option A and Option B.” Participants in responding to the loss task read: “You violated a traffic rule and hurt somebody a week ago. You are now informed that you will be fined and have been given two options of how to pay the fine: Option A and Option B.” Then, under both gain and loss, participants read: “Now, each scenario below describes the amount that you will pay by picking one of the options. Read each scenario and check the option you would like to pick in that scenario: A or B?”. Following this, the 7 scenarios below were presented for the gain condition (for the loss condition the word “receive” was replaced by “pay”:

Scenario 1:

____ Option A: Flip a coin; receive $0 if it is heads, or $1000 if it is tails.

____ Option B: Receive $200 for sure.

Scenario 2:

____ Option A: Flip a coin; receive $0 if it is heads, or $1000 if it is tails.

____ Option B: Receive $300 for sure.

Scenario 3:

____ Option A: Flip a coin; receive $0 if it is heads, or $1000 if it is tails.

____ Option B: Receive $400 for sure.

Scenario 4:

____ Option A: Flip a coin; receive $0 if it is heads, or $1000 if it is tails.

____ Option B: Receive $500 for sure.

Scenario 5:

____ Option A: Flip a coin; receive $0 if it is heads, or $1000 if it is tails.

____ Option B: Receive $600 for sure.

Scenario 6:

____ Option A: Flip a coin; receive $0 if it is heads, or $1000 if it is tails.

____ Option B: Receive $700 for sure.

Scenario 7:

____ Option A: Flip a coin; receive $0 if it is heads, or $1000 if it is tails.

____ Option B: Receive $800 for sure.

Choices made on these iterative scenarios serve as the risk-aversion/risk-seeking measure by enabling calculation of certainty equivalents. Certainty equivalency denotes the sure amount people should feel indifferent toward when comparing it to a gamble with a probabilistic payoff. The certainty equivalent amount, in return, enables computation of degree of risk-aversion and risk-seeking, i.e., α, which is the curvature of utility functions of money for gains and losses. I calculated the certainty equivalence as the mid-point of the shift between the risky and the sure option. For instance, if a participant chose the risky option up until when the sure option was $400, but then chose the sure option once the sure amount reached $500, then the certainty equivalent of gaining $1000 with a probability of .5 for this person was equal to $450. The operational relation between certainty equivalence and risk-taking is such that the higher the absolute certainty equivalence amounts are, the greater the risk-taking in the domain of gains is,

and the lesser the risk-taking in the domain of losses is. The certainty equivalent amounts were used in computation of curvature of the utility functions as described below.

Next, I adopted a power function such that $u(x) = x^{\alpha}$ for gains and, $u(x) = -(-x)^{\alpha}$ for losses (e.g., Abdellaoui et al., 2008; Tversky & Kahneman, 1992). The "x" was the certainty equivalents of $1000, α was the curvature of the utility functions to be estimated. I set the probability at .5.[11] When $\alpha = 1$, the utility function is linear, and people are risk-neutral. When the curvature of the utility function is linear, people are indifferent between gaining, for example, $500 for sure and gaining $1000 with a probability of .5. When $\alpha < 1$, people are risk-averse in the domain of gains, and risk-seeking in the domain of losses. When curvature of the utility function is less than 1, then people prefer to gain (lose) a sure amount less than the half of the probabilistic amount, for example, less than $500 when the alternative is a gamble with .5 probability of gaining (losing) $1000. When $\alpha > 1$, people are risk-seeking in the domain of gains, and risk-averse in the domain of losses. When the curvature of the utility function is greater than 1, people prefer to gain (lose) sure amount more than the half of the probabilistic amount, for example, more than $500 when the alternative is a gamble with .5 probability of gaining (losing) $1000. For risk-neutral people the subjective value of gaining or losing money is equal to its objective value. For risk-averse people subjective value is less than its objective value and for risk-seeking people subjective value is greater than its objective value. Since the higher α mean opposite risk-taking tendencies under gain and

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[11] I did not estimate the weighting functions, because the focus was on the α.

loss, and decision domain was a within subject factor, it was necessary to separately analyze gain and loss. The estimation method of Hsee and Weber (1999) was not employed here because it goal of present study was to bridge the gap between psychology and economics literature and the calculation method employed by Hsee and Weber (1999) does not lend itself to a direct classification of people as risk-averse and risk-seeking unless a second transformation is made on the values to find the cut-off point.

Because the experimental primes did not produce valid changes in measures of self-construal and SRF, I did not look at effects of experimentally created incidental fit on risk-taking. Therefore, I relied on measures of self-construal and SRF to assess possible fit effects on risk-taking. In order to be in line with regulatory fit literature which measures fit or non-fit without specification of the degree of fit (e.g., Koenig et al., 2009; Lee & Aaker, 2004), I split the participants into two based on median value for both SRF and self-construal measures. Median split has the disadvantage of loss of information reflected as a conservative bias in detecting effects as well as possibility of finding spurious correlation when two or more continuous variables have non-linear relationships (Maxwell & Delany, 1993). Under these circumstances employing a regression model with interactions can produce most accurate results (West et al., 1996). However, in case of the interaction between self-construals and SRF, it is established that the relationship between the two is linear (e.g., Lee et al., 2000; Lockwood et al., 2005). Therefore, a liberal bias is unlikely. The loss of information still poses a threat in the sense that median split reduced the power of analysis in detecting an existing effect. However, the regulatory fit is such that there is no antecedent theoretical developments to date that would enable interpretation of degrees of fit. There is either fit or non-fit, but nothing in

between. As a result, I employed a median split in keeping with established practice in the regulatory fit literature (e.g., Appelt et al., 2007; Cesario et al., 2004). Because order had no effects, the analysis reported below did not include it as a factor.

Subjecting the risk-taking index for gains and losses separately into the 2 (Self-construal median split: Independence versus Interdependence) x 2 (SRF median split: Promotion versus Prevention) ANOVA, I found that the effect of SRF median split was significant for gains, $F(1, 60) = 9.34$, $p = .014$, $\eta_p^2 = .136$, but not for losses, $F < 1$. Under the gain context, when people were chronically more promotion-focused compared to when they were chronically more prevention-focused, they were more risk-taking ($\alpha = 0.61$ vs. $\alpha = 0.96$). That is, when given the choice between a sure option and a lottery with the same expect values, promotion-focused individuals were more likely to choose the lottery compared to the sure option. No other effects were significant, all $F < 1.82$. The fact that there were no effects for loss context was challenging to explain the results with prospect theory. Therefore, a close examination of responses to loss context was necessary.

This of the data showed that 51 participants out of 64 were risk-averse under loss--contrary to the findings of prospect theory. Prospect theory makes the prediction that people are risk-seeking under loss. However, in my data as well as in those reported by Hsee and Weber (1999), people appear to be risk-averse under loss.[12] Because the

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[12] Because Hsee and Weber (1999) applied a discontinuous computation method, where they had seven scenarios but converted the responses to 8-point scale, it was not possible to compute a precise cut-off point to determine risk-aversion vs. risk-seeking. However, even if a liberal standard of 4 as the cut-off point is adopted, in 3 conditions out of 4 under the loss scenarios, their participants had scores lower than 4, i.e., the majority was risk-averse under loss as well-a result in contradiction to the prospect theory.

scenarios used to assess loss were about avoiding paying a fine for a traffic violation, rather than simple lotteries without any story line, participants may be basing their decisions not only on the monetary amounts but also whether to pay a fine or not. In other words, the ticket scenarios may have introduced a moral decision in addition to the financial decision. In the gain condition, on the other hand, the scenarios, which were about money won in a lottery, were closer to what is usually used on economics literature: gambles. Because the preludes to the financial decision-making task seem to introduce noise to the assessments, I decided not use the stories preceding the financial decision task, but rather use the more typical gamble tasks.

Individual Difference Analysis of Mode of Thinking

Similar to analysis of risk preference in the previous section, a correlational approach to analyzing implications of self-construal and SRF for mode of thinking is adopted. Because the sample sizes in all the pilots were small, I decided to combine all the data from pilots to see if the measured self-construal, the regulatory focus, and the fit between the two had any association with mode of thinking. For that purpose, I assembled a combined-file consisting of data from all the pilot studies, then subjected the system1 and system 2 thinking as measured by self-reports on the REI, into 2 (independence-interdependence median split) x 2 (promotion-prevention median split) factorial design. The effects for system 1 thinking (intuitive thinking) was not significant, all $F < 1$. Unlike previous studies (e.g., Aaker & Maheswaran, 1997; Pham & Avnet, 2004), however, I found effects on system 2 thinking (systematic thinking): independence, compared to interdependence, was associated with greater systematic thinking, $F(1, 194) = 4.36$, $p = .038$, $\eta_p^2 = .022$, and promotion, compared to prevention-

focus was associated with greater systematic thinking too, $F(1, 194) = 4.67$, $p = .032$, $\eta_p^2 = .023$. Yet, there was no interaction effect, $F(1, 194) = 0.84$, $p = .36$, $\eta_p^2 = .004$. In other words, the incidental fit produced no effects on mode of thinking.

In summary, the self-report measure of preference of mode of thinking, i.e., REI, did not show the hypothesized fit effects. However, the REI assesses preferences for different modes of thinking (Epstein et al., 1996), and it does not tap operational shifts in mode of thinking. For the purpose of the pilot study it was assumed that temporary shifts in thinking modes might translate into temporary shifts in the preferences of different thinking modes. Although no effects of fit were found on the REI, it is still possible that temporary shifts in modes of thinking did occur without them being reflected in the REI. Yet, this does not mean that temporary shifts in thinking modes are not accessible to self-reports at all. Therefore, for the main studies I decided to generate self-report measures of thinking mode that inquired about the specific approach that participants used on a task, i.e., items focusing on short-term retrospective reports of one's actual experiences when working on a task rather than general preferences.

Summary of the Pilot Studies and the Paradigm used in the Main Studies

As discussed in the introduction to this appendix, the sequential approach to priming self-construal and self-regulatory focus is not desirable because of the cross-contamination effects between the two. Therefore, the pilot studies were an attempt to generate a paradigm in which self-construal and self-regulatory focus can be manipulated simultaneously. However, there were suggestions of cross-construct priming effects. Therefore, for the main studies I decided to use a paradigm that is more established in the literature, such that one construct is assessed as individual differences and the other

construct is varied experimentally (e.g., Lee et al., 2000, Study 1; Zhang & Mittal, 2007, Study 2). Regulatory fit is created when a particular individual, e.g., with independent self-construal, is primed a corresponding self-regulatory focus, e.g., promotion priming. Regulatory non-fit occurs when an individual of the same kind is primed with the non-corresponding self-regulatory focus, e.g., a person with an independent self-construal is receives a prevention-focus prime. This basic paradigm is described in the Chapter 5.

Appendix B: Study 1 – Offline Materials

SELF-DESCRIPTIONS

Dear participant,

Thank you very much for participating in this research. The purpose of this study is to investigate how personality characteristics influence decision making. Specifically, we are interested in the way you describe yourself, which we assess using a variety of different questionnaires. You will also be asked to work on a decision making task and answer questions about your experience. Additional questions will address the circumstances of your present life situation as well as demographic characteristics.

Your participation will take about 20 minutes of your time. Your participation is completely voluntary and you may refuse to participate or withdraw from the study at any time without penalty. Also, your participation is confidential. Only the Department of Health and Human Service, National Science Foundation, and the University of Nevada, Reno Social Behavioral Institutional Review Board may inspect the study records. You will not be personally identified in any reports or publications that may result from this study.

There may be no direct benefits or known risks to you as a participant in this study. However, society and the social science community may gain a better understanding of how personality characteristics influence decision making processes. If you participated in this study to earn SONA credit, you will earn one (1) Social Research Participation Credit. If you are an Amazon MTurk worker, you will receive 50 cents,

If you have questions about this study please contact Dr. Markus Kemmelmeier at (775) 784-1287 [markusk@unr.edu], or Irem Uz, MA, MBA, at (775) (775-682-7973) [irem@unr.edu] at any time. You may ask about your rights as a research subject or you may report (anonymously if you so choose) any comments, concern, or complaints to the University of Nevada, Reno Social Behavioral Institutional Review Board, telephone number (775) 327-2368, or by addressing a letter to the Chair of the Board, c/o UNR Office of Human Research Protection, 205 Ross Hall / 331, University of Nevada, Reno, Reno, Nevada, 89557.

If you consent to participate in this research study, please proceed to the next page.

For statistical purposes, we would like you to provide us with some demographic information:

AGE: _____years
SEX: ___male ___female
MAJOR: _____
GPA:_____
ETHNICITY:

a. Asian American
b. Alaskan/Native American
c. African American
d. Caucasian
e. Hispanic
f. Other: _____

Are you an American citizen? __yes ___no

SELF-CONSTRUAL ASSESSMENT:

We would like to learn how you would describe yourself. We would like to know how much you personally agree or disagree with each of these statements. Please enter the number that comes closest to your own response in the space provided.

Strongly disagree 1 2 3 4 5 6 7 **Strongly agree**

___ 1. I have respect for the authority figures with whom I interact.

___ 2. It is important for me to maintain harmony within my group.

___ 3. My happiness depends on the happiness of those around me.

___ 4. I would offer my seat in a bus to my professor.

___ 5. I respect people who are modest about themselves.

___ 6. I will sacrifice my self-interest for the benefit of the group I am in.

___ 7. I often have the feeling that my relationships with others are more important than my own accomplishments.

___ 8. I should take into consideration my parents' advice when making education/career plans.

___ 9. It is important to me to respect decisions made by the group.

___10. I will stay in a group if they need me, even when I'm not happy with the group.

___11. If my brother or sister fails, I feel responsible.

___12. Even when I strongly disagree with group members, I avoid an argument.

___13. I'd rather say "No" directly, than risk being misunderstood.

___14. Speaking up during a class is not a problem for me.

___15. Having a lively imagination is important to me.

___16. I am comfortable with being singled out for praise or rewards.

___17. I am the same person at home that I am at school.

___18. Being able to take care of myself is a primary concern for me.

___19. I act the same way no matter who I am with.

___20. I feel comfortable using someone's first name soon after I meet them, even when they are much older than I am.

___21. I prefer to be direct and forthright when dealing with people I've just met.

___22. I enjoy being unique and different from others in many respects.

___23. My personal identity independent of others is very important to me.

___24. I value being in good health above everything.

PROMOTION PRIME:
In this survey we are interested in how people's standards change over time. We would like to invite you to think about your hopes, aspirations and dreams as you were growing up. In the space provided please briefly list two of your hopes, aspirations and dreams in the past.

Past
1. _____
_____
2. _____
_____

Now please think about your *current* hopes, aspirations and dreams, and list two of your *current* hopes, aspirations and dreams.

1. _____
_____
2. _____
_____

PREVENTION PRIME:

In this survey we are interested in how people's standards change over time. We would like to invite you to think about your duties, obligations, and responsibilities as you were growing up. In the space provided please briefly list two of your duties, obligations, and responsibilities in the past.

Past
1. _____
_____
2. _____
_____

Now please think about your *current* duties, obligations, and responsibilities, and list two of your *current* duties, obligations, and responsibilities.

Current
1. _____
_____
2. _____
_____

LOSS CONDITION (the dollar amount counterbalanced):

In the following questions, you will be presented with a series of hypothetical gambles. In each gamble, you will be asked to pick up between two options. Option 'a' will be flipping a coin, and option 'b' will be a sure amount. Please review each gamble and choose the option that you would prefer if you were faced with such a gamble.

In each of the gambles, which option would you prefer: option a or b?

Gamble 1: Choose a or b. I would rather…

a. Flip a coin; lose $0 if it is heads, or lose $1000 (2000 or 4000) if it is tails.
b. Lose $200 (400, or 800) for sure.

Gamble 2: Choose a or b. I would rather…

a. Flip a coin; lose $0 if it is heads, or lose $1000(2000 or 4000) if it is tails.

b. Lose $300(600, or 1200) for sure.

Gamble 3: Choose a or b. I would rather…

a. Flip a coin; lose $0 if it is heads, or lose $1000(2000 or 4000) if it is tails.

b. Lose $400(800 or 1600) for sure.

Gamble 4: Choose a or b. I would rather…

a. Flip a coin; lose $0 if it is heads, or lose $1000(2000 or 4000) if it is tails.
b. Lose $500 (1000 or 2000) for sure.

Gamble 5: Choose a or b. I would rather…

a. Flip a coin; lose $0 if it is heads, or lose $1000(2000 or 4000) if it is tails.

b. Lose $600(1200 or 2400) for sure.

Gamble 6: Choose a or b. I would rather…

a. Flip a coin; lose $0 if it is heads, or lose $1000(2000 or 4000) if it is tails.

b. Lose $700 (1400 or 2800) for sure.

Gamble 7: Choose a or b. I would rather…

a. Flip a coin; lose $0 if it is heads, or lose $1000(2000 or 4000) if it is tails.

b. Lose $800 (1600 or 3200) for sure.

GAIN CONDITION (the dollar amount counterbalanced):

In the following questions, you will be presented with a series of hypothetical gambles. In each gamble, you will be asked to pick up between two options. Option ‘a’ will be flipping a coin, and option ‘b’ will be a sure amount. Please review each gamble and choose the option that you would prefer if you were faced with such a gamble.

In each of the gambles, which option would you prefer: option a or b?

Gamble 1: Choose a or b. I would rather…

a. Flip a coin; gain $0 if it is heads, or gain $1000(2000 or 4000) if it is tails.

b. Gain $200 (400 or 800) for sure.

Gamble 2: Choose a or b. I would rather…

a. Flip a coin; gain $0 if it is heads, or gain $1000(2000 or 4000) if it is tails.

b. Gain $300 (600, or 1200) for sure.

Gamble 3: Choose a or b. I would rather…

a. Flip a coin; gain $0 if it is heads, or gain $1000(2000 or 4000) if it is tails.

b. Gain $400(800, or 1600) for sure.

Gamble 4: Choose a or b. I would rather…

a. Flip a coin; gain $0 if it is heads, or gain $1000(2000 or 4000) if it is tails.

b. Gain $500(1000, or 2000) for sure.

Gamble 5: Choose a or b. I would rather…

a. Flip a coin; gain $0 if it is heads, or gain $1000(2000 or 4000) if it is tails.

b. Gain $600 for sure(1200, or 2400).

Gamble 6: Choose a or b. I would rather…

a. Flip a coin; gain $0 if it is heads, or gain $1000(2000 or 4000) if it is tails.

b. Gain $700 (1400, or 2800) for sure.

Gamble 7: Choose a or b. I would rather…

a. Flip a coin; gain $0 if it is heads, or gain $1000(2000 or 4000) if it is tails.

b. Gain $800 (1600, or 3200) for sure.

MIXED CONDITION (the dollar amount counterbalanced):

In the following questions, you will be presented with a series of hypothetical gambles. In each gamble, you will be asked to pick up between two options. Option ‘a’ will be flipping a coin, and option ‘b’ will be a sure amount. Please review each gamble and choose the option that you would prefer if you were faced with such a gamble.

In each of the gambles, which option would you prefer: option a or b?

Gamble 1: Choose a or b. I would rather…

a. Flip a coin; gain $2000(1000, or 4000) if it is heads, or lose $2500(1250, or 5000) if it is tails.

b. Get $0 for sure.

Gamble 2: Choose a or b. I would rather…

a. Flip a coin; gain $2000(1000, or 4000) if it is heads, or lose $2000(1000, or 4000) if it is tails.

b. Get $0 for sure.

Gamble 3: Choose a or b. I would rather…

a. Flip a coin; gain $2000(1000, or 4000) if it is heads, or lose $1200(600, or 2400) if it is tails.

b. Get $0 for sure.

Gamble 4: Choose a or b. I would rather…

a. Flip a coin; gain $2000(1000, or 4000) if it is heads, or lose $800(400, or 1600) if it is tails.

b. Get $0 for sure.

Gamble 5: Choose a or b. I would rather…

a. Flip a coin; gain $2000(1000, or 4000) if it is heads, or lose $550 (275, or 1100) if it is tails.

b. Get $0 for sure.

Gamble 6: Choose a or b. I would rather…

a. Flip a coin; gain $2000 (1000, or 4000) if it is heads, or lose $400 (200, or 800) if it is tails.

b. Get $0 for sure.

Gamble 7:

a. Flip a coin; gain $2000(1000, or 4000) if it is heads, or lose $250(125, or 500) if it is tails.

b. Get $0 for sure.

The following question all refer to the choices in the preceding decision making task that you just completed.

FEELING RIGHT:

1. As you were completing this task about decision making, how did it feel?

It felt wrong	1	2	3	4	5	6	7	**It felt right**

2. How certain were you feeling when you were doing the task?

Not at all certain	1	2	3	4	5	6	7	**Completely certain**

STRENGTH OF ENGAGEMENT:

3. How interested were you in the task?

Not at all interested	1	2	3	4	5	6	7	**Very much interested**

4. How engaging was the task?

Not at all engaging	1	2	3	4	5	6	7	**Very much engaging**

MODE OF THINKING:

5. How much mental effort did you invest in the task?

No effort at all	1	2	3	4	5	6	7	**A great deal of effort**

6. To what extent did you pick up an option based on its intuitive appeal?

Not at all	1	2	3	4	5	6	7	**A great deal**

7. To what extent did you evaluate the options in a systematic step-by-step manner?

Not at all	1	2	3	4	5	6	7	**A great deal**

8. To what extent did you just pick an option based on your hunches?

Not at all	1	2	3	4	5	6	7	**A great deal**

9. To what extent did you do any numerical calculations while making your decisions on this task?

Not at all	1	2	3	4	5	6	7	**A great deal**

10. To what extent did you pick up the option that comes to your mind first?

Never	1	2	3	4	5	6	7	**Always**

FEELINGS:

Please indicate below on a scale from 1 to 7 how you feel *right now*.

1. How happy are you ***now***?

Not at all 1 2 3 4 5 6 7 **Extremely**

2. How tense are you ***now***?

Not at all 1 2 3 4 5 6 7 **Extremely**

3. How discouraged are you ***now***?

Not at all 1 2 3 4 5 6 7 **Extremely**

4. How relaxed are you ***now***?

Not at all 1 2 3 4 5 6 7 **Extremely**

5. How certain are you ***now***?

Not at all 1 2 3 4 5 6 7 **Extremely**

6. How agitated are you ***now***?

Not at all 1 2 3 4 5 6 7 **Extremely**

7. How sad are you ***now***?

Not at all 1 2 3 4 5 6 7 **Extremely**

SIZE OF FINANCIAL NETWORK (counterbalanced):

The following questions ask about people in your environment who provide you with help or support.

How many people can you count on to console you when you are very upset? ___

How many people can you really count on to help you if you needed financial help or material support? ____

SOCIOECONOMIC VARIABLES:

A goal of the present study is to find out the extent people take into account their own socioeconomic factors while making financial decisions under risk. You were asked to make a hypothetical financial decision in the preceding pages. We will be linking the responses of that financial decision task to the answers provided below.

Your family's socioeconomic status:

a. Upper class
b. Upper middle class
c. Lower middle class
d. Working class
e. Lower class

Your total yearly income before taxes: $_____

Do you have any dependents, i.e., people who rely on your financial support for living?
___Yes ___No

If Yes, how many dependents do you have? ___

What is the amount of money you have at your disposal to spend on leisurely activities this week: $_____

How do you support yourself? Check all that apply.

a. I work for living
b. I rely on financial support of my parents or relatives
c. Scholarship or grant money
d. Loans

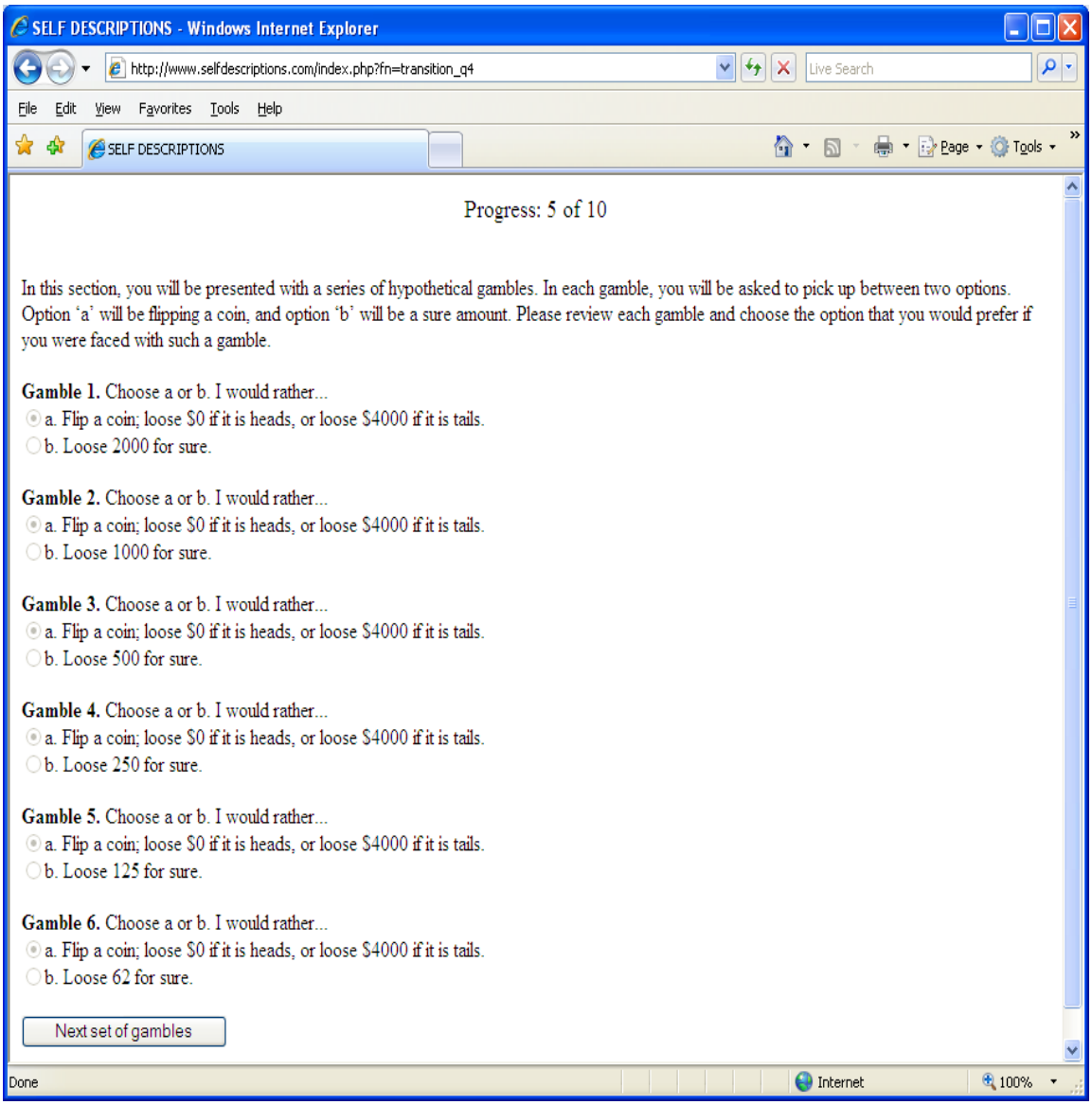
We will be conducting another experiment, which involves the opportunity to earn real money. If you would like to be invited for that experiment, please provide your email in the space provided below:
Your email: _____

Thank you very much for your participation in this study.

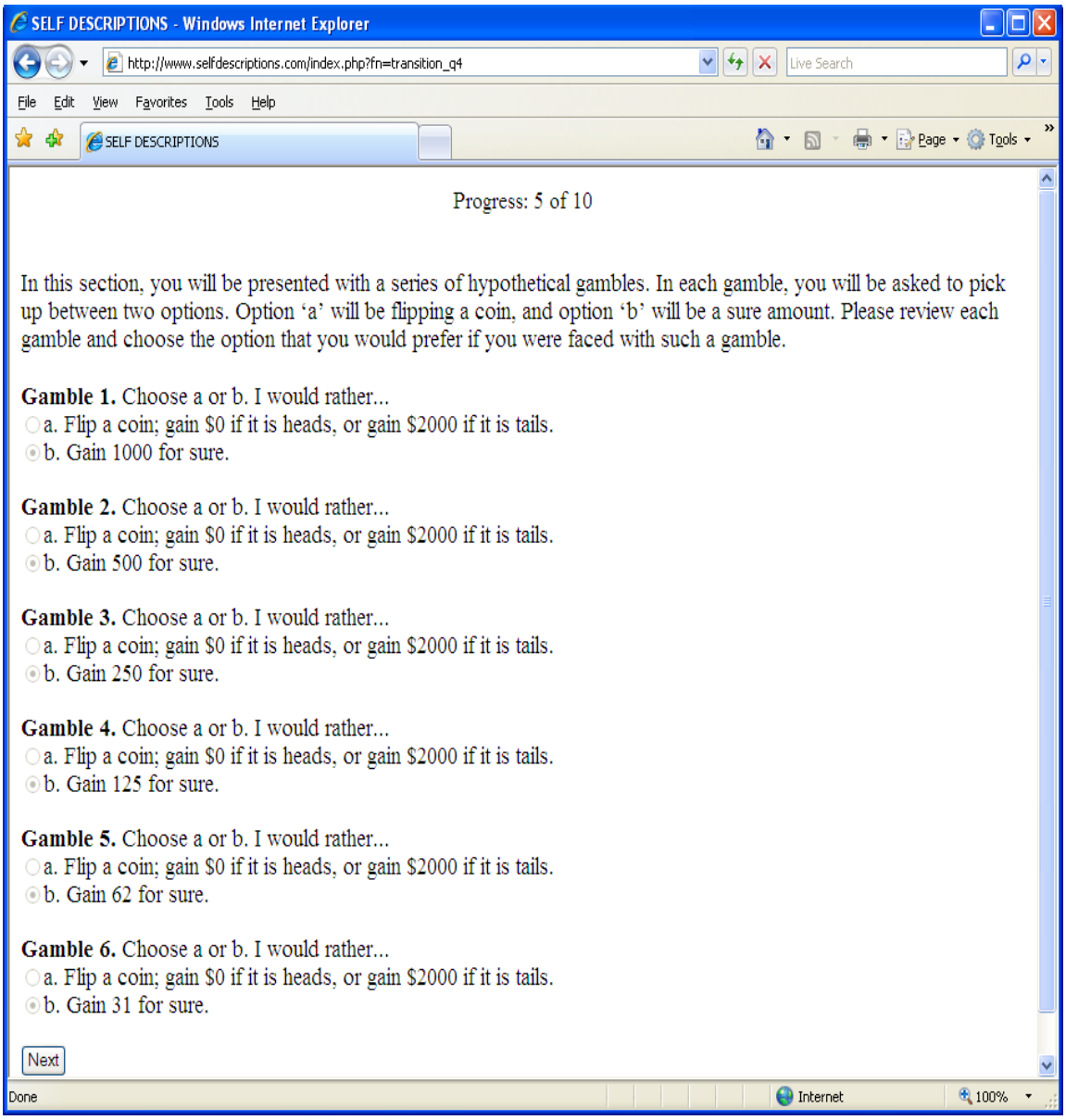
Appendix C: Study 1 – Screenshots of the Online Decision Task

From www.selfdescriptions.com

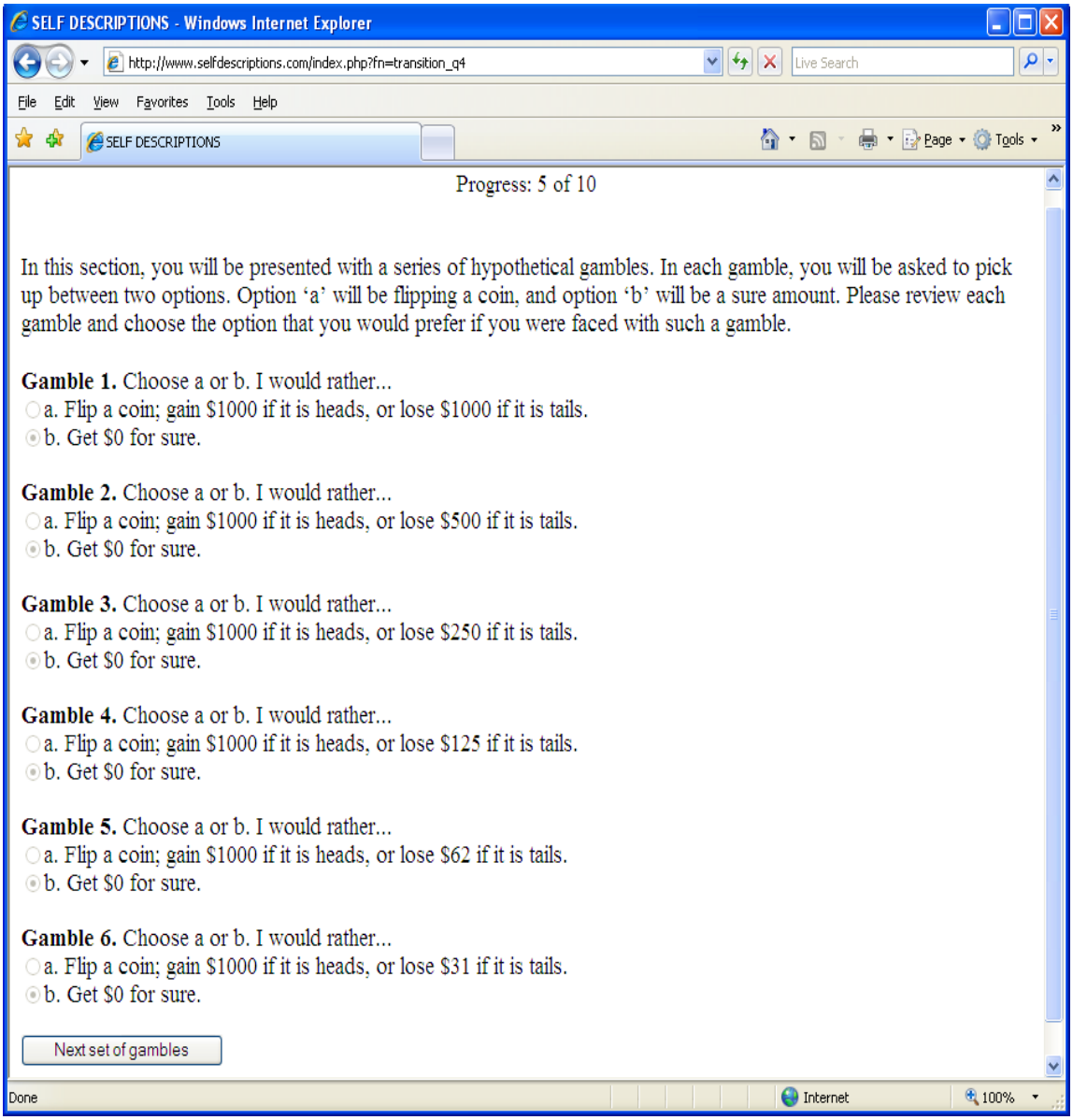
LOSS CONDITION (sample for $4000)



GAIN CONDITION (sample for $2000):



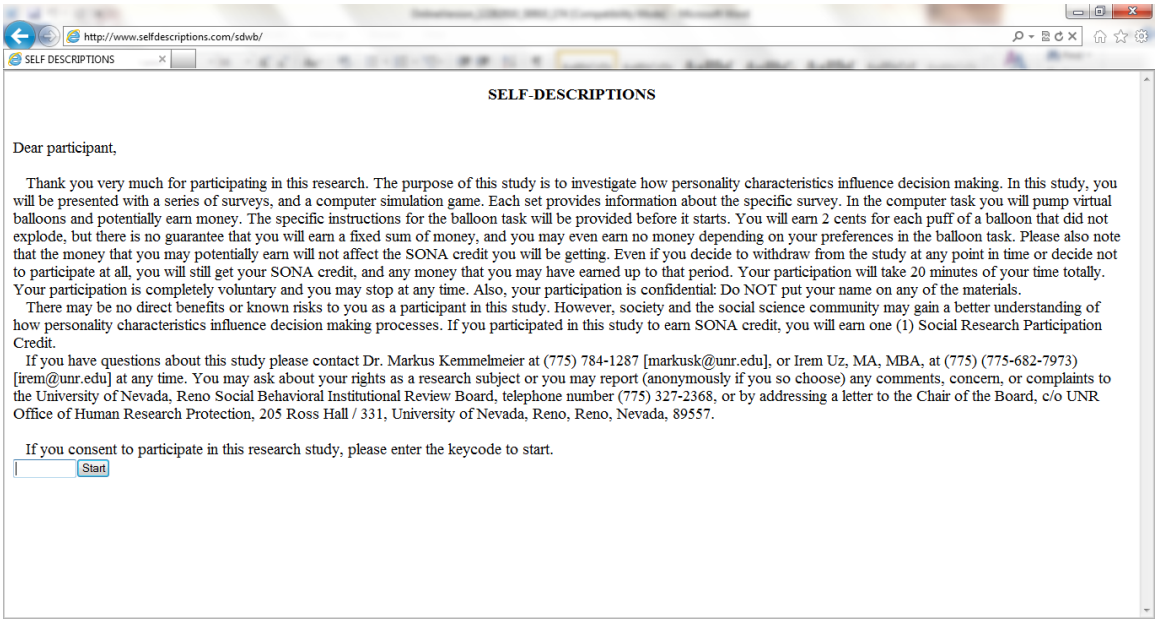
MIXED CONDITION (sample for $1000)



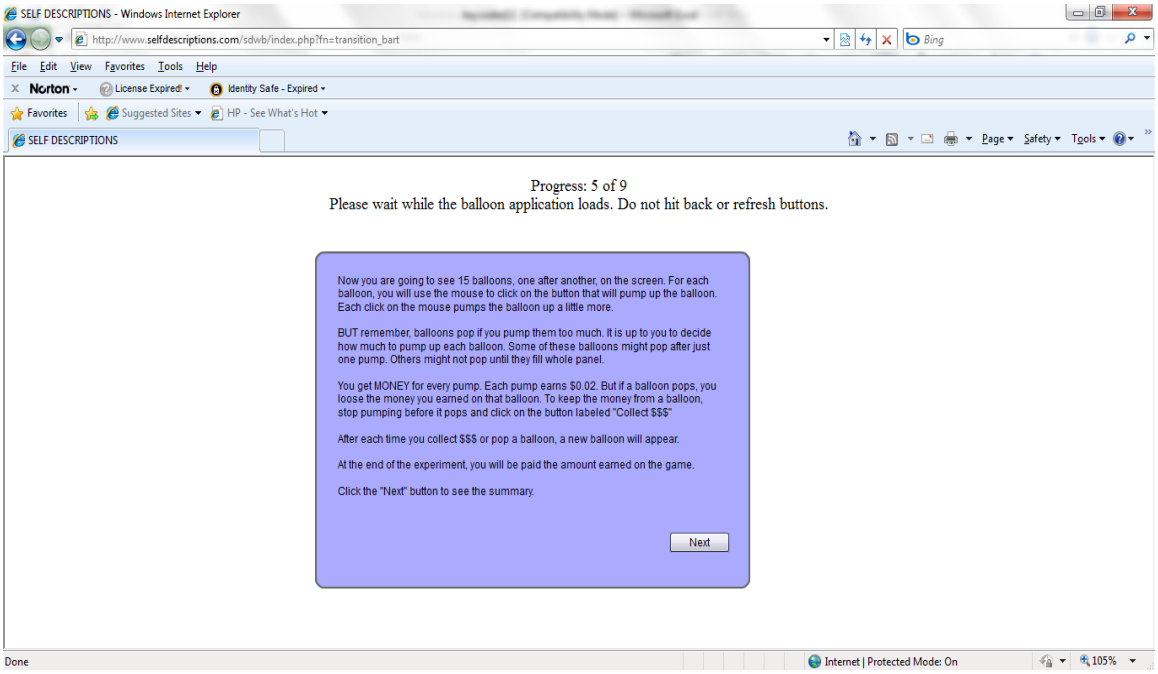
Appendix D: Study 2 – Screenshots for Parts that are Different from Study 1

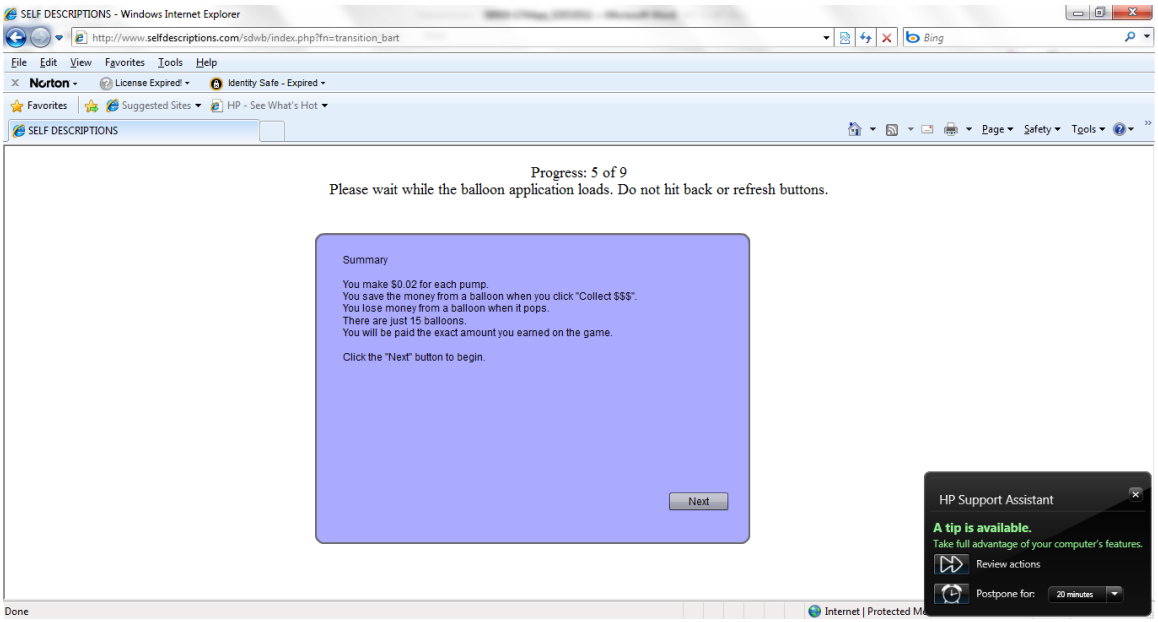
From www.selfdescriptions.com/sdwb

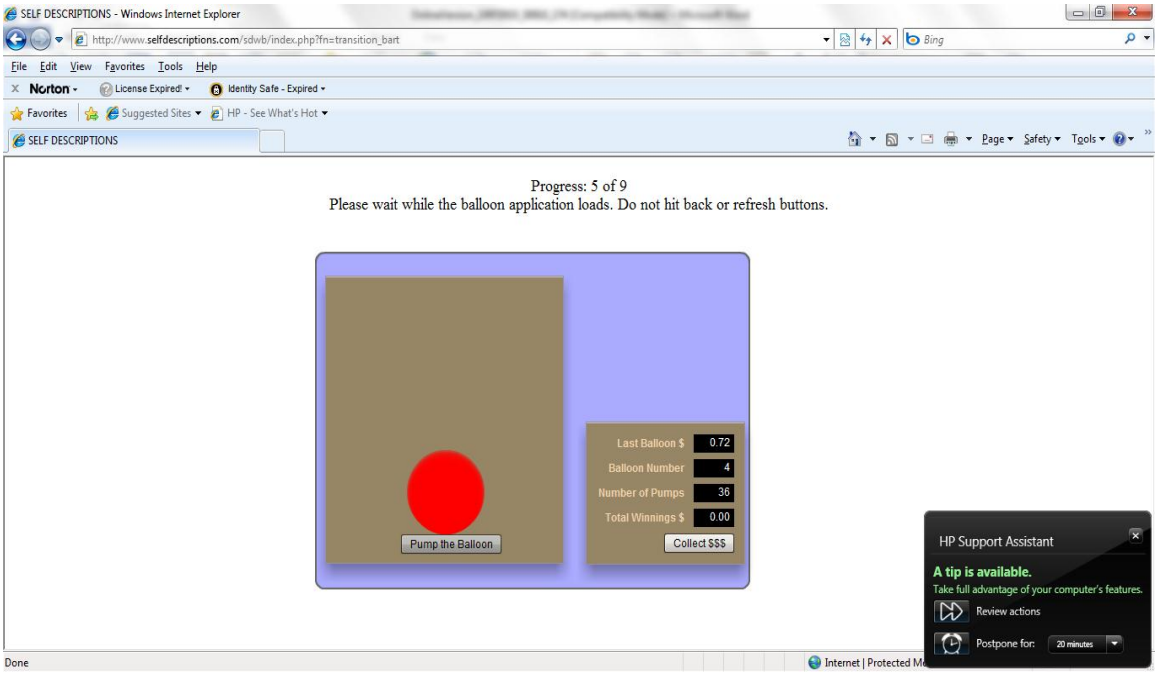
INFORMATION PAGE:



BALLOON ANALOGUE RISK TASK:



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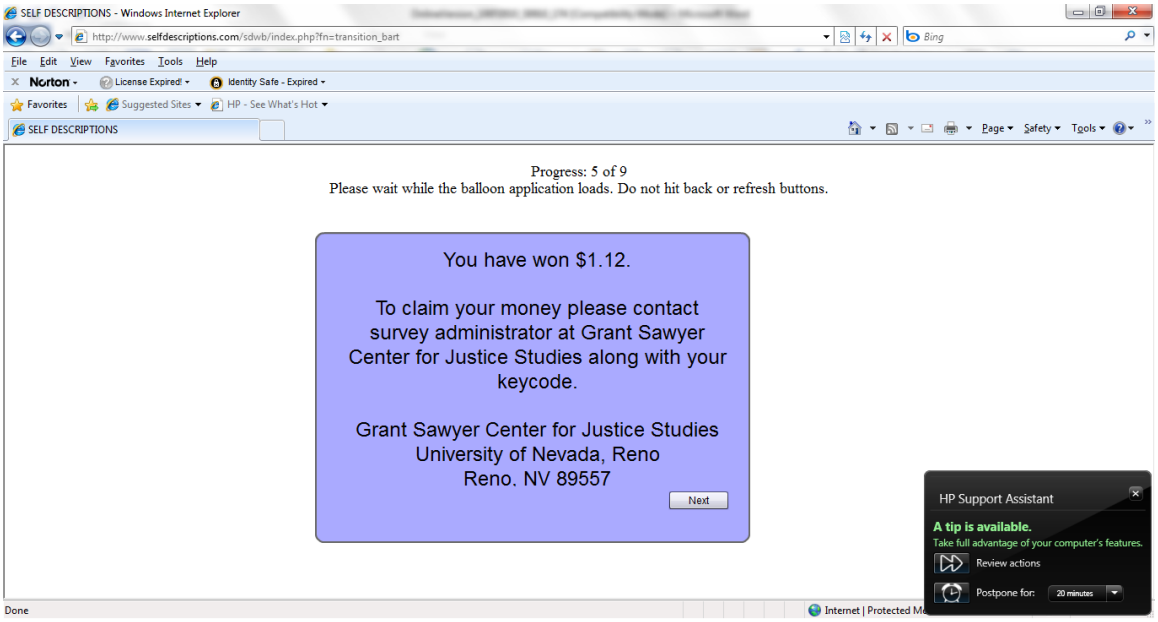
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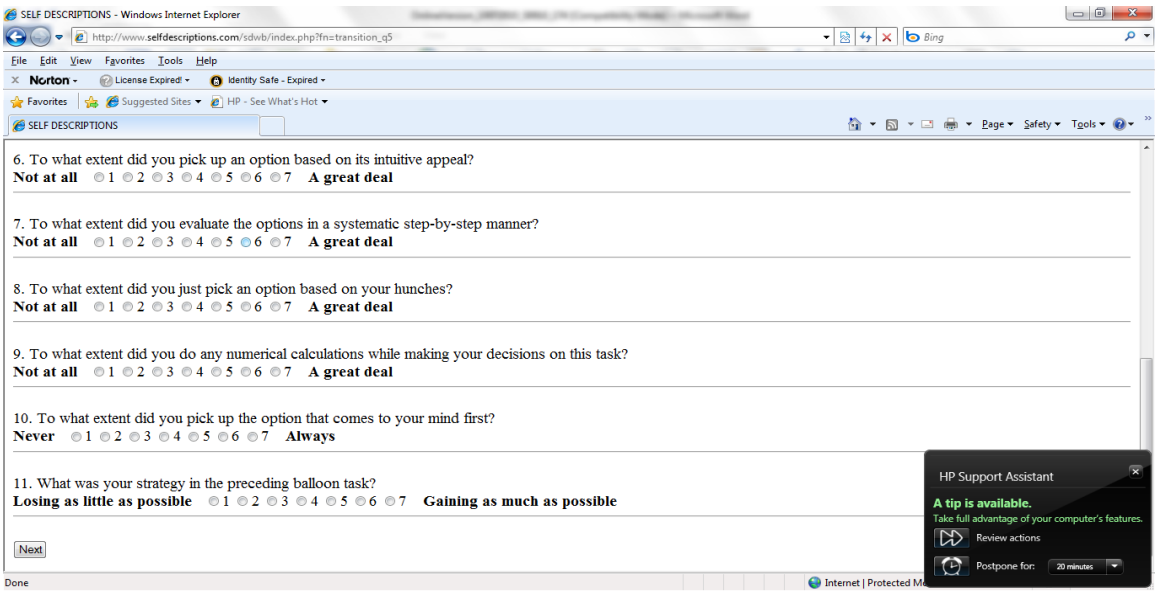
FEELING RIGHT, STRENGTH OF ENGAGEMENT, MODE OF THINKING AND STRATEGY QUESTIONS:



Tables

Table 1

Examples of Dual-Process Theories in Psychology.

	System 1	System 2
Elaboration Likelihood Model (e.g. Petty & Wegener, 1999)	*Low elaboration*	*High elaboration*
Heuristic-Systematic Model (e.g. Chen & Chaiken, 1999)	*Heuristic*	*Systematic*
Rule-based/Associative Reasoning (e.g. Sloman, 1996)	*Associative*	*Rule-based*
Cognitive-Experiential Self Theory (e.g. Epstein & Pacini, 1999)	*Intuitive*	*Rational*

Table 2

Hypotheses.

Hypothesis 1: Self-construals predict risk-taking.
Hypothesis 1a. People with interdependent self-construals are less risk-averse than people with independent self-construals when financial decisions pertain to gains.
Hypothesis 1b. People with interdependent self-construals are more risk-seeking than people with independent self-construals when financial decisions pertain to losses.
Hypothesis 1c. People with interdependent self-construals are more loss-averse than people with independent self-construals when financial decisions pertain to a trade-off between gains and losses.
Hypothesis 2: Self-regulatory focus predicts risk-taking.
Hypothesis 2a. Promotion-focused individuals are less risk-averse than prevention-focused individuals when financial decision pertains to gains.
Hypothesis 2b. Promotion-focused individuals are more risk-seeking than prevention-focused individuals when financial decision pertains to losses.
Hypothesis 2c. Promotion-focused individuals are less loss-averse than prevention-focused individuals when financial decision pertains to the trade-off between gains and losses.
Hypothesis 3: Replicating the predictions of prospect theory (Study1).
Hypothesis 3a. People are risk-averse when financial decisions pertain to gains.
Hypothesis 3b. People are risk-seeking when financial decisions pertain to losses.
Hypothesis 3c. People are loss-averse when financial decisions pertain to a trade-off between gains and losses.

Table 2 continued

Hypothesis 4: Regulatory fit predicts motivational experiences.

Hypothesis 4a. Under conditions of incidental regulatory fit, people feel more right about the task compared to conditions of incidental non-fit (Study 1 and 2).

Hypothesis 4b. Under conditions of integral regulatory fit, people feel more strongly engaged in the task compared to conditions of integral non-fit (Study 1).

Hypothesis 5: The nature of motivational experiences (Study 1 and 2).

Hypothesis 5a. Feeling right can be captured by the extent people feel certain about the task and feel right about it.

Hypothesis 5b. Strength of engagement can be captured by the extent people find the task is engaging and they are interested in the task.

Hypothesis 5c. Feeling right and strength of engagement are separate constructs.

Hypothesis 6: Regulatory fit predicts processing mode.

Hypothesis 6a. Incidental regulatory fit results in greater intuitive processing compared to incidental non-fit (Study 1 and 2).

Hypothesis 6b.Incidental regulatory fit results in faster response times compared to incidental non-fit (Study 1 and 2).

Hypothesis 6c. Integral regulatory fit results in greater systematic processing compared to integral non-fit (Study 1).

Hypothesis 6d. Integral regulatory fit results in slower response times compared to integral non-fit (Study 1).

Hypothesis 6e. Incidental regulatory fit results in being farther away from risk-neutrality compared to incidental non-fit (Study 1 and 2).

Hypothesis 6f. Integral regulatory fit results in being closer to risk-neutrality compared to integral non-fit (Study 1).

Table 2 continued

Hypothesis 7: The motivational experiences predict processing mode.

Hypothesis 7a. Feeling right results in greater intuitive thinking (Study 1 and 2).

Hypothesis 7b. Feeling right results in faster response times (Study 1 and 2).

Hypothesis 7c. Feeling right results in lesser deviation from linearity (Study 1).

Hypothesis 7d. Strength of engagement results in greater systematic thinking (Study 1 and 2).

Hypothesis 7e. Strength of engagement results in slower response times (Study 1 and 2).

Hypothesis 7f. Strength of engagement results in lesser deviation from linearity (Study 1).

Hypothesis 8: Regulatory fit predicts correlates of financial decisions.

Hypothesis 8a. When people experience incidental fit, emotional experiences are more strongly correlated with financial decisions than when people do not experience incidental fit (Study 1 and 2).

Hypothesis 8b. When people experience integral fit, people's objective life constraints are more strongly correlated with financial decisions than when people do not experience integral fit (Study 1).

Table 3

An Illustration of the Utility Elicitation Method (adapted from Abdellaoui et al., 2008).

Iteration	Offered choices in elicitation of certainty equivalents in losses	Offered choices in elicitation of certainty equivalents in mixed gambles
1	-500 vs. (**-1000, 1/2; 0, 1/2**)	**0** vs. (2000, 1/2; -4000, 1/2)
2	**-250** vs. (-1000, 1/2; 0, 1/2)	**0** vs. (2000, 1/2; -2000, 1/2)
3	-375 vs. (**-1000, 1/2; 0, 1/2**)	0 vs. (**2000, 1/2; -1000, 1/2**)
4	**-312** vs. (-1000, 1/2; 0, 1/2)	0 vs. (**2000, 1/2; -1500, 1/2**)
5	-343 vs. (**-1000, 1/2; 0, 1/2**)	**0** vs. (2000, 1/2; -1750, 1/2)
6	**-327** vs. (-1000, 1/2; 0, 1/2)	0 vs. (**2000, 1/2; -1625, 1/2**)
Certainty equivalent	-335	-1687

Note. Choices are in bold.

Table 4

Risk-Taking/Risk aversion (α) as a function of Decision Context, SRF Prime, and Chronic Self-Construal (Offline Mode).

	SRF Prime					
	Promotion			Prevention		
	M	*(SE)*	*n*	*M*	*(SE)*	*n*
Gain						
Chronic Self-construals						
Independent	0.67	(0.05)	20	0.55	(0.05)	19
Interdependent	0.61	(0.07)	9	0.70	(0.07)	11
Loss						
Chronic Self-construals						
Independent	1.20[a]	(0.05)	18	1.21[a]	(0.06)	13
Interdependent	1.40[b]	(0.07)	11	1.16[a]	(0.05)	17

Notes. Means within the same panel that do not share the same superscript differ at $p < .05$. Means are estimates obtained from factorial model which are adjusted for all other effects in the model.

Table 5

Intuitive and Systematic Thinking as a function of SRF Prime and Chronic Self-Construal

	SRF Prime					
	Promotion			Prevention		
	M	*(SE)*	*n*	*M*	*(SE)*	*n*
Intuitive						
Chronic Self-construals						
Independent	4.53	(0.11)	124	4.65	(0.13)	96
Interdependent	4.69	(0.13)	104	4.52	(0.12)	115
Systematic						
Chronic Self-construals						
Independent	4.20[b]	(0.14)	124	3.86[a]	(0.14)	96
Interdependent	4.20[b]	(0.12)	104	4.23[b]	(0.13)	115
Intuitive-Systematic						
Chronic Self-construals						
Independent	0.33	(0.17)	124	0.79*	(0.20)	96
Interdependent	0.49*	(0.20)	104	0.29	(0.18)	115

Notes. On the top two panels, means within the same panel that do not share the same superscript differ at $p < .05$. On the bottom panel, means with * differ from 0 at $p < .01$.

Table 6

Response Time in Seconds as a function of Sample, SRF Prime and Chronic Self-Construal.

	SRF Prime					
	Promotion			Prevention		
	M	*(SE)*	*n*	*M*	*(SE)*	*n*
MTurk						
Chronic Self-construals						
Independent	28.25[a]	(1.06)	44	31.69[a]	(1.06)	27
Interdependent	26.67[ab]	(1.05)	37	24.55[b]	(1.05)	39
Online Students						
Chronic Self-construals						
Independent	29.51[a]	(1.05)	30	31.04[a]	1.06	30
Interdependent	29.11[a]	(1.05)	43	32.73[a]	1.05	40

Note. Means within the same panel that do not share the same superscript differ at $p < .01$.

Table 7

Correlations between Risk-taking Parameters of Study 1 and Study 2.

	Study 1 Risk-taking		
	α_{Gains}	α_{Losses}	loss aversion
Study 2 Risk-taking			
Puffs	.399*	.142	.523*
Pops	.405*	.256*	.639***
Earnings	.340*	.095	.458*

***$p < .001$, *$p < .05$.

Figures

Figure 1. Theoretical Model Proposed

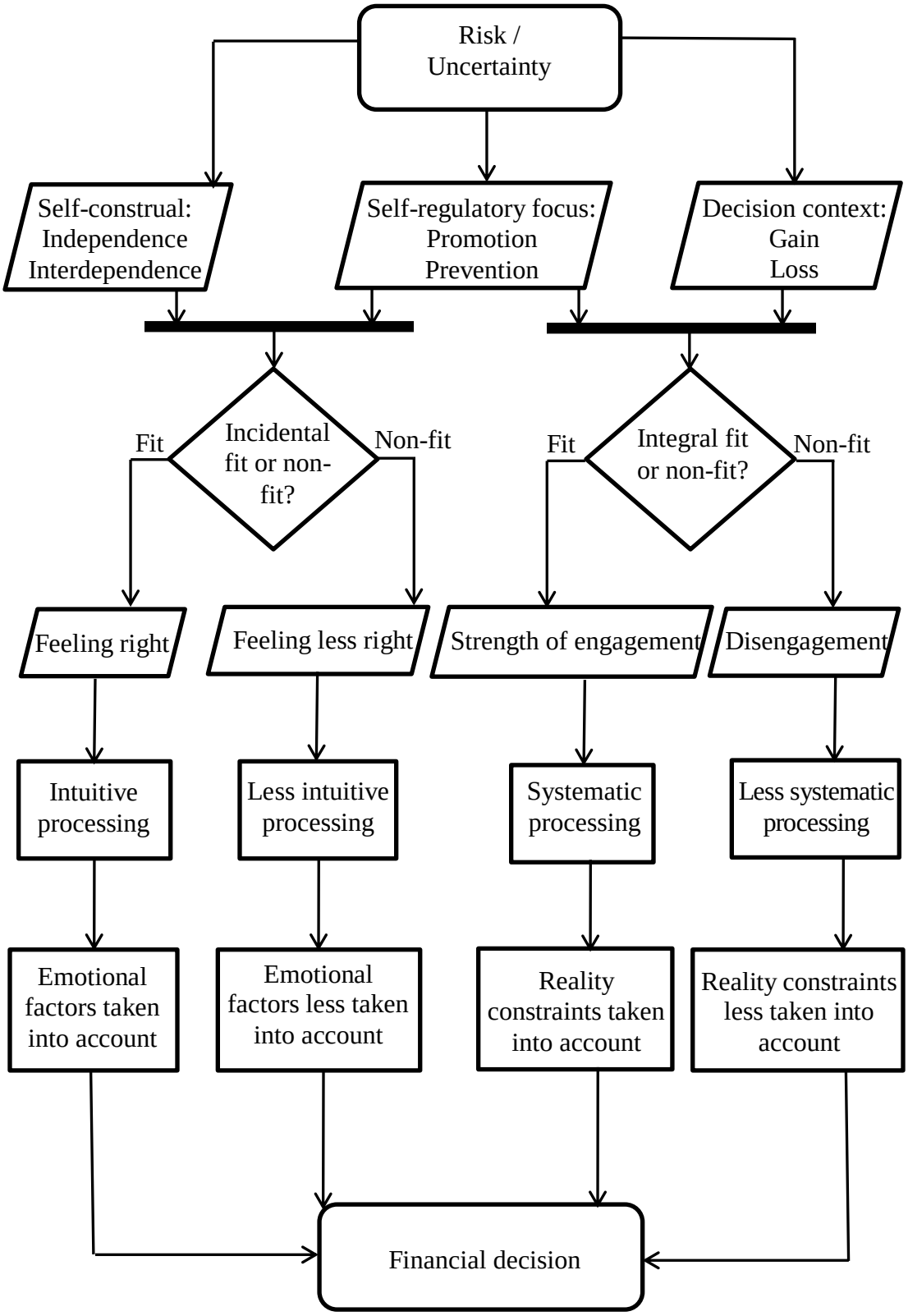
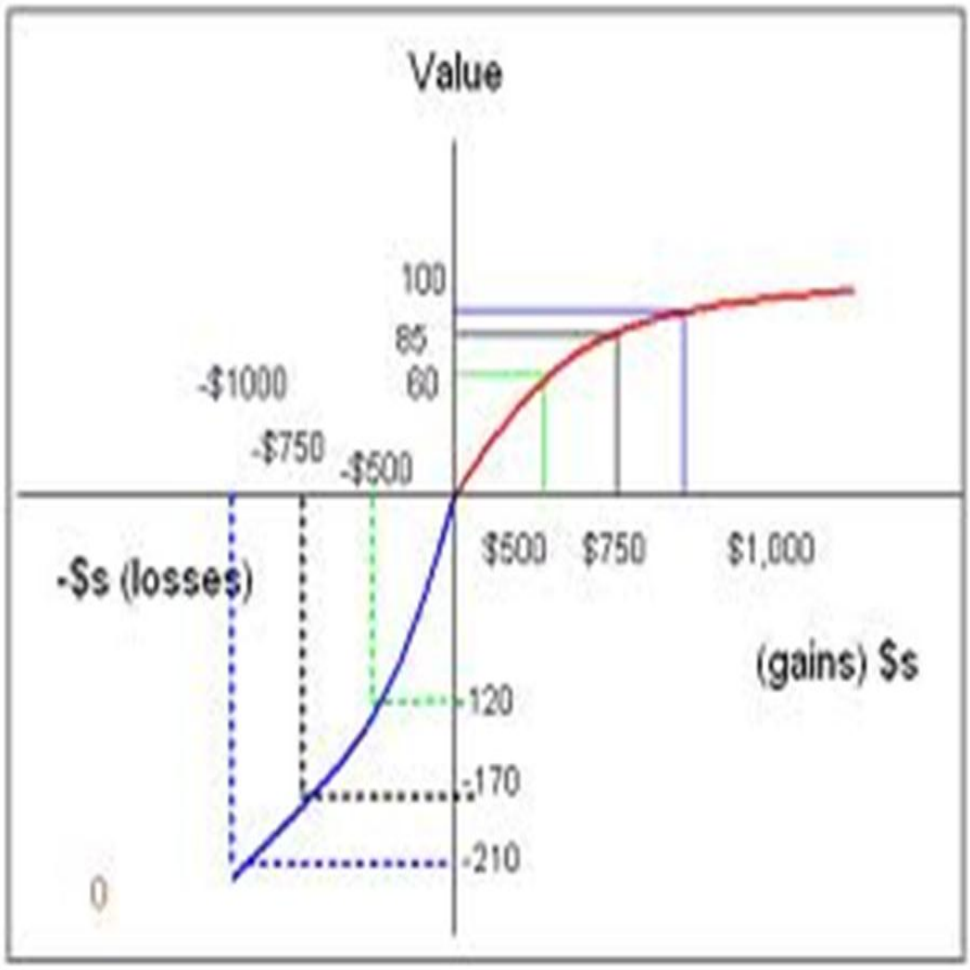


Figure 2. Prospect Theory



The value function is concave above the origin, representing risk-aversion; convex below the origin, representing risk-seeking. The value function below the origin is steeper than above the origin, representing loss aversion.

Figure 3. The Proposed Value Functions for Different Regulatory Foci

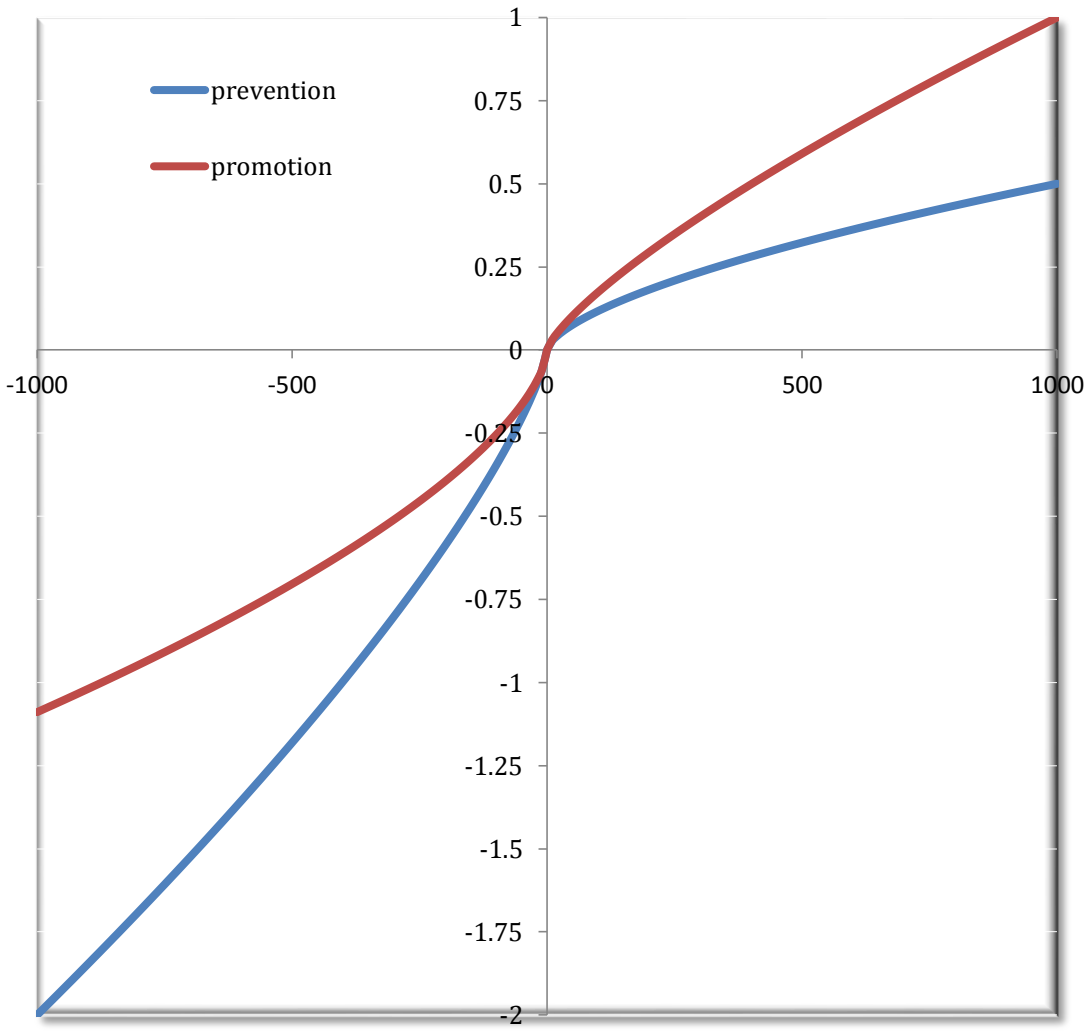
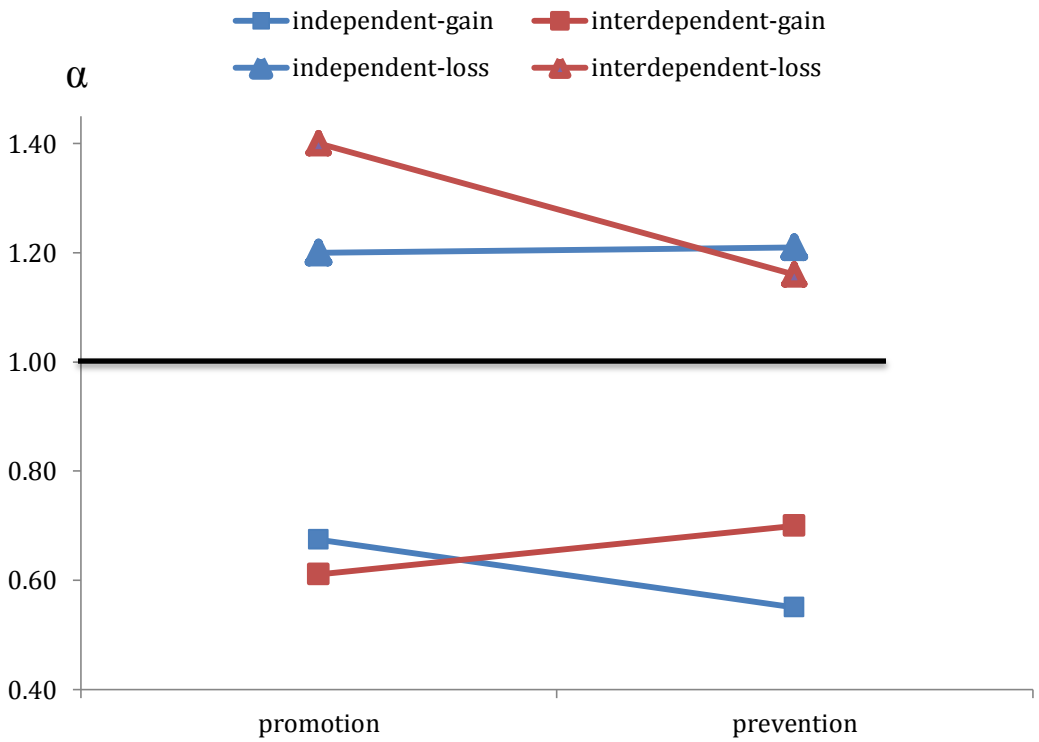
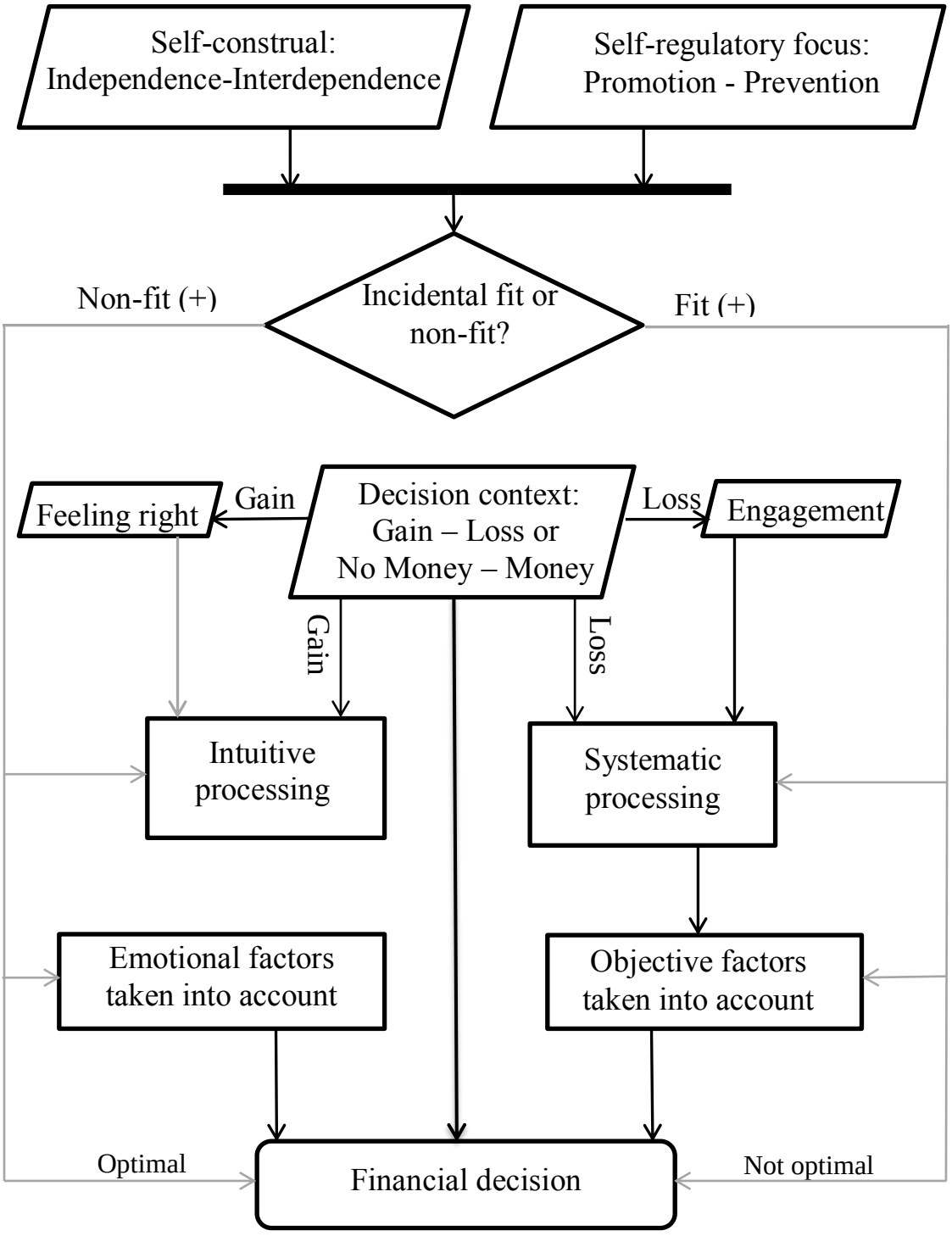


Figure 4. Incidental Fit results in Decisions Closer to Risk-Neutrality (offline sample)



Note. The dark black line in the middle shows the risk-neutral point, i.e., $\alpha = 1$.

Figure 5. Revised Model



Note. Black arrows, compared to gray arrows, depict stronger effects.