Emotion, age and domain effects on risky decision making

by

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ABSTRACT

Although traditional decision theories assume that people make choices by weighing the possible gains and risks, there are many different factors which can influence people's decision making. This dissertation examines several important influences on risky decision making including age, risk domain and affect. The research in Chapter 2 examines how young and older adults perceive and judge risks in several risk domains. Older adults are generally stereotyped to be more risk-averse than young adults. However, we found that while older adults, as compared to young adults, did perceive more risk and rated themselves as less likely to engage in risks in health/safety and ethical domains, the opposite pattern occurred for social risks: older adults perceived less risk and rated themselves as more likely to engage in the socially risky behaviors. The research in Chapter 3 focuses on the effects of emotional valence and certainty on how people think and decide about social and health risks. Participants primed with positive emotions came up with more positive outcomes than participants primed with negative emotions for both a social risk task and a health risk task. However, participants primed with positive emotions also produced more negative outcomes than participants primed with negative emotions for the health risk task. Participants primed with positive emotions also rated themselves as more likely to choose the riskier task for the health risk task and one replication of the social risk task. Chapter 4 reviews the literature on affective influences on risky decision. Although there are many distinctions made between the different types of emotions which can influence risk preferences, the type of risk involved is often ignored. In my review, I highlight some of the typical risky decision making tasks and their advantages and disadvantages as well as identify some holes in this area of research.

CHAPTER I

Introduction

Imagine that you are faced with a choice involving a risky situation. What factors will influence your decision? A typical answer might be that you would take into consideration the possible choices and the pros and cons of each. But what about individual factors such as your age, race or gender? What about your current mood? Or the domain of the risky situation? These are all ongoing questions that are being investigated in the risk literatures as we try to determine how to define risk, what factors influence our perceptions of risk, and whether certain groups view risk differently.

Although there is much research on risk in the field of social psychology, there are several untested assumptions as well as several apparent inconsistencies within the results. For example, some studies find that one's emotional state influences decisions involving risk while other studies find no impact of emotions on risky decision-making. Some research has found gender differences on risk-taking while other research failed to see any distinctions between males and females. One prime example of this type of inconsistency is the research on risk and aging. Although there is little research in general on risk and aging, what little has been done has been completely contradictory; some studies found that older adults become more cautious and risk-avoidant, other studies found no differences and some studies found older adults demonstrating more risk-seeking behavior than their younger counterparts.

Risk and Aging Studies

In Chapter 2, I examine one specific area of in which the research is conflicted: risk and aging. The comparison of young and older adults on various risk tasks is a largely neglected area of research and the research that has been done has found increasingly inconsistent results. Older adults consistently report less impulsivity and sensation-seeking than young adults (e.g. Patton, Stanford, & Barratt, 1995; Spinella, 2007). However, an increasing numbers of studies have shown no differences between older adults and young adults on risky decision making (e.g. Dror, Katona, & Mungur, 1998; Reece et al., 2010; Samanez-Larkin, Kuhnen, Yoo, & Knutson, 2010; Chou, Lee, & Ho, 2007). Furthermore, several studies have even found that older adults can be more risk-seeking than their younger counterparts (e.g. Denburg, Tranel, & Bechara, 2005; Samanez-larkin, Kuhnen, Yoo, and Knutson, 2010).

There have been many explanations proposed for these conflicting results, but one that has not yet been fully examined is that of risk domains. Particularly in the area of risk and aging, risk domain might be of extreme importance. For example, older adults might be expected to be more cautious or risk-averse in a health domain as they tend to have more health issues already and might be more focused on issues related to health. However, for other domains, such as social risks, they might actually be more risk-seeking as their social relationships are more established so they might feel they have less to lose. If this were the case, it would suggest that older and younger adults might vary on their risk preferences based on risk domain.

In order to investigate this possibility and expand our knowledge of the role of age on risk preferences, we conducted a series of studies that compare older and younger adults' risk perceptions and preferences' across a variety of domains. Our hypothesis was that there would be an interaction of age and risk domain such that older adults will be more risk-averse for health risks but more risk-seeking for social risks. In addition to identifying these age differences

across domain, we explored participants' risk perceptions and risk preferences, and examined more deeply their motives for engaging in risky behaviors.

The research in Chapter 2 examines participants from three age groups: young adults (18-25 years old), adults (26-59 years old) and older adults (60-83 years old). Participants were surveyed on their risk perceptions and risk preferences for a variety of risky behaviors/situations chosen across five different risk domains: social risk, health/safety risk, ethical risk, environmental risk and other risk. In addition to examining participants' risk perceptions and risk preferences, we examined a variety of specific factors which may help explain any age differences in risk perception and preferences. We included sensation-seeking scales in order to evaluate individual difference factors of risk preferences. We predicted that older adults would appear more risk-averse on a sensation seeking scale which focused more on risky behavior but would look similar to the younger adults on a sensation seeking scale focusing on embodied feelings of risky excitement.

In addition to personality factors, we examined possible motives for risk-taking that could explain these differences. For instance, if young adults are more likely to engage in health risks than older adults, it might not simply be because they think these behaviors are less risky but also because they feel they have more to gain by engaging in these behaviors. We addressed this possibility by asking participants about four specific motivations: risk enjoyment, risk unpleasantness, possible gains and possible losses. Risk enjoyment and risk unpleasantness involve the subjective experience of engaging in the behavior. Although we expected enjoyment and unpleasantness to be negatively correlated, we believe they are separate experiences so we included separate scales for each. Possible gains and possible losses are related to the outcome of the risky behavior. Since some situations may have multiple gains or losses, we asked

participants to specify what they might gain or lose for each situation in addition to rating their likelihood of gaining or losing it. We also connected this work with related models in the literature such as Weber's model of risk and the health belief model.

Emotional Influences on Social Risk Studies

Chapter 3 investigates a different influence on risky behavior: how emotion affects risks in the social risk domain. As mentioned previously, risk domain has been largely ignored throughout the literature and most studies have focused on health/safety or financial domains. This seems to be driven by the idea that risk behavior is consistent across domain. In other words, if one is more risk-seeking for health risks, then one is probably also more risk-seeking for recreational, ethical or social risks too, i.e., exhibit cross-domain consistency in risk-seeking. However, recent research has indicated that social risks often show contrasting results to research on other domains. For example, although generally males tend to be more risk-seeking than females, this result has not been found using socially risky scenarios (Weber, Blais & Betz, 2002). This suggests that risk behavior may vary by domain and that we cannot generalize effects from one risk domain to another. Consequently, much more research is needed in order to see whether social risks are affected by the same influences which affect risks in other domains. This is especially true considering that the typical participant population consists of college students who tend to be young and in a stable environment. Due to these factors, the participants may very well be more concerned with risks having to do with social relationships than any sort of financial or health risks.

One specific effect that has yet to be examined for social risks is that of emotional influence on risk behavior. Previous research has found that negative emotions tend to lead to more risk-aversion, more pessimistic judgments and more systematic processing while positive

emotions tend to produce more risk-seeking, more optimistic judgments and more heuristic processing. While these results have been replicated, they have never been replicated using a social risk task.

Additionally, according to the Appraisal-Tendency Framework, emotions are associated with varying levels of a number of cognitive dimensions other than valence. One particular cognitive dimension that has been examined in the risk domain is certainty. Studies have found that emotions associated with certainty tend to increase risk-seeking, optimistic expectations and heuristic processing while emotions associated with uncertainty tend to increase risk-aversion, pessimistic expectations and systematic processing. However, again, differences in emotional certainty on social risks have yet to be examined. To address these issues, I conducted a series of studies in an attempt to replicate this effect using a social risk rather than a financial or health risk. In addition, I investigated the mechanism by which the emotion influences the risk decision by asking participants to list possible outcomes for each choice. This mechanism will add to our understanding of how emotions influence decision-making as well as possibly explain why some emotions have more impact than others.

For the research in Chapter 3, we had participants complete an emotion induction in which they wrote about situations in their current lives that are causing them to experience one of two positive emotions (one certain and one uncertain) or one of two negative emotions (one certain and one uncertain). Following the emotion induction, participants completed a risky decision making task either in a social domain or in a health domain. We hypothesized that emotion valence and emotion certainty would have independent effects on how participants thought about the risky situations and whether they would be more likely to choose a riskier option.

Affect & Risk Review

In response to the research from Chapters 2 and 3, I decided to further investigate some of the inconsistencies of risk research in social psychology. I proposed that one explanation for these discrepancies may be the overgeneralization of specific types of risks and tasks used to assess risk to general theories of risk. For instance, suppose that one set of studies found that negative emotions such as fear and anger increase risk-seeking while another set of studies found the opposite or no differences. Rather than suppose that one set of studies is simply wrong, it is possible that both are correct but applicable to different types of risky decisions. In this case, we would need to determine the type of risk task used in each of the studies and make a comparison of the two and develop a more nuanced view of how we define risk or risky decisions.

In order to investigate this explanation, I completed an analytical review of the literature on the different types of risky decision tasks used in one particular area of social psychology. By directly comparing many different lines of research, I attempt to explain some irregularities in the literature as well as identify some new directions to pursue. Although the literature on risk research is extremely broad, for my literature review, I focused on social psychological studies that examine the influence of affect on risk and specifically studies where risk tasks are used as the primary dependent variables.

One specific distinction that I discuss in my literature review is the difference between risk perceptions and risk preferences. Although risk perceptions and risk preferences are often correlated, they measure two inherently separate constructs. Risk perception refers to how much risk a person sees in a given behavior or situation while risk preference refers to what a person will choose given the choice between a more risky option and a safer option. While often the more risk a person sees in a specific choice, the less likely they would be to choose that option,

this is not always the case. For instance, one might fully understand the risks of riding a motorcycle yet still choose to own one because he enjoys riding it and decides that the enjoyment is worth the risk. Although these are two distinct concepts, psychological studies rarely distinguish between them. Furthermore, studies generally measure either risk perceptions or risk preferences but discuss them similarly and generalize both concepts to the broader factor of risk. This can be dangerous as some influences might affect risk perceptions but not risk preferences or vice versa. For instance, a classic study by Johnson and Tversky (1983) demonstrated that participants induced with negative mood appeared to have increased perceptions of risk when compared to participants induced with positive mood. This result has spawned a number of studies examining the effects of mood on risk but most of these studies have again looked only at risk perceptions rather than risk preferences. While mood may consistently affect how risky options appear to be, there is little empirical evidence that this translates directly into people's behavior. Therefore, separating out these two concepts may explain some inconsistencies among the results in the literature and demonstrate the danger of generalizing from the use of a single risk perception or risk preference task.

An additional distinction I focus on in my literature review is that of risk domain. Although risk can be examined in any number of domains, most studies use tasks that focus on risks in a single domain. In addition, the majority of the literature has focused only on financial and health domains, which may not generalize to all other domains. For example, while most people would agree that both riding a motorcycle and betting a large sum of money at a roulette wheel are risky behaviors, it is not clear whether the same people who would ride the motorcycle would also bet the money. In other words, the relationship between risks in different domains has yet to be fully understood. Therefore, if one study uses a risk task focusing on health-related

risks, while another study uses a financial risk task, their conflicting results may actually be demonstrating interesting differences between risk domains rather than failures to replicate specific results. This may also lead to new research on cross-domain consistency of risk taking.

Overall, my literature review uses these distinctions between different types of risk tasks to illustrate some basic issues within the field. By evaluating these risk tasks and making distinctions of risk type and risk domain, I point out some holes in this area of research and suggest some future directions for this field.

Altogether, these three projects add to our knowledge of risky decision-making by examining the existing literature in a new way, and filling in some important holes in the current research. Evaluating previous research using new definitions and distinctions of risky behavior can not only help explain many conflicting results but also identify new directions to explore. Combining literatures on risk domains and aging research can expand our knowledge of the role of age on risk-taking as well as clarify previous findings from this field. Finally, examining a fairly new domain of risk may create new inconsistencies in the field but will also force us to reexamine our definitions of risk and be more cautious when generalizing results across risk domains.

CHAPTER II

Age Differences in Risk: Perceptions, Intentions and Domains

What constitutes a risky situation? Most people would agree that unprotected sex and recreational drugs are risky. But what about taking a shower? A 2013 New York Times story by Jared Diamond suggested that everyday activities like a shower can be dangerous for older adults. Yet even if everyone agreed that showers are risky, would we then all stop showering after the age of 65? Probably not, because showering also has benefits. This example illustrates that we sometimes do things even when we know they are risky and highlights the importance of a lifespan perspective when studying risk.

Older Adults and Risk

The general stereotype of older adults is that they are more cautious than younger people (e.g., Heckhausen, Dixon, & Baltes, 1989). However, this stereotype does not always hold true. For instance, when controlling for factors including race, socioeconomic status and gender, older and younger adults have equal pathological gambling rates (Welte, Barnes, Wieczorek, Tidwell, & Parker, 2001). Unsafe sex has also increased among older adults, and approximately 25% of all people living with HIV/AIDS are 50 or older. This is not simply because people with HIV/AIDS now live longer: 15% of newly diagnosed cases are in people 50 and older (CDC, 2005). These statistics imply that older adults may be less risk averse than assumed.

Research on older adults' risky behavior has also shown mixed results. Older adults consistently report less impulsivity and sensation-seeking on personality scales than young adults (e.g., Patton, Stanford, & Barratt, 1995; Spinella, 2007). Also, early studies found that older

adults rated risky outcomes as more likely and tended to choose less risky options in hypothetical scenarios (e.g. Botwinick & Thompson, 1966; Chaubey, 1974; Kogan & Wallach, 1961). However, more recent studies suggest that older adults' decisions do not differ from their younger counterparts (e.g. Chou, Lee, & Ho, 2007; Dror, Katona, & Mungur, 1998; Reece et al., 2010). For instance, several studies using the Iowa Gambling Task found no differences in risk aversion between the two age groups (Kovalchik, Camerer, Grether, Plott, & Allman, 2005; MacPherson, Phillips, & Della Sala, 2002). Some studies have even found more risk-seeking in older adults (e.g. Smanez-Larkin, Kuhnen, Yoo, & Knutson, 2010). Several explanations have been suggested for these inconsistent results. In an early review of the literature, Okun (1976) observed age differences on a choice dilemma task (where participants are forced to choose between a risky and a less risky option) when participants were allowed to skip questions but not when the participants were forced to answer all questions. Thus while older participants may be more likely to avoid risky choices, they may not be more risk-avoidant when a decision must be made.

Another proposition was that the absence of age differences in some lab studies was due to cognitive impairments or external factors (Dror, Katona, & Mungur, 1998). Since unhealthy participants are usually excluded in lab studies age differences did not occur. In other words, older adults with poor health or cognitive deficits may contribute to the statistics that show older adults as more risk-averse, but these people usually do not participate in lab studies. Thus the specific population studied could be important in understanding how older adults deal with risky situations. Other explanations of the inconsistent results have examined the information provided in different risk tasks (Zamarian, Sinz, Bonatti, Gamboz, & Delazer, 2008), the

presence of certain versus uncertain choices (Mather et al., 2012) and the role of learning in risky decision-making (Rolison, Hanoch, & Wood, 2012).

Figner and Weber (2011) suggest that people's attitude toward risk is not a single trait but rather an interaction between individual differences (such as age and gender) and the situation (such as type of risk domain). For example, males might take more recreational risks but fewer social risks. Therefore we should be cautious about generalizing results from a single population or risk task, and should examine risky behavior across a variety of populations and risk domains.

Risk Domain

Although risky attitudes are often considered a stable personality trait (e.g. Weber, 1998), they also vary across domain (e.g. Schoemaker, 1990; Weber & Blais, 2006). A few studies have suggested that age differences may depend on risk domain (e.g. Wallach & Kogan, 1961; Roalf, Mitchell, Harbaugh, & Janowsky, 2012), yet most studies involving older adults and risk focus on a single domain. For example, most risky *behavioral* tasks involve gambles in which participants choose between more risky and less risky options and many risk *perception* tasks focus on health risks. These two types of risk may not produce similar results for the same populations.

Weber, Blais, and Betz (2002) developed the Domain-Specific Risk-Taking (DOSPERT) scale, which examines individual differences in risk perception and risk preference across five domains of risk: ethical (e.g. cheating on an exam), financial (e.g. betting money on a sporting event), health/safety (e.g. riding a motorcycle without a helmet), recreational (e.g. bungee jumping) and social (e.g. going on a blind date). Validation of the DOSPERT showed that participants varied in their risk perceptions and risk preferences across domains.

Yet in research on risky decisions, domain has been largely overlooked. For example, it is generally understood that adolescents tend to engage in more risky behavior than adults (Arnett, 1992). However, these results are based mainly on health behaviors such as smoking, drunk driving, or unsafe sex (for a review, see Albert & Steinberg, 2011). When it comes to social risks, such as disagreeing with a friend or wearing the wrong color shoes, adolescents appear to be extremely conservative. There is some evidence that adolescents are especially influenced by their peers while making risky decisions (Gardner & Steinberg, 2005), yet even this research focuses mostly on health or safety risks.

There is even less research focusing on whether older adults distinguish among risk domains, and the existing research tends to be inconclusive and contradictory. These conflicting results may be explained by considering risk domains and looking at social risks separately from the more traditional domains. Since older adults tend to have more health problems, they might be especially risk-averse for health-related risks. However, for social risks, older adults may be less intimidated by authorities and less concerned that a single social misstep will ruin their lives forever.

Socioemotional selectivity theory (SST) asserts that as individuals age, their social motivations change (Carstensen, 1993). SST suggests that older adults tend to have emotion regulation goals that cause them to be more selective in their social partners. For instance, older adults tend to spend time with more familiar social partners (such as their relatives) rather than new people (Fredrickson & Carstensen, 1990). This implies that although older adults may have smaller social networks, their networks are stronger and more durable than those of young adults. Therefore, older adults may see socially risky behaviors as less risky. For example, if your relationship is strong, disagreeing with a friend is unlikely to have serious consequences but if

your friend is just one of many less certain relationships, a serious argument could cause it to dissolve.

Risk Motivations

In addition to age differences in risky behavior, there may also be differences in *why* people choose to take a risk. Imagine that Jack and Jill are offered cocaine at a party. Jack chooses to use the cocaine because he likes it. Jill, on the other hand, does not like cocaine and worries about the possible side-effects, but she uses it because all of her friends are doing it. If we only examine behavior, Jack and Jill appear similar, but if we want to try to prevent Jack and Jill from using cocaine, it is important to understand their differing motivations.

Risk perception is not a direct proxy for the likelihood of engaging in risky behavior. Often studies do not ask participants about actual risk behaviors, but rather about how risky they believe they are; the assumption is that if people believe that behaviors are risky, they are less likely to engage in them. However, although these two concepts are often used interchangeably, they are different. Risk perception refers to one's assessment of how risky a behavior is whereas risk preference refers to one's inclination to do it. Risk perception clearly plays a role in risk preference; the more risk that one sees in a behavior, the less likely one is to engage in that behavior. The reverse is also true: many people engage in risky behavior because they underestimate the risk involved.

However, failing to appreciate the risk is not the only reason that people take risks. As in the shower example, there are reasons to engage in risky behavior even when we know it is risky. Some people may enjoy risk and seek dangerous situations such as skydiving or traveling to third-world countries. Other people feel uncomfortable in risky situations, motivating them to avoid them. Sensation-seeking scales measure these individual differences and predict risk-

taking (e.g. Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002). Returning to our cocaine example, Jack enjoys cocaine and would likely score high on a sensation-seeking scale whereas Jill finds it somewhat unpleasant and would likely score low.

In addition to affective motivations, people may also take or avoid risks in order to gain something or to avoid losing something. For example, people often risk money by investing in risky stocks because they believe that the risk is worth the possibility of gaining more money. People also risk having their hearts broken by proposing marriage, believing that the possibility of being accepted is worth the risk. Patients undergo experimental treatments with severe side-effects because the possibility of recovery makes the risk seem justified. In all of these cases, people understand the risks, but judge the possible outcomes worthwhile.

Current Studies

To examine how age affects risk-taking across domains, we conducted two surveys of adult participants. Our goals were to determine whether participants had consistent risk preferences across domains, to examine age differences in risk perceptions and preferences across domains, and to identify motivations that might explain these age differences. We asked participants about risk perceptions and preferences in several risk domains (health/safety, social, ethical, environmental, and other). We predicted age differences in risk perception and risk preference for both the social and health/safety domains but in opposite directions. For the social domain, following SST, we predicted that as older adults have strong, durable social networks, they would find risky social behaviors less threatening and would be more likely to engage in them. For the health/safety domain, we predicted the opposite. As older adults develop more health problems, we hypothesized that they would rate health/safety behaviors as more risky and would be less likely to engage in them. We had no specific predictions for the other three

domains but included them to collect exploratory data. We also examined motivations for each risky behavior and included personality measures of sensation-seeking as well as questions about participants' previous experiences with the risky behaviors in order to create a model of risky decision-making across different age groups. We discuss differences in the two surveys below.

Study 1

Method

Participants

Participants (N = 176) ranging in age from 18 to 83 years were divided into three age groups: young adults (18-25 years; 15 males, 45 females, *M* = 19.83, *SD* = 2.34), adults (26 to 59 years (31 males, 48 females, *M* = 38.15, *SD* = 9.05), and older adults (60 to 83 years (12 males, 25 females, *M* = 71.05, *SD* = 7.69). Most of the young adults (N=41) were recruited from the University of Michigan Psychology subject pool and received course credit for participation. The other young adults (N=19) and the participants in the middle-age group were recruited online through the Amazon Turk website and received $0.25 for their participation. Participants in the older adult group were recruited via telephone from local areas and received $10.00 for participating[1]. The majority of the participants self-defined as Caucasian (N=134) while the rest self-defined as Asian/Asian-America (N=19), Black/African-American (N=14), Latino/Hispanic (N=7) and other (N=2). Racial breakdowns were roughly the same for each age group.

Materials

[1]Although our participants were recruited from different populations, our two main comparison groups (young adults and older adults) were mostly recruited from the local Ann Arbor population. Furthermore, although the subject pool population was more female, no differences were found for our main results between the young adults recruited from Amazon Turk and the young adults recruited from the University of Michigan subject pool.

Risk Items. Forty risky behaviors/situations were chosen across five different risk domains: Social risk, Health/Safety risk, Ethical risk, Environmental risk and Other. Fifteen items were taken from the DOSPERT (Weber et al., 2002) and we created the rest of the items so that risk would apply equally to young and older adults. Although we used some items from the DOSPERT, others were omitted after pretesting with our specific populations as many participants found them unfamiliar and irrelevant to their lives. The domain of recreational risks was not included as older adults do not engage in many of the behaviors included in this domain and most of them would be objectively riskier for the older adults. Financial risks were also omitted, because those items did not apply to most of our young adults. Our young adults had little experience with either betting or investing. Environmental risks were added as this type of risk is commonly studied but not across different age groups. Finally, our last domain of risks included risks that did not fit in any previously defined domain. See Appendix A for the full list of risk items.

Behavior Intentions. Participants were asked to rate the likelihood that they would engage in each risky behavior. The behavior intention question was "indicate the likelihood that you would engage in the described activity or behavior if you were to find yourself in that situation," (DOSPERT; Weber et al., 2002). We used this wording so that even participants who had not engaged in the behavior could respond. Participants responded on a 7-point scale from "Extremely Unlikely" to "Extremely Likely." Internal consistency for the behavior intention question was acceptable at the .70 level for most of the risk domains: Health/Safety Risk (13 items; α=.85), Ethical Risk (6 items; α=.77), and Environmental Risk (7 items; α=.83). One item ("moving to a city far away from your family") was omitted from the Social Risk items to increase reliability to an acceptable level (6 items; α=.70), Reliability was low for the seven

Other Risk items (α=.65), which was expected as the items were not chosen to be related to each other. Subscales were created for behavior intentions for each of the risk domains using the average of the items in each domain.

Risk Perceptions. The risk perception question asked participants to provide a "gut level assessment of how risky each situation or behavior is" (Weber et al., 2002), with a 7-point response scale ranging from "Not at all Risky" to "Extremely Risky." Internal consistency for the risk perception question was acceptable at the .70 level for all five risk domains: Social Risk (6 items; α=.77), Health/Safety Risk (13 items; α=.88), Ethical Risk (6 items; α=.81), Environmental Risk (7 items; α=.84) and Other Risk items (7 items; α=.71). We created subscales for risk-perception for each of the risk domains using the average of the items in each domain.

Risk Domains. To ensure that our categorizations matched the participants' categorizations, they were asked to label each of the risk items with one of the five risk domains (social, health/safety, ethical, environmental, other). Participants who chose the "other" category were asked to name the category that best fit the risk item. The majority of participants chose the same category as the experimenters (63%); these agreements were especially high for social risks (72%), health/safety risks (91%) and ethical risks (85%) while agreement was much lower for environmental risks (35%) and other risks (33%). Similar percentages were found across age groups. There were no differences in how the young and older adults labeled the risks. Analyses showed no significant differences between the participant-defined risk categories and the experimenter-defined risk categories; the results presented are based on the experimenter-defined categories.

Procedure

Participants completed the survey either online or in a lab at the University of Michigan. Participants were told that they would be answering a series of questions regarding their thoughts and behaviors about risky situations. The questions were presented in the same order for all participants with the behavior intention questions first, followed by the risk perception questions and finally the risk domain questions. The behavior intention questions were asked first because we thought it would be more likely that risk perceptions would influence the behavioral intentions than the other way around. Participants answered demographic questions at the end of the survey.

Results

Correlations

There were significant positive correlations among all of the risk domains on risk intentions (see Table 2.1). However, these correlations ranged from .16 to .78; interestingly, the social risk subscale was least correlated with the other risk domains (ranging from .16 to .34). The high positive correlations suggest that people who tend to engage in risky behavior in one domain also tend to engage in risky behavior in other domains. Likewise, there were significant positive correlations among all of the risk domains on risk perceptions (see Table 2.2). Again, these correlations varied from .19 to .75 and the social risk subscale tended to be least correlated with the other risk domains. These results indicate that there may also be a general tendency for people who see situations in one domain as risky to perceive high risk in other domains. Finally, Pearson correlations were computed between risk intention and risk perception for each of the five risk domains. There were significant negative correlations between risk intentions and risk perception in each domain. The correlations were high for both the health (r = -.59) and ethical

(r = -.56) domains but lower for the social (r = -.37), environmental (r = -.28) and other (r = -.48) domains.

Age Differences

We sampled from three age groups representing three different stages of life. As these three groups were specifically targeted, our age distribution was not continuous. Therefore we analyzed the data using age as a categorical variable mainly comparing young adults to the older adults. The pattern of results remains the same when analyzing the data with age as a continuous variable[2]. The effects of age on risk intention and perception were examined using univariate ANOVAs with age group as the independent variable and risk intention and perception as the dependent variables.

Health/Safety Risks. For the health/safety risk domain, as predicted, age had a significant effect on risk perception ($F(2, 164) = 3.45$, $p < .05$; Figure 2.1). Pairwise planned contrasts showed that older adults (M = 5.55, SD = 1.19) rated health/safety risks as significantly more risky than young adults (M = 4.99, SD = 0.85; $p < .05$) or adults (M = 5.08, SD = 1.02; $p < .05$). Young adults and adults did not differ on perceptions of health/safety risks. Age also had a significant effect on risk intentions for health/safety risks ($F(2, 165) = 15.85$, $p < .01$). Specifically, pairwise planned contrasts demonstrated that young adults (M = 3.18, SD = 1.05) were significantly more likely to engage in risky health or safety behaviors than adults (M = 2.77, SD = 1.19; $p < .05$) or older adults (M = 1.85, SD = 0.82; $p < .01$). Older adults were also significantly less likely to engage in these risky behaviors than the adults ($p < .01$).

[2] We mean centered age and entered both linear and quadratic predictors. Across all ten regressions the linear predictor of age yielded the same statistical conclusion as the linear contrast in the three group ANOVA (i.e., young vs older adults). In two cases (ethical and other risk perceptions) the quadratic term in the three group ANOVA was statistically significant but the quadratic predictor in the regression was not. We do not make use of quadratic trends in this paper, focusing on pairwise differences between age groups, so we do not consider the regression results using continuous age.

Ethical Risks. The ethical risk domain resembled the health/safety domain for risk intention (Figure 2.2). Age had a significant effect on risk perception ($F(2, 169) = 6.77$, $p < .01$). Pairwise planned contrasts showed that the older adults ($M = 5.77$, $SD = 1.16$) rated the ethical risk items as significantly more risky than the adults ($M = 4.97$, $SD = 1.21$; $p < .01$) or the young adults ($M = 4.89$, $SD = 1.07$; $p < .01$). Adults and young adults did not differ. Age also had a significant effect on risk intentions ($F(2, 169) = 13.08$, $p < .01$). As in the health/safety domain, pairwise planned contrasts demonstrated that the young adults ($M = 2.58$, $SD = 1.07$) were significantly more likely to say that they would engage in the risky behaviors than the adults ($M = 1.97$, $SD = 1.08$; $p < .01$) or the older adults ($M = 1.51$, $SD = 0.68$; $p < .01$). The difference between the adults and older adults for ethical risk intentions was also significant ($p < .05$).

Social Risks. For the social risk domain, the opposite pattern occurred (Figure 2.3). Age had a marginally significant overall effect on the perception of social risks ($F(2, 172) = 2.59$, $p = .08$). Pairwise planned contrasts illustrated that young adults ($M = 2.83$, $SD = 1.02$) rated the social risk items as significantly more risky than the adults ($M = 2.48$, $SD = 0.99$; $p < .05$) and marginally more than the older adults ($M = 2.45$, $SD = 0.94$; $p = .07$). For the risk intention questions, age did not have a significant effect on risk intention ($p = .21$).

To compare the pattern observed in the social domain to that in the health/safety and ethical domains, we conducted a 5x2x3 ANOVA with risk domain and risk perceptions or intentions as within-subjects factors and age group as a between-subjects factor with contrasts to compare the age difference pattern seen in the health/safety and ethical risks to the pattern found in the social risks. This interaction effect comparing young and older adults was statistically significant ($F(2,150) = 13.52$, $p < .01$).

The last two risk domains, environmental risk and other risk, showed no age differences in either risk intentions or perceptions. Table 2.3 presents means for risk perceptions and risk intentions by domain.

Discussion

Overall, participants showed a general risk perception and risk preference across domains: If they perceived risk in one domain, they also perceived risk in others, and if they were risk-seeking in one domain, they tended to be risk-seeking in other domains. However, as predicted, age differences varied by domain. For health/safety and ethical domains, older participants perceived more risk and rated themselves as less likely to engage in the risky behaviors than young adults, while for social risks, older participants perceived less risk and rated themselves as equally likely to engage in the risky behaviors as the young adults.

The results for the environmental and "other" risk domains did not show any differences between the age groups. One explanation for the lack of differences for the environmental risks is that they were all risks that were difficult to control. Most of the items involved being exposed to something harmful, such as radiation or pesticides, which very few people would choose to do deliberately but are also somewhat hard to deliberately avoid. Therefore, the lack of control might eliminate any age differences across the domain. The environmental risks were also often labeled as "health/safety" risks by the participants indicating that they may constitute a subcategory of health/safety risks which involve a lack of conscious choice.

The "other" risk domain did not show overall differences because the individual items were too unrelated, although several of the individual items did show age differences. For instance, older adults rated driving over the speed limit as marginally more risky than the young adults and rated themselves as less likely to engage in it while the opposite pattern occurred for

the item involving being a victim of violent crime. However, since there were no consistent age differences in either domain, both environmental and other risk domains were dropped for Study 2.

Study 2 was conducted to explore why the age differences found in Study 1 might have occurred. We hypothesized that older and younger participants may appraise the costs and benefits associated with the risks differently. Traditionally, decision-making models propose that decisions about risk involve trade-offs between the perceived benefits and the perceived risks of the decision (Weber, 1998). If the possible benefits outweigh the risks, the riskier choice is picked, whereas if the risks outweigh the benefits the safer choice is made. Risky decision-making also varies with whether the risky situation involves a gain or a loss. Generally, "losses loom larger than gains", and people tend to make riskier choices in order to avoid losses than to realize gains (Kahneman & Tversky, 1979). Weller, Levin, and Denburg (2011) examined risky loss scenarios separately from risky gain scenarios and found that although risk-taking decreased for risky gains across the lifespan, risk-taking for risky losses remained fairly consistent. If risks in some domains are more related to losses than to gains, this might explain the age differences found in Study 1. Additionally, one limitation to Study 1 was that the majority of our sample was female, so in Study 2, we sought a more equal gender distribution.

For Study 2, we examined two types of benefits, risk enjoyment and concrete gains, and two types of costs, risk unpleasantness and concrete losses. We predicted that compared to the young adults, older adults would rate the health/safety and ethical risks as being less enjoyable, more unpleasant, less likely to cause gains and more likely to cause losses. We also predicted that the older adults would find the social risks to be more enjoyable, less unpleasant, more likely to cause gains and less likely to cause losses than the young adults.

Study 2

Method

Participants

Participants (n = 182) ranging in age from 18 to 83 years were divided into three age groups: young adults (18-25 years; 39 males, 41 females, *M* = 20.19, *SD* = 2.35), adults (26 to 59 years; 26 males, 34 females, *M* = 34.67, *SD* = 8.87), and older adults (60 to 83 years; 18 males, 24 females, *M* = 69.40, *SD* = 6.47). Most of the young adults (N=48) were recruited from the University of Michigan Psychology subject pool and received course credit for participation; the other young adults (N=22) and the participants in the middle-age group were recruited online through the Amazon Turk website and received $0.25 for their participation[3]. Participants in the older adult group were recruited from a shared older adult database at the University of Michigan via telephone and received $10.00 for participating. The majority of the participants self-defined as Caucasian (N=142) while the rest self-defined as Asian/Asian-America (N=17), Black/African-American (N=11), Latino/Hispanic (N=11) and other (N=1).

Materials

Risk Items. Fifteen risky behaviors/situations were chosen from the original forty items in Study 1 (see starred items in Appendix A). For Study 2, we used the five risk items showing the strongest age effect for each of the three risk domains. When Study 1 was reanalyzed using only the 15 most effective items, the results remained the same.

Behavior Intention and Risk Perception. As in Study 1, participants rated the likelihood that they would engage in each behavior as well as its perceived riskiness. Internal consistency for the risk intention question was low for two of the risk domains: Social Risk (5

[3]Again, no differences were found for our main results between the young adults recruited from Amazon Turk and the young adults recruited from the University of Michigan subject pool.

items; α=.57) and Health/Safety Risk (5 items; α=.62), but acceptable at the .70 level for Ethical Risk (5 items; α=.70). Internal consistency for the risk perception question was acceptable at the .70 level for the two risk domains: Social Risk (5 items; α=.74) and Ethical Risk (5 items; α=.78). Internal consistency was lower for the Health/Safety domain (5 items; α=.64). Subscales were created for behavior intention and risk perception for each of the risk domains using the average of the items in each domain.

Risk Motivations. To identify the reasons that people choose to engage in risky behaviors in different domains, participants were asked whether each of the following factors influenced their decisions for each risky situation: whether they would find the behavior enjoyable, whether they would find the behavior unpleasant, whether they thought they might gain something from the behavior, and whether they thought they might lose something. From these data, four subscales were created by adding participants' scores together: 1) An enjoyment subscale ranging from 0-5 in which 0 indicated that the participant did not enjoy any of the risky behaviors in that domain and 5 indicated that the participant enjoyed all of them 2) an unpleasantness subscale using similar methods; 3&4) Gain and loss subscales with scores ranging from 0-5 in which 0 indicated that the participant would not gain or lose anything by engaging in any of the risky behaviors in that domain and 5 indicated that the participant would gain or lose something by engaging in all of them.

Participants also rated how enjoyable/unpleasant it was on a 5-point scale ranging from "Not at all enjoyable (or unpleasant)" to "Extremely enjoyable (or unpleasant)" and were given an open-ended question where they identified what they would gain or lose and then rated the likelihood of gaining or losing it on a 7-point scale ranging from "Extremely Unlikely" to "Extremely Likely."

Past Behavior. Participants were asked whether they had engaged in the risky behavior in the past. Possible responses for this question were: "never engaged in this behavior," "engaged in this behavior in the past year," and "engaged in this behavior (not including the past year)." Participants indicated whether they ever had the opportunity to engage in this behavior.

Sensation-Seeking Scales. We included two sensation-seeking scales: the Brief Sensation Seeking Scale (BSSS) (Hoyle et al., 2002) and the Need Inventory for Sensation Seeking (NISS) (Roth & Hammelstein, 2012). The BSSS focuses on specific behaviors (e.g. "I would like to try bungee jumping") while the NISS asks more general questions (e.g. "I like to find myself in situations which make my heart beat faster").

Procedure

The procedure for Study 2 was the same as in Study 1. Participants completed the survey either online or in a lab at the University of Michigan. Participants were told that they would be answering a series of questions regarding their thoughts and behaviors about risky situations. The questions were presented in the same order for all participants with the behavior intention questions occurring first, followed by the risk perception questions, the risk factor questions and then the sensation-seeking scales. Participants answered demographic questions at the end of the survey.

Results

Correlations

Similar to Study 1, all of the risk domains for risk perceptions were correlated. Health/safety and ethical risk perceptions were highly correlated ($r = .74$, $p < .01$); social risks had lower correlations with health/safety risks ($r = .31$, $p < .01$) and ethical risks ($r = .27$, $p < .01$). Health/safety and ethical risk intentions were also highly correlated ($r = .61$, $p < .01$).

However, social risk intentions had a low correlation to health/safety risk intentions (r = .15, p = .05) and was not significantly correlated with ethical risk intentions (r = .10, p > .05). These correlations support the idea that health/safety and ethical risks are highly related with each other whereas social risks appear to be different. We also found significant negative correlations between risk perceptions and risk intentions for all three domains ranging from -.44 to -.56 indicating that risk perception plays a role in whether people are likely to report they would engage in risky behavior.

Sensation Seeking

Age differences on the two sensation-seeking scales were examined using univariate ANOVAs with age group as the independent variable and the sensation-seeking scales as the dependent variables. Age had a significant effect on both the BSSS (F(2, 169) = 20.78, p < .01) and the NISS (F(2, 169) = 9.79, p < .01). As predicted, for the BSSS, young adults (M = 25.73, SD = 6.09) scored significantly higher than the adults (M = 21.31, SD = 6.38; p < .01) and the older adults (M = 18.45, SD = 4.95; p < .01). Older adults also scored significantly lower than the adults (p < .05). For the NISS, young adults (M = 50.88, SD = 7.60) also scored significantly higher than the adults (M = 45.02, SD = 9.55; p < .01) and the older adults (M = 45.56, SD = 7.67; p < .01). However, adults and older adults did not differ on their NISS scores.

Age Differences on Risk Intentions and Risk Perceptions

The patterns of age differences for risk perceptions and risk intentions mostly replicated the results of Study 1 showing that older adults tended to see more risk and rate themselves as less likely to engage in risky behavior for health/safety and ethical risks but not for social risks. The effects of age on risk perceptions and risk intentions were examined using univariate

ANOVAs with age group as the independent variable and risk intention and risk perception as the dependent variables.

Health/Safety Risks. Replicating Study 1, for the health/safety risk domain, age had a significant effect on risk perceptions, ($F(2, 174) = 6.01$, $p < .01$) and intentions ($F(2, 175) = 8.60$, $p < .01$; see Figure 2.1). Pairwise planned contrasts showed that older adults ($M = 5.32$, $SD = 0.97$) rated health/safety risks as more risky than young adults ($M = 4.81$, $SD = 0.94$; $p < .01$) and adults ($M = 4.66$, $SD = 0.97$; $p < .01$). Pairwise planned contrasts also showed that older adults ($M = 2.48$, $SD = 1.02$) were significantly less likely to say they would engage in risky health or safety behaviors than young adults ($M = 3.41$, $SD = 1.05$; $p < .01$) and adults ($M = 3.21$, $SD = 1.31$; $p < .01$). No differences were found between adults and young adults for risk perceptions or intentions.

Ethical Risks. As in Study 1, the ethical risk domain resembled the health/safety domain for risk intention and risk perception (see Figure 2.2). Age had a significant effect on both risk perceptions ($F(2, 174) = 4.75$, $p = .01$) and risk intentions ($F(2, 171) = 13.18$, $p < .01$). Pairwise planned contrasts demonstrated that the older adults ($M = 5.57$, $SD = 1.12$) rated the ethical risk items as significantly more risky than the young adults ($M = 4.93$, $SD = 1.02$; $p < .01$) and the adults ($M = 4.98$, $SD = 1.24$; $p = .01$). Pairwise planned contrasts also showed that the young adults ($M = 2.64$, $SD = 1.10$) were significantly more likely to say that they would engage in the risky behaviors than the adults ($M = 2.28$, $SD = 1.17$; $p < .01$) and the older adults ($M = 1.57$, $SD = 0.71$; $p < .01$). Older adults were also significantly less likely to say they would engage in the risky behaviors than the adults ($p < .05$).

Social Risks. For the social risk domain, the results were again reversed (see Figure 2.3). Age had a significant effect on risk perception in the social domain ($F(2, 172) = 3.82$, $p < .05$).

Young adults (M = 2.73, SD = 1.06) rated the social risk items as significantly more risky than adults (M = 2.32, SD = 1.07; $p < .05$) and older adults (M = 2.28, SD = 0.77; $p < .05$). Age also had a significant effect on risk intention ($F(2, 174) = 5.67$, $p < .01$): young adults (M = 4.61, SD = 0.91) were significantly less likely to say they would engage in social risks than older adults (M = 5.26, SD = 0.95; $p < .05$) and marginally less likely to say they would engage in social risks than adults (M = 4.94, SD = 1.15; $p = .06$). No differences were found between the adults and older adults for either risk intention or risk perception.

As in Study 1, we conducted a test of interaction using a 3x2x3 ANOVA with risk domain and risk perceptions/intentions as within-subjects factors and age group as a between-subjects factor with contrasts to compare the age difference pattern seen in the health/safety and ethical risks to the pattern found in the social risks. This interaction effect comparing young and older adults was statistically significant ($F(2,161) = 19.46$, $p < .01$).

Motivational Factors

The enjoyment, unpleasantness, gain and loss subscales were analyzed for differences among the age groups in reasons for engaging in the risky behaviors (see Table 2.4 for means). As older adults rated themselves less likely to engage in the health/safety and ethical risks, we expected that they would also rate these risks as less enjoyable, more unpleasant, less likely to cause gains and more likely to cause losses than the young adults. We also expected that the older adults would find the social risks more enjoyable, less unpleasant, more likely to cause gains and less likely to cause losses than the young adults.

Health/Safety Risks. For the health/safety domain, as predicted, age had a significant effect on enjoyment ($F(2,179) = 8.30$, $p < .01$) and gain ($F(2, 179) = 6.49$, $p < .01$). Older adults (M = 0.33, SD = 0.57) were less likely to enjoy the risky health/safety behaviors than young

adults (M = 1.00, SD = 0.95; $p < .01$) or adults (M = 1.10, SD = 1.04; $p < .01$). Additionally, the young adults (M = 0.69, SD = 0.84) stated that they were more likely to gain something by engaging in the risky behaviors than adults (M = 0.42, SD = 0.87; $p < .51$) or older adults (M = 0.17, SD = 0.44; $p < .01$). Age also had a significant effect on unpleasantness ($F(2, 179) = 3.77$, $p < .05$). However, the effect contradicted our predictions as young adults (M = 2.70, SD = 1.22) rated the health/safety risks as more unpleasant than adults (M = 2.20, SD = 1.52; $p < .05$) or older adults (M = 2.02, SD = 1.67; $p < .01$). No age differences were found for perceived loss.

Ethical Risks. For ethical risks, the pattern was again similar to the health/safety domain. Age had a significant effect on the enjoyment ($F(2, 179) = 5.59$, $p < .01$) and gain subscales ($F(2, 179) = 8.74$, $p < .01$). Older adults (M = 0.21, SD = 0.65) rated the ethical risks as less enjoyable than the young adults (M = 0.66, SD = 0.86; $p < .01$) or adults (M = 0.77, SD = 0.98; $p < .01$). Older adults (M = 0.55, SD = 1.11) also said they were less likely to gain something than the young adults (M = 1.74, SD = 1.54; $p < .01$) or adults (M = 1.35, SD = 1.66; $p < .01$). No age differences were found for unpleasantness or loss.

Social Risks. In the social domain, young adults (M = 1.18, SD = 1.19) were less likely to enjoy socially risky behavior than adults (M = 1.63, SD = 1.48; $p < .05$), while older adults (M = 1.31, SD = 1.20) did not differ from either young adults or adults. Age also had a significant effect on unpleasantness ($F(2, 179) = 10.31$, $p < .01$) and losses ($F(2, 179) = 3.55$, $p < .05$). Young adults (M = 2.19, SD = 1.44) rated socially risky behaviors as more unpleasant than adults (M = 1.50, SD = 1.27; $p < .01$) or older adults (M = 1.07, SD = 1.31; $p < .01$) and said they were (M = 2.08, SD = 1.52) more likely to lose something by engaging in socially risky behavior than older adults (M = 1.36, SD = 1.48; $p = .01$).

Discussion

The correlations across risk domains suggest a general risk trait for both risk perceptions and behavioral intentions. In both studies, we found significant correlations among domains for both risk perceptions, suggesting that people who see risk in one domain tend to see risk in other domains as well, and for risk intentions, suggesting that people generally engage in or avoid risky behavior across the board. However, the size of the correlations varied indicating that some risk domains may be more related than others.

Health/safety risks and ethical risks showed high correlations and similar age difference suggesting that they may be highly related. Although these domains may seem different at first glance, there are similarities. Morality is inherent in ethical risks; there is an obvious "right" way and a "wrong" way to behave. However, the risky health behavior items also contain some underlying morality concerns. Unhealthy lifestyles, including behaviors such as smoking, eating unhealthy foods and practicing unsafe sexual behavior, may appear to harm only the person doing them, but these behaviors can also be interpreted as harming others; for instance, second-hand smoke may cause lung cancer, unsafe sex can spread sexually transmitted disease and unhealthy behaviors lead to rising health care costs. Unhealthy behaviors are associated with vice while healthy behaviors are seen as virtuous (Leichter, 1997). On the other hand, the risky social behaviors are morally neutral. Although it might be rude to talk back to an authority figure or disagree with a friend, whether it is right depends on the circumstances.

Health risks and environmental risks also show relatively high correlations, although health risks showed age differences while environmental risks did not. These high correlations make sense as environmental risks could be considered a subcategory of health risks; ones' health is at risk in risky environments. However, they differ from the other health/safety items in how much control one has over taking the risks. Although it is possible to avoid some

environmental risks (e.g. buying organic food to avoid pesticides), others are unavoidable. This lack of control also affects the morality of the behaviors: if people get lung cancer after smoking for 30 years, it is considered their fault but if they get lung cancer from second-hand smoke, they are considered unfortunate rather than blameworthy.

However, even assuming some general risk tendencies, there is variance between domains. Whether older adults are more risk-averse than young adults depends on the kind of risk. In both Study 1 and Study 2, older adults perceived more health and safety risks and rated themselves as less likely than young people to engage in risky behaviors in these domains. However, in the social domain the pattern was reversed: older adults actually perceived less risk and rated themselves as more likely to engage in the risky behaviors than the young adults. These results suggest that risk perceptions and risk preferences are highly dependent on domain, and results from one domain may not generalize.

Our findings may help explain the conflicting results in this field. Most experiments focus solely on risks in a single domain (Mather, 2006). If risk attitudes are domain-dependent, then a study that examines risk in one domain may have different results than a study that examines a risk in a different domain. In other words, a study on health/safety risks may not generalize to social or even ethical risks.

Our studies also investigated the role of motives. Risk-return models examine trade-offs between the perceived benefits and risks in order to decide on the best course of action (Weber, 1998). These models assume that people weigh the benefit they would receive for engaging in a risky behavior against the risk, and might provide an explanation for the age differences we found. In Study 2, we measured benefits and risks including enjoyment, unpleasantness, potential losses and potential gains. Older adults rated health/safety and ethical risky behaviors

as less enjoyable, and less likely to cause gains than young adults, suggesting that the older adults refrain from taking health/safety risks because they see fewer benefits. Older adults also rated socially risky behaviors as more enjoyable, less unpleasant and less likely to cause losses than young adults, indicating that the older adults see more benefits and less risk in risky social behaviors than their younger counterparts.

Limitations

One limitation to our studies is that they used self-report for both behavior and motives. To compare a variety of risk domains, we wanted measures of many different risks, which ruled out the measurement of actual behaviors. Self-reports of behavior can be somewhat unreliable especially when asking about undesirable behavior such as risky behavior. Although we believe it is unlikely that social desirability factors influence older and younger adults differently, it is possible that participants may have generally underestimated their propensity for risky behavior or the potential benefits (or enjoyment) they might receive from engaging in the risky behavior. Another limitation is that there could have been order effects since all participants saw the items in the same order. We believe that while this might have increased or decreased risk perceptions or behavioral intentions for individual items, it is unlikely to have influenced the age effects.

One final limitation is that overall our social risky behaviors were rated as less risky than the health/safety or ethical risky behaviors. This is potentially problematic as it is possible that the age differences seen between domains could be due to risk level rather than domain. We examined this possibility by examining individual items within the risk domains. We looked at the social risk item that was rated as most risky (M = 3.76, SD = 1.61; disagreeing with an authority figure on a major issue) and the health/safety item that was rated as least risky (M = 3.13, SD = 1.59; drinking out of the same glass as someone else). For the social risk item older

adults (M = 5.20, SD = 1.64) were significantly more likely to say that they would engage in the behavior than the young adults (M = 3.94, SD = 1.63; $F(2, 177) = 6.76$, $p < .01$). For the health risk item older adults (M = 3.37, SD = 1.87) were significantly less likely to say that they would engage in the behavior than the young adults (M = 4.76, SD = 1.86; $F(2, 175) = 7.04$, $p < .01$). This shows that we are finding opposite patterns in behavioral intentions across domain even with moderate risks in both domains.

Implications and Future Directions

Although it is generally believed that older adults avoid risks, our research suggests that this depends on the risk domain. In our studies, older adults were less risk-seeking in health/safety and ethical domains but more risk-seeking for social risks, suggesting that people do not become more risk-averse as they age but rather that the domain that they worry about may change. Young healthy adults may see health and safety risks as more enjoyable and more likely to provide them with benefits (e.g. looking cool). For example, when asked what would be gained by "consuming five or more alcoholic drinks in a single evening," one young participant wrote "friends due to lower inhibitions." Thus this participant is willing to take a health risk for the possibility of a social gain. In the social risk domain, young adults see themselves as having more to lose by taking risks. In describing what might be lost by "going to a social event by yourself," one young participant said "social status as being seen as having no friends." Again, what dictates the behavior of the young adult participants seems to be a preoccupation with social relationships. As young adults tend to have less stable social relationships than older adults, it seems reasonable that they should be more concerned with establishing themselves socially.

On the other hand, older adults tend to have more established social networks but increasing health concerns. Therefore, older adults may be more concerned with physical precautions and less willing to take risks that might result in injury. Older adults said they were to enjoy health risks or to gain something from engaging in the risky behaviors. They also saw themselves as more likely to lose something and the most common answer for what might be lost in the health/safety risks was "my life." A further question is whether different age groups process the risk information differently. For instance, fuzzy trace theory suggests that there are two types of processing -- gist-based (less precise, more qualitative) and verbatim (more precise, more quantitative), which can influence how people make decisions that involve risk (Reyna, 2004). Reyna and colleagues found that these processes can vary by age such that adolescents used more verbatim-based processing while adults used more gist-based processing (Reyna et al, 2011). If this trend continues as we age, the older adults may use even more gist-based processing. The current research did not measure type of processing but future research could examine the role of type of processing in age differences in risk.

Another question is which of the motivations are most important for each age group? The risk return models suggest that people evaluate the costs and benefits of engaging in the risky behavior and make a decision based on the overall analysis. Contrary to our expectations we found that young adults rated health/safety risks as more unpleasant than the older adults yet they also rated themselves as more likely to engage in the behaviors. This suggests that the young adults feel that possible gains are worth some unpleasantness. Future research could investigate whether gains or losses are more important and possibly better predictors of risky behavior for each age group.

Our research omitted some important domains, such as financial risk. With our diverse population, we were unable to find financial items that were equally relevant for both young and older adults. The young adults in our sample were college students who mostly did not have a steady income or pay for their own expenses while the older adults were mostly retired and had different types of incomes that may not accurately predict their level of wealth. Therefore, we had trouble finding hypothetical financial risky behaviors which would overlap for the two different populations. Further, research on age differences in financial risk shows inconsistent results. Some studies found that older adults perform worse on gambling tasks (Fein, McGillivray, & Finn, 2007; Denburg, Tranel, & Bechara, 2005). However, one study using the IGT found that a subset of older adults showed better decision-making skills than younger adults (Denburg, Recknor, Bechara, & Tranel, 2006). Some research has found that there is a curvilinear relationship between financial risk tolerance and age, such that people tend to become more risk-seeking until they reach retirement, at which point they become less risk-seeking (e.g. Riley & Chow, 1992). Older adults have also been shown to have different neural activation when faced with financial decisions (Harle & Sanfey, 2012). These results indicate that age and financial risk may have a more complicated relationship as we did not observe reversals in the trends for any of the five risk domains we tested (see footnote 2).

Future research should examine differences within domains in addition to differences between domains. Although we included multiple risky behaviors for each domain, there are many other risky behaviors in each domain that might be examined. As there is variability among domains, there may also be variability within each domain. For instance, some health/safety risks may be more appealing to young adults while others are more appealing to older adults. Future research should examine this within-domain heterogeneity. In addition, we

defined our risk domains based on the domain of the possible loss. However, as we saw in the young adults with the health/safety risks, the gains were not always in the same domain as the loss. A health risk was sometimes seen as worth taking in exchange for a social gain. Future research could investigate the relative importance of losses and gains in domains other than the primary domain defined by the loss.

While our studies illustrate significant age differences in risk preferences across domains, further research is needed to fully understand why these differences occur. Using our qualitative data, we have begun to speculate on how and why risk preferences change throughout the lifespan. However, future research should delve further into the types of gains and losses for each risk domain and how these tradeoffs relate to the participants' enjoyment of the risky behavior.

Table 2.1

Correlations Between Risk Intention Subscales

Domain	Health/Safety Risk	Ethical Risk	Environmental Risk	Other Risk
Social Risk	0.225**	0.159*	0.340**	0.323**
Health/Safety Risk		0.784**	0.516**	0.615**
Ethical Risk			0.407**	0.542**
Environmental Risk				0.588**

Note. *p<.05, **p<.01

Table 2.2

Correlations Between Risk Perception Subscales

Domain	Health/Safety Risk	Ethical Risk	Environmental Risk	Other Risk
Social Risk	0.299**	0.272**	0.185**	0.475**
Health/Safety Risk		0.748**	0.705**	0.724**
Ethical Risk			0.531**	0.626**
Environmental Risk				0.546**

Note. *p<.05,**p<.01

Table 2.3

Risk Perception and Risk Intention Means for all Domains

		Health/Safety Risk	Ethical Risk	Social Risk	Environmental Risk	Other Risk
Risk Perceptions	Young Adults	*M* = 4.99 *SD* = 0.85	*M* = 4.89 *SD* = 1.07	*M* = 2.83 *SD* = 1.02	*M* = 5.42 *SD* = 0.95	*M* = 4.65 *SD* = 0.88
	Adults	*M* = 5.08 *SD* = 1.02	*M* = 4.97 *SD* = 1.21	*M* = 2.48 *SD* = 0.99	*M* = 5.49 *SD* =1.06	*M* = 4.33 *SD* = 1.03
	Older Adults	*M* = 5.55 *SD* = 1.19	*M* = 5.77 *SD* = 1.16	*M* = 2.45 *SD* = 0.94	*M* = 5.56 *SD* = 1.39	*M* = 4.76 *SD* = 1.11
Risk Intentions	Young Adults	*M* = 3.18 *SD* = 1.06	*M* = 2.58 *SD* = 1.07	*M* = 4.57 *SD* = 0.96	*M* = 2.71 *SD* = 1.04	*M* = 2.84 *SD* = 1.08
	Adults	*M* = 2.77 *SD* = 1.19	*M* = 1.97 *SD* = 1.08	*M* = 4.87 *SD* = 1.13	*M* = 2.95 *SD* =1.17	*M* = 3.03 *SD* = 1.04
	Older Adults	*M* = 1.85 *SD* = 0.82	*M* = 1.51 *SD* = 0.68	*M* = 4.88 *SD* = 0.95	*M* = 2.36 *SD* = 0.99	*M* = 2.53 *SD* = 1.00

Table 2.4

Risk Motivation Means for all Domains

Risk Domain	Motivation	Young Adults	Adults	Older Adults
Health/Safety Risks	Enjoyment	*M* = 1.00 *SD* = .95	*M* = 1.10 *SD* =1.04	*M* = 0.33 *SD* = .57
	Unpleasantness	*M* = 2.70 *SD* =1.22	*M* = 2.20 *SD* = 1.52	*M* = 2.02 *SD* = 1.67
	Gain	*M* = 0.69 *SD* = 0.84	*M* = 0.42 *SD* = 0.87	*M* = 0.17 *SD* = 0.44
	Loss	*M* = 3.34 *SD* = 1.55	*M* = 3.62 *SD* = 1.32	*M* = 3.60 *SD* = 1.21
Ethical Risks	Enjoyment	*M* = 0.66 *SD* = 0.86	*M* = 0.77 *SD* = 0.98	*M* = 0.21 *SD* = 0.65
	Unpleasantness	*M* = 2.64 *SD* = 1.54	*M* = 2.23 *SD* = 1.74	*M* = 2.36 *SD* = 1.83
	Gain	*M* = 1.74 *SD* = 1.54	*M* = 1.35 *SD* = 1.66	*M* = 0.55 *SD* = 1.11
	Loss	*M* = 3.23 *SD* = 1.65	*M* = 3.63 *SD* = 1.54	*M* = 3.36 *SD* = 1.64
Social Risks	Enjoyment	*M* = 1.18 *SD* = 1.19	*M* = 1.63 *SD* = 1.48	*M* = 1.31 *SD* = 1.20
	Unpleasantness	*M* = 2.19 *SD* = 1.44	*M* = 1.50 *SD* = 1.27	*M* = 1.07 *SD* = 1.31
	Gain	*M* = 2.90 *SD* = 1.66	*M* = 2.60 *SD* = 1.66	*M* = 2.93 *SD* = 1.61
	Loss	*M* = 2.08 *SD* = 1.52	*M* = 1.67 *SD* = 1.37	*M* = 1.36 *SD* = 1.48

Figure 2.1

Risk perceptions and behavioral intentions for health/safety risks across the three age groups. Error bars represent one standard error above and below the mean.

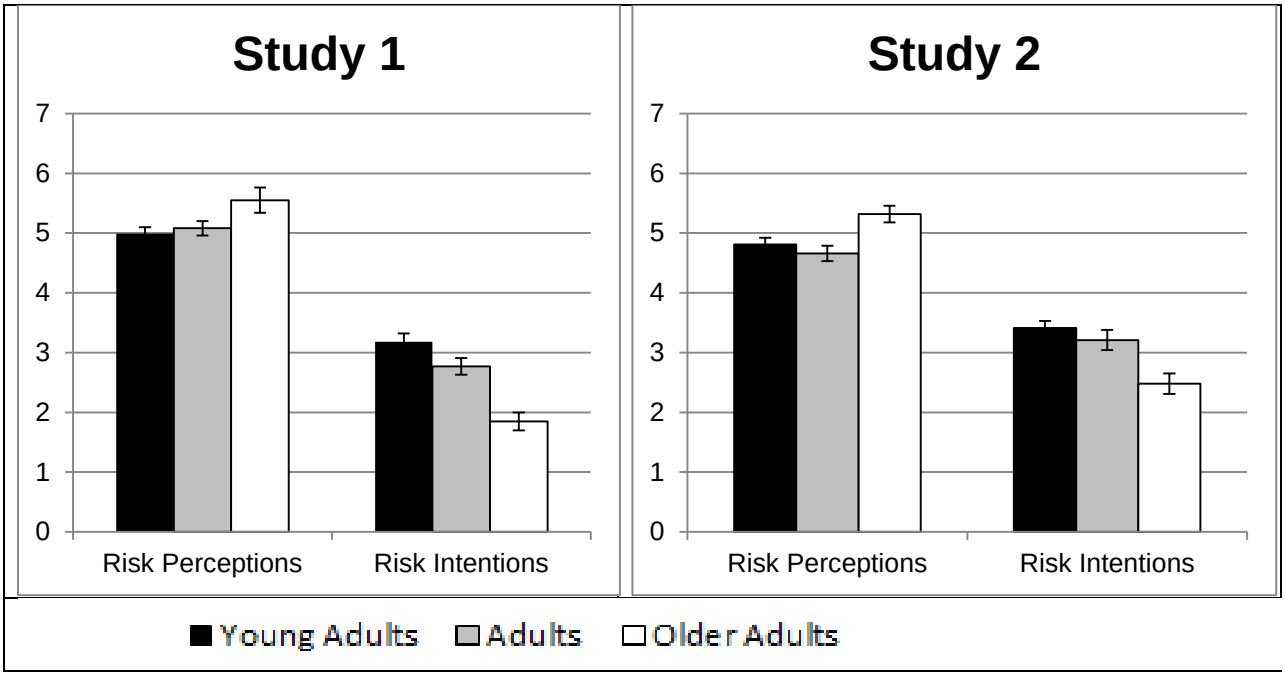


Figure 2.2

Risk perceptions and behavioral intentions for ethical risks across the three age groups. Error bars represent one standard error above and below the mean.

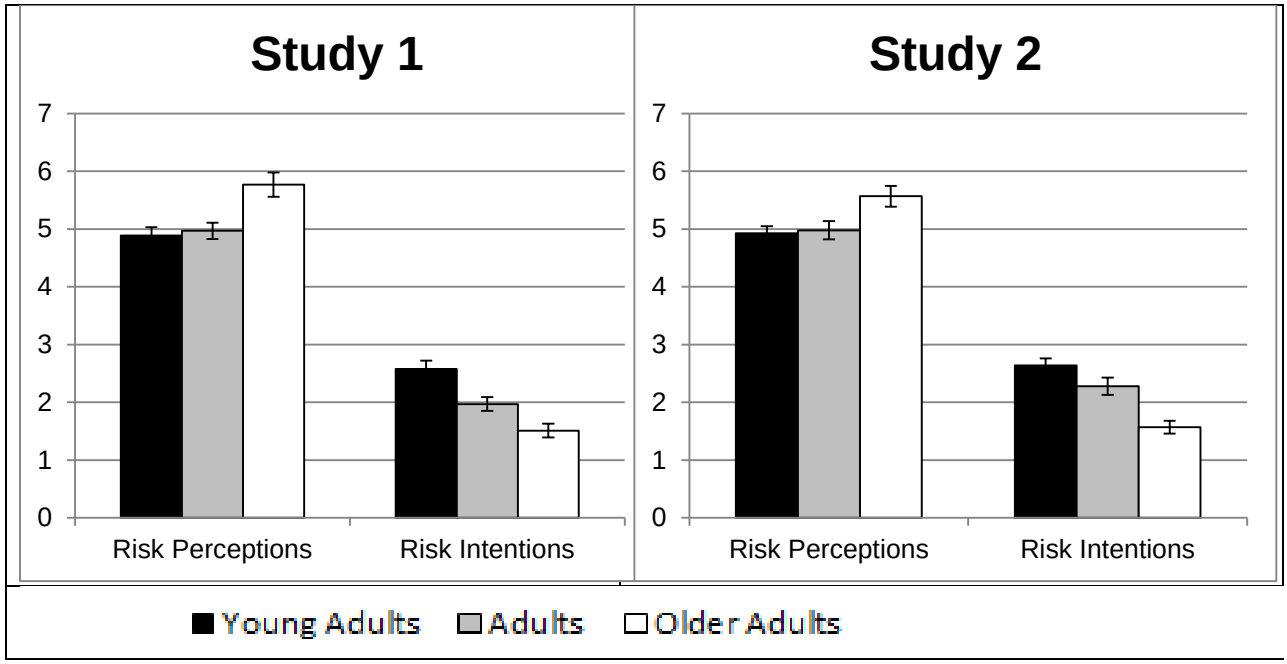
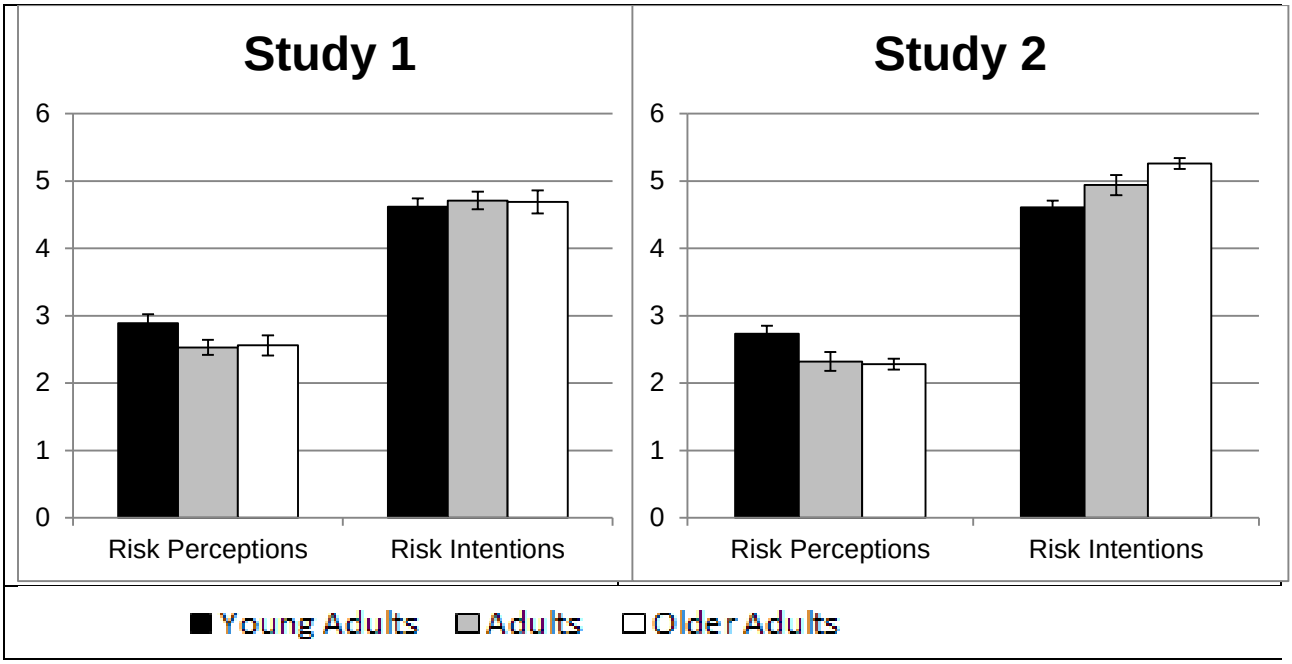


Figure 2.3

Risk perceptions and behavioral intentions for social risks across the three age groups. Error bars represent one standard error above and below the mean.



CHAPTER III
Emotional Valence and Certainty on Social Risks

Do you put on your seatbelt when you get in the car? Do you buy a lottery ticket at the grocery store? Do you raise your hand in class when you are not quite sure of the answer? We are all faced with decisions involving risk and one important influence on our decisions is our feeling at the time of the decision. Research on the effects of emotions on judgments of risk has looked mainly at differences between positive and negative emotions in general. Recent studies have examined individual emotions and their effects on risky decision making. However, another way to categorize multiple emotions is to examine the appraisals associated with the emotions. The current research examines the effects of four emotions that vary on the dimensions of certainty and valence to investigate their independent roles on judgments of risk in several domains.

Emotion and Risk

Decision making models originally focused only on cognitive factors and recently have started to incorporate emotions. Emotions can affect decision making in a number of different ways and there are a variety of types of emotions that can be examined. In the current research, we chose to focus on incidental emotions. Incidental emotions can be defined as immediate emotions, or current feeling states, that are unrelated to the given task or decision. For instance, imagine that you deciding whether or not to buy a lottery ticket. You might be feeling happy because earlier that day your paper was accepted by JPSP or you might be feeling unhappy because your paper was rejected yet again by JPSP. Either way, your current mood might affect

whether or not you choose to buy the lottery ticket but your mood is not caused by the situation revolving around the lottery ticket purchase. Incidental emotions have been demonstrated to affect a variety of judgments including judgments of overall happiness (Schwartz & Clore, 1983) and criminal sentencing (Lerner, Goldberg, & Tetlock, 1998).

There are many studies that examine the effects of incidental emotions, or more generally mood, on decisions involving risk. Participants primed with positive mood, as compared to participants primed with negative mood, have been shown to demonstrate higher levels of optimism (e.g. Mayer, Gaschke, Braverman & Evans, 1992), to feel greater self-efficacy (Kavanagh & Bower, 1985), and to perceive less risk (e.g. Johnson & Tversky, 1983). Wright and Bower (1992) also found that participants in a positive mood rated positive events as more likely to occur and negative events as less likely to occur while participants in a negative mood rated positive events as less likely to occur and negative events more likely to occur.

Appraisal-Tendency Framework

Until recently, most research on the effects of emotions on judgment has focused on emotion valence. However, recent research has questioned the validity of focusing solely on the effects of emotion valence. For example, Small and Lerner (2008) found that incidental sadness and anger influenced judgments about welfare assistance differently such that anger decreased the welfare assistance amounts participants felt were appropriate while sadness increased the amounts. These effects have also been found specifically for decisions involving risk. For instance, Lerner, Gonzalez, Small and Fischhoff (2003) found that fear and anger have distinct effects on risk judgments such that fear tends to lead to more pessimistic expectations and risk-avoidance while anger tends to lead to more optimistic expectations and risk-seeking.

Although much of the current research on emotions focuses on the effects of specific individual emotions, there is some evidence that there may be some broader categories. Appraisal theories of emotion propose that emotions can be evaluated on a variety of different cognitive dimensions so that each emotion has a unique profile (e.g. Scherer, 1984; Smith & Ellsworth, 1985). In their appraisal theory, Smith and Ellsworth (1985) identified six cognitive dimensions that differentiate between emotional experiences: certainty, pleasantness, attentional activity, control, anticipated effort and responsibility. Using their dimensions, one can distinguish between two negative emotions, such as fear and anger, that may be similar on pleasantness but differ on other dimensions such as certainty and control. The Appraisal-Tendency Framework created by Lerner and Keltner (2000) proposes that each emotion is associated with varying levels of each of the cognitive dimensions and that these associations influence how future events are evaluated. For instance, if one is feeling hopeful, which is high on pleasantness but low on certainty, future events may be seen as more pleasant but less certain than they would otherwise.

The dimension of certainty distinguishes between specific emotions both positive and negative. Tiedens and Linton (2001) demonstrated that experiencing emotions associated with certainty tended to lead to more heuristic processing while experiencing emotions associated with uncertainty tended to lead to more systematic processing. Fear (an emotion associated with uncertainty) has also been found to make people more responsive to variations in procedural justice than disgust (an emotion associated with certainty) (De Cremer & Van Hiel, 2008). Finally, in a study on dispositional fear and anger, Lerner and Keltner (2001) found that fear and anger had opposite effects on risk perception such that fearful people were more risk-averse while angry people were more risk-seeking. Furthermore, these effects were mediated by

appraisals of certainty and control. The basic theory in comparing emotions associated with high or low levels of certainty is that experiencing emotions that are associated with a sense of certainty leads people to feel that they already have enough information to feel confident in their judgments whereas experiencing emotions which are associated with uncertainty can lead people to feel that they should carefully examine all information prior to making their decision.

Risk Domains

There can be risk in almost every aspect of life. Yates and Stone (1992) defined the risk construct as being comprised of potential losses and controlled by the significance and the certainty of these losses. For example, suppose that one is given the choice between two options. In Option A, you are guaranteed to lose a specific amount of money while in Option B you have the possibility of losing money but also the possibility of not losing anything. Both options include potential losses but whether there is risk involved depends on the amount and the probabilities. If Option A involves losing $1.00 and Option B involves losing $1.01, not much risk is involved. Now, suppose Option A guarantees a loss of $100 while Option B has a 99.9% possibility of losing $100 and a 0.1% possibility of not losing anything. This situation still does not involve much risk as the probabilities are so extreme. However, if Option A guarantees a loss of $10 while Option B has a 50% chance of losing $0 and a 50% chance of losing $20, Option A is clearly a safer choice while Option B involves some risk.

Financial and health risks are typically the easiest to quantify, which has led the field of emotions and risky decision making to focus mainly on risks in these domains. However, risky situations can occur in many different domains. Weber et al. (2002) developed the Domain-Specific Risk-Taking (DOSPERT) scale that examines individual differences in risk preference across a variety of domains. The DOSPERT outlines five main domains of risk: ethical (e.g.

cheating on an exam), financial (e.g. betting money on a sporting event), health/safety (e.g. consuming five or more servings of alcohol in a single evening), recreational (e.g. going bungee jumping off of a bridge) and social (e.g. going on a blind date).

Most studies that examine the effects of emotion on risky behavior assume that risky behavior in one domain will generalize to other domains. However, few if any studies have actually examined risks from the social domain. This is potentially problematic as what little research we have suggests that social risks may not coincide with risks in other domains. For example, although typically men tend to be more risk-seeking than women, this gender difference is not found in social risks (Weber et al., 2002). Furthermore, the domain of social risk may be particularly relevant to the normal participant population. Most social psychological studies use samples of college students who are young and usually in good financial situations. Due to these factors, they may be more concerned with risks related to their social relationships rather than financial or health risks.

Although social risks may be more difficult to quantify, it is easy to see how they might relate back to Yates' definition of risk. For instance, imagine a risk from the social domain, such as disagreeing with an authority figure. Arguing with your boss could have serious negative consequences (or losses) such as losing your job, and depending on the personality of your boss, the probability of such an event occurring could vary. Furthermore, in real life situations, we are often not given the possible outcomes or the probabilities that each outcome will occur for every risky situation that we encounter. When deciding whether to start that argument with your boss, there may a variety of different negative outcomes that might occur (such as getting fired, being demoted, upsetting your coworkers etc.) and the probability of each is most likely totally unknown.

Current Studies & Hypotheses

Although there is some research examining how emotions affect risky decisions, few have looked at dimensions of certainty as well as valence and none have examined these effects on a measure of social risk. The current studies investigated the effects of different emotions that vary on valence and certainty on judgments involving risk in a social domain. In order to examine these specific dimensions, we chose four emotions which vary on valence and certainty but are similar on other cognitive dimensions. Our two positive emotions were happiness, an emotion high on certainty and hope, an emotion low on certainty. Our two negative emotions were anger (high certainty) and fear (low certainty).

In addition to examining the effects of emotion valence and certainty, we also assessed participants' own estimates of possible outcomes for the risky situations as well as their ultimate choice between a more risky and a less risky option. The theory is that incidental emotions or mood states affect judgments about risk by influencing people's cognitive processes regarding possible outcomes for a risky situation. For example, if you are deciding whether or not to buy a lottery ticket, you might think of all of the possible events that might happen if you do or do not buy the ticket. For instance, you might imagine winning the jackpot or winning a smaller amount of money. You might also imagine spending the money on the ticket but not winning anything. Depending on the situation, there could be an infinite number of different possible outcomes and your current emotions might affect which of these outcomes come to mind more quickly.

More specifically, the hypothesis was that experiencing a sense of certainty would lead to more heuristic processing of information and therefore produce fewer possible outcomes while experiencing a sense of uncertainty would lead to a more systematic processing of information

and produce a greater number of possible outcomes. This does not necessarily mean that experiencing emotions associated with certainty would lead to more risk-aversion or risk-seeking than experiencing emotions associated with uncertainty. Rather, we hypothesized that the content of the outcomes would be influenced by the valence of the emotion. In particular, an emotion associated low certainty and negative valence (fear) would lead to a greater number of outcomes that are mostly negative while an emotion associated with high certainty and negative valence (anger) would lead to fewer outcomes produced that are mostly negative. Conversely, an emotion associated with low certainty and positive valence (hope) would lead to a greater number of outcomes that are mostly positive while an emotion associated with high certainty and positive valence (happiness) would lead to fewer outcomes but still mostly positive. Finally, we hypothesized that judgments about how likely participants are to engage in the risky behavior would be based on the number of outcomes as well as the ratio of positive to negative outcomes produced such that participants in the hope condition would be the most likely to choose to engage in the risky behavior, followed by participants in the happiness condition, followed by the control condition, followed by participants in the anger condition and finally participants in the fear condition should be least likely to choose to engage in the risky behavior.

Study 1a

Method

Participants

One hundred forty two participants (73 female, 68 male) from the University of Michigan were recruited from the introductory psychology subject pool. Participants received course credit for participation. Participants ranged in age from 18 to 22 years (M = 18.76, SD = .86). The majority of the participants self-defined as Caucasian (N = 103) while the rest self-defined

as Asian/Asian-American (N = 18), Black/African-American (N = 6), Hispanic (N = 5) and Other (N = 8).

Materials

Emotion Induction. Participants were asked to write either a control essay about their morning routine or an essay about situations in their current lives that are causing them to experience one of four emotions: anger, fear, happiness or hope. Participants were given seven minutes to remember and vividly describe their emotional experience. The essay instructions for the emotion essays were adapted from Ellsworth and Tong (2006).

Decision-Making Scenario Task. Participants were asked to read a short scenario about a socially risky situation. The scenario for this study involved choosing between going to a party where you did not know anyone very well by yourself or staying home (see Appendix B for the full scenario). After reading the scenario, participants were asked to list possibilities of what might happen if they choose to attend the party and what might happen if they choose not to attend the party. Participants then responded to a question about the likelihood that they would attend the party on an 11-point scale ranging from 0 (Extremely Unlikely) to 10 (Extremely Likely). Participants were also asked how confident they were in their decision on an 11-point scale ranging from 0 (Extremely Unconfident) to 10 (Extremely Confident). After completing the likelihood and confidence questions, participants were asked to return to the possible outcomes that they had previously listed and label each outcome as positive, negative or neutral.

Risk Questionnaire. Participants completed a brief survey about their own risky behavior and their preferences for risky behaviors. Questions included items regarding impulsivity, extreme sports (e.g. sky diving), socially risky behaviors (e.g. singing karaoke in

front of a group of people), and health risks (e.g. smoking cigarettes). Participants were asked questions regarding past behavior as well as their preferences for engaging in the listed behaviors.

Procedure

Participants completed the study in a computer lab at the University of Michigan either alone or in groups of up to five participants. Participants were given seven minutes to work on the emotion-induction essay, after which the experimenter instructed participants to move on to the next task. Participants then completed the Decision-Making Scenario Task, the Risk Questionnaire and demographic questions at their own pace. Participants were then thanked and debriefed.

Results

Social Risk Outcomes

The total number of outcomes produced was evaluated using a one-way ANOVA. Overall, participants primed with positive emotions produced slightly more outcomes than participants primed with negative emotions and participants primed with uncertain emotions produced slightly more outcomes than participants primed with certain emotions. However, the only significant difference was between participants primed with anger (M = 7.13, SD = 2.00) and participants primed with hope (M = 8.75, SD = 3.01), $t(136) = -1.48$, $p = .04$. So, the negative, certain emotion (anger) produced the fewest outcomes while the positive, uncertain emotion (hope) produced the most outcomes.

Outcomes were labeled as positive, negative or neutral based on participants' self-ratings. A one-way ANOVA indicated that participants primed with positive emotions produced significantly more positive outcomes (M = 4.24, SD = 2.76) than participants primed with negative emotions (M = 3.41, SD = 3.10), $t(136) = -2.18$, $p < .05$ (Figure 3.1). Emotional

certainty did not have a significant effect on number of positive outcomes produced. More specifically, positive outcomes were divided into positive outcomes for going to the party and positive outcomes for staying home (see Figure 3.1). Although participants primed with positive emotions produced more of both types of positive emotions, the effect of positive emotion priming on number of positive emotions produced is driven mainly by the positive emotions produced for staying home. In other words, participants primed with positive emotions produced significantly more positive outcomes for staying home (M = 1.52, SD = 1.27) than participants primed with negative emotions (M = 0.97, SD = 0.86), $t(136) = -2.15$, $p < .05$.

Conversely, emotional valence did not have a significant effect on number of negative outcomes produced (see Figure 3.2). However, a one-way ANOVA revealed that participants primed with uncertain emotions produced significantly more negative outcomes (M = 3.27, SD = 1.70) than participants primed with certain emotions (M = 2.65, SD = 1.45), $t(136) = -1.97$, $p = .05$. This effect was driven entirely by the number of negative outcomes produced for going to the party (see Figure 3.2). So, participants primed with uncertain emotions produced significantly more negative outcomes for going to the party (M = 1.79, SD = 1.18) than participants primed with certain emotions (M = 1.30, SD = 0.89), $t(136) = -2.35$, $p < .05$.

Party Attendance

In order to test our hypothesis about the effects of emotional valence and certainty on party attendance, we performed a one-way ANOVA (see Figure 3.3). We found a marginally significant main effect for emotion valence ($t(135) = 1.75$, $p = .08$) such that participants who experienced negative emotions (M = 6.66, SD = 2.19) rated themselves as more likely to attend the party than participants who experienced positive emotions (M = 5.89, SD = 2.56). The largest difference was found between the negative, certain emotion (anger; M = 6.97, SD = 2.13)

and the positive, uncertain emotion (hope; $M = 5.78$, $SD = 2.75$). We did not find an effect for emotional certainty on party attendance.

Regressions

A multiple regression was performed with party attendance as the dependent variable and number of positive outcomes for going to the party, number of negative outcomes for going to the party, number of positive outcomes for staying home and number of negative outcomes for staying home as the independent variables. Table 3.1 displays the correlations between the variables, the unstandardized regression coefficients (B) and intercept, the standardized regression coefficients (β), R^2, and adjusted R^2. R for regression was significantly different from zero, $F(4, 134) = 2.60$, $p < .05$. The number of positive outcomes for going to the party was a significant predictor of party attendance such that the more positive outcomes produced for going to the party, the more likely participants were to say they would attend the party. Additionally, the number of positive outcomes for staying home was a marginally significant predictor of party attendance such that the more positive outcomes produced for staying home, the less likely participants were to say they would attend the party.

Discussion

The results of Study 1a demonstrated that emotion valence played a large role in determining both the number and type of outcomes produced. Participants who were primed with positive emotions produced slightly more outcomes than participants primed with negative emotions (though this difference is mainly due to the difference between those primed with hope and those primed with anger). However, participants primed with positive emotions did generate significantly more positive outcomes overall than participants primed with negative emotions

and in particular, they produced more positive emotions for staying home from the party (the safe option).

Emotion valence also influenced risk preferences for the social risk task. However, in contrast to our predictions, participants primed with positive emotions were marginally less likely to say that they would attend the party than participants primed with negative emotions. Previous research has generally found that positive emotions increase risk seeking. However, mood maintenance theory has proposed that the effects of positive mood vary as people in positive moods are simply protective of their good mood and act to avoid any negativity (e.g. Isen & Simmonds, 1978). Since our participants in positive moods came up with more positive outcomes for staying home from the party, they may have felt that the safer option, staying home, was more likely to allow them to continue their good moods than attending the party.

While emotion valence drove the effects for positive outcomes, emotion certainty influenced the number of negative outcomes produced. Specifically, participants primed with uncertain emotions came up with more negative outcomes than participants primed with certain emotions and in particular, they produced more negative outcomes for going to the party (the riskier option). These results provide some support for our hypothesis that emotion valence would affect the valence of the outcomes produced. However, the results do not support our hypothesis about emotion certainty; we believed that emotion certainty would influence the overall number of outcomes but instead it appears as if emotion certainty may be related more to negative outcomes. This would explain why the emotion certainty did not affect the risky decision: since only the positive outcomes (for both going to the party and staying home) were predictors of party attendance, the effects of emotional certainty on the negative outcomes produced would not influence the final decisions.

Study 1a focused only on a single type of social risk, so for Study 1b, we wanted to replicate our results using a different social risk scenario. Since our participants were college students, we created another social risk scenario task that would be relevant to this age group. In our new social risk scenario, participants were told to imagine they had just finished their junior year of college and had to choose between spending their summer at an internship in a big city where they didn't know anyone or in their hometown with their friends and family but with a summer job that was unlikely to help them in their future field. Based on the results from Study 1a, we hypothesized that emotional valence would affect the number of positive outcomes produced whereas emotional certainty would affect the number of negative outcomes generated. We also predicted that emotional valence would influence ratings of the likelihood of choosing the riskier option (taking the internship).

Study 1b

Methods

Participants

One hundred ninety participants (120 females, 70 males) were recruited from the University of Michigan. Participants received course credit for their participation. Participants ranged in age from 18 to 27 years (M = 19.52, SD = 1.14). The majority of the participants self-defined as Caucasian (N = 125) while the rest self-defined as Asian/Asian-American (N = 32), Latino/Hispanic (N = 8), Black/African-American (N = 6) and Other (N = 15).

Procedure & Materials

Participants completed the same emotion induction as described in Study 1a with the exception that there was no neutral control. Participants then completed a decision-making

scenario similar to the first study. However, the scenario used in this study differed from the scenario in the first study in importance; while the scenario in Study 1a involved a trivial decision regarding attending a party, the scenario in Study 1b focused on a choice between taking an unpaid summer internship in a new city or working a less-desirable job in your hometown. See Appendix C for the full text. In addition to rating each outcome as positive, negative or neutral, as in Study, participants were also asked to rate the likelihood of each outcome occurring on a 7-point scale from 1 (Extremely Unlikely) to 7 (Extremely Likely). Finally, participants were also asked to circle the one outcome that had the most influence on their decision. After completing the decision-making scenario task, participants completed the risk questionnaire and demographics from Study 1.

Results

Social Risk Outcomes

A two-way ANOVA was performed to evaluate the effects of emotion valence and certainty on the total number of outcomes produced. There was no main effect of emotion valence (p = .63) or emotion certainty (p = .80) on total number of outcomes. There was also no interaction between emotion valence and certainty (p = .47). When examining outcomes by their valence, there was no main effect of emotion valence (p = .99) or emotion certainty (p = .66) on total number of positive outcomes; there was also no main effect of emotion valence (p = .39) or emotion certainty (p = .30) on number of negative outcomes. There were no interactions between emotion valence and emotion certainty for either positive outcomes (p = .48) or negative outcomes (p = .90).

Two-way ANOVAs were performed to examine the effects of emotion valence and certainty on the number of positive outcomes for taking the internship, the number of negative

outcomes for taking the internship, the number of positive outcomes for not taking the internship and the number of negative outcomes for not taking the internship. Emotion valence did not have a main effect on the number of positive outcomes for taking the internship (p = .92), the number of negative outcomes for taking the internship (p = .51), the number of positive outcomes for not taking the internship (p = .88) and the number of negative outcomes for not taking the internship (p = .45). Emotion certainty also did not have a main effect on the number of positive outcomes for taking the internship (p = .94), the number of negative outcomes for taking the internship (p = .18), the number of positive outcomes for not taking the internship (p = .51) and the number of negative outcomes for not taking the internship (p = .71). No interactions were found for the number of positive outcomes for taking the internship (p = .54), the number of negative outcomes for taking the internship (p = .60), the number of positive outcomes for not taking the internship (p = .63) and the number of negative outcomes for not taking the internship (p = .76).

Internship Choice

We performed a two-way ANOVA to test our hypothesis about the effects of emotion valence and certainty on internship choice. We did not find a significant main effect for emotion valence (p = .89) or emotion certainty (p = .33) on internship choice. There was also no interaction between emotion valence and emotion certainty on internship choice (p = .12).

Regression

A multiple regression was performed between likelihood of taking the internship as the dependent variable and number of positive outcomes for taking the internship, number of negative outcomes for taking the internship, number of positive outcomes for not taking the internship and number of negative outcomes for not taking the internship as the independent

variables. Table 3.2 displays the correlations between the variables, the unstandardized regression coefficients (*B*) and intercept, the standardized regression coefficients (β), R^2, and adjusted R^2. *R* for regression was significantly different from zero, $F(4, 181) = 9.73$, $p < .01$. The number of positive outcomes for taking the internship was a significant predictor of taking the internship such that the more positive outcomes produced for taking the internship, the more likely participants were to say that they would take the internship. Additionally, the number of positive outcomes for not taking the internship was also a significant negative predictor for taking the internship. In other words, the more positive outcomes produced for going back to one's hometown, the less likely one would be to take the internship.

Discussion

Study 1b attempted to replicate results from Study 1a using a different social risk scenario. However, we did not find any results from our emotion primes on the outcome measures or the overall risk preferences using the new internship scenario. However, we did find similar results for the regression analyses for determining predictors of making the riskier choice (taking the internship). As in Study 1a, producing more positive outcomes for taking the internship led to increased risk taking while producing more outcomes for not taking the internship had a negative influence on risk taking. Also, the numbers of negative outcomes for either taking or not taking the internship did not predict the internship decision.

One possible issue with the internship scenario is that it was a more complicated scenario than our original party scenario. Although we focused on the social aspects of the internship (e.g. living alone in a city versus living at home with family and friends), there were also some financial differences between the two options (unpaid internship versus well-paid job). If social risks are essentially different from the more traditional financial or health risks, then any effects

of the emotional prime may have been diluted. In Study 2, we aim to replicate the results from Study 1a using the original social risk task from Study 1a as well as directly compare the results from a social risk task to risk taking in another domain using the same methodology. Therefore, we selected a health risk task that has been used in emotion and risk research (see Lerner & Keltner, 2001). However, we adapted it to match our social risk task by asking participants to generate possible outcomes in addition to asking them their risk preferences. We hypothesized that our results for the social risk task would replicate Study 1a such that positive emotions would increase the number of positive outcomes produced for the safer outcome and consequently the positive emotions would decrease overall risk preferences. For the health risk task, we hypothesized that participants primed with positive emotions would produce more positive outcomes than participants primed with negative emotions and, based on previous research, that positive emotions would lead to increased risk-seeking for the health risk scenario.

Study 2

Methods

Participants

Two hundred and eleven participants (112 female, 99 male) from the University of Michigan were recruited from the introductory psychology subject pool. Participants received course credit for participation. Participants ranged in age from 18 to 23 years (M = 18.97, SD = 1.05). The majority of the participants self-defined as Caucasian (N = 150) while the rest self-defined as Asian/Asian-American (N = 35), Black/African-American (N = 8), Hispanic (N = 5) and Other (N = 13).

Materials & Procedure

Participants completed an emotion induction essay similar to the previous studies in which they were asked to think of a current situation that caused them to feel one of four emotions: anger, fear, happiness or hope. Participants completed the same hypothetical social risk decision task as Study 1 in which they had the choice to go to a party or stay home. Participants also completed a hypothetical health risk decision task based on Tversky and Kahneman's (1981) "Asian disease problem" as adapted by Lerner and Keltner (2001). In this problem, participants are told to imagine that an unknown Asian disease will be coming to the United States and is expected to kill 600 people. They are also told that there are two possible programs that could combat the disease. The two programs (A and B) are framed in one of two ways. In the gain frame, "If Program A is adopted, 200 people will be saved. If Program B is adopted, there is a 1/3 probability that 600 people will be saved and a 2/3 probability that no one will be saved." In the loss frame, "If Program A is adopted, 400 people will die. If Program B is adopted, there is a 1/3 probability that nobody will die and a 2/3 probability that 600 people will die." Each participant saw only the gain frame or the loss frame. Similar to the social risk decision task, participants were asked to list possibilities of what might happen if they choose Program A or Program B. They were then asked to rate the likelihood that they would choose Program A over Program B on an 11-point scale ranging from 0 (Extremely Unlikely) to 10 (Extremely Likely) and their confidence in their decision (also on an 11-point scale). Finally, participants were asked to return to the possible outcomes that they had listed and label them as positive, negative or neutral. All participants completed both the social risk decision task and the health risk decision task, but the order in which they completed these tasks was counterbalanced. Participants also completed two sensation seeking scales: the Need Inventory for Sensation Seeking (Roth & Hammelstein, 2012) and the Brief Sensation Seeking Scale (Hoyle et al., 2002).

Results

Social Risk Decision Task

Outcomes. A two-way ANOVA evaluated the effects of emotion valence and certainty on the total number of outcomes produced. Emotion valence had a significant main effect on number of outcomes, F (1, 207) = 4.64, p = .004. However, there was also a significant interaction between emotion valence and emotion certainty, F(1, 207) = 5.46, p = .020. A closer look indicates that there was no difference between positive and negative uncertain emotions but a significant difference between the positive, certain emotion, happiness (M = 8.42, SD = 2.61), and the negative, certain emotion, anger (M = 6.40, SD = 2.78).

When outcomes were divided into positive and negative outcomes, a two-way ANOVA indicated an overall main effect for valence on the number of positive outcomes produced, F (1, 207) = 3.97, p = .048 (see Figure 3.4), but no significant effects for the number of negative outcomes produced. For the positive outcomes produced, participants primed with positive emotions (M = 3.80, SD = 1.97) produced more positive outcomes than participants primed with negative emotions (M = 3.29, SD = 1.78), F (1, 207) = 3.97, p = .048. Emotional certainty did not have a significant effect on the number of positive or negative outcomes produced and there were no significant interactions between emotion valence and certainty on the number of positive or negative outcomes produced.

Similarly to Study 1, participants primed with positive emotions (M = 1.44, SD = 1.31) elicited marginally more positive outcomes for staying home than participants primed with negative emotions (M = 1.15, SD = 1.13), F(1, 207) = 2.89, p = .091. Participants primed with positive emotions also produced more positive outcomes for going to the party than participants primed with negative emotions but this difference was not significant. In contrast to Study 1, we

did not find any significant differences for either emotion valence or emotion certainty on the number of negative outcomes produced.

Party Attendance. We performed a two-way ANOVA to examine the effects of emotion valence and certainty on party attendance (see Figure 3.5). We found a significant main effect for emotion valence ($F(1, 206) = 4.87$, $p = .029$). However, the pattern was opposite to that of Study 1: participants primed with positive emotions ($M = 6.34$, $SD = 2.47$) rated themselves as more likely to attend the party than participants primed with negative emotions ($M = 5.54$, $p = 2.75$). Emotion certainty did not have any effects on ratings of likelihood to attend the party.

Regressions. A multiple regression was performed between party attendance as the dependent variable and number of positive outcomes for going to the party, number of negative outcomes for going to the party, number of positive outcomes for staying home and number of negative outcomes for staying home as the independent variables. Table 3.3 displays the correlations between the variables, the unstandardized regression coefficients (B) and intercept, the standardized regression coefficients (β), R^2, and adjusted R^2. R for regression was significantly different from zero, $F(4, 205) = 5.89$, $p < .001$. The number of positive outcomes for going to the party and the number of positive outcomes for staying home were both significant predictors of party attendance such that the more positive outcomes produced for going to the party, the more likely participants were to say they would attend the party while the more positive outcomes produced for staying home, the less likely participants were to say that they would attend the party.

Health Risk Decision Task

Outcomes. The gain/loss framing had no effects and no interactions for any of the outcome measures so we combined the results for the gain and loss frames for the following analyses. We ran a two-way ANOVA to examine the effects of emotion valence and certainty on the total number of outcomes for the health risk decision task. There was a significant main effect of emotion valence on total number of outcomes, F (1, 207) = 5.46, p = .020. Similar to the social risk decision task, participants primed with positive emotions (M = 4.95, SD = 2.29) produced overall more outcomes than participants primed with negative emotions (M = 4.30, SD = 1.75), t(207) = -2.34, p = .020. Looking more specifically at the type of outcomes produced, participants primed with positive emotions (M = 2.10, SD = 1.10) produced marginally more positive outcomes than participants primed with negative emotions (M = 1.84, SD = 1.11), F(1, 207) = 3.09, p = .080 (see Figure 3.6). However, participants primed with positive emotions (M = 2.85, SD = 1.67) also produced significantly more negative outcomes than participants primed with negative emotions (M = 2.46, SD = 1.17), F(1, 207) = 3.84, p = .051 (see Figure 3.7). More specifically, participants primed with positive emotions (M = 1.16, SD = .65) produced marginally more positive outcomes for Program B (the riskier choice) than participants primed with negative emotions (M = 1.00, SD = .58), F(1, 207) = 3.51, p = .062. Participants primed with positive emotions (M = 1.44, SD = 1.02) produced significantly more negative outcomes for Program A (the less risky option) than participants primed with negative emotions (M = 1.16, SD = 0.79), F(1, 207) = 4.87, p = .028. Emotion certainty did not have a significant effect on any of the outcome measures.

Program Choice. We performed a three-way ANOVA to examine the effects of emotion valence, emotion certainty, and gain/loss framing on program choice. There was an overall main effect for whether the participants saw the gain or loss version of the health risk

task, $F(1, 203) = 29.05$, $p < .001$ (see Figure 3.8). Participants who saw the gain version (M = 4.25, SD = 2.35) rated themselves as significantly less likely to choose the risky choice than participants who saw the loss version (M = 6.04, SD = 2.53). However, there was no interaction between the gain/loss framing and emotion valence or certainty so we combined the gain and loss frames for the remaining analyses. There was also a main effect of valence on program choice, $F(1, 203) = 5.22$, $p = .023$, such that participants primed with positive emotions (M = 5.50, SD = 2.53) were significantly more likely to choose the riskier Program B than participants primed with negative emotions (M = 4.76, SD = 2.61). Emotion certainty did not have any effect on program choice.

Regressions. A multiple regression was performed between program choice as the dependent variable and number of positive outcomes for Program A, number of negative outcomes for Program A, number of positive outcomes for Program B and number of negative outcomes for Program B as the independent variables. Table 3.4 displays the correlations between the variables, the unstandardized regression coefficients (B) and intercept, the standardized regression coefficients (β), R^2, and adjusted R^2. R for regression was significantly different from zero, $F(4, 206) = 6.64$, $p < .001$. The number of negative outcomes for Program A and the number of positive outcomes for Program B were both significant positive predictors for choosing Program B while the number of positive outcomes for Program A and the number of negative outcomes for Program B were both significant negative predictors for choosing Program B.

Social and Health Correlations

There was a positive correlation between the total number of outcomes produced for the health risk task and the total number of outcomes produced for the social risk task (r = .42, p

< .01). So, participants who produced more outcomes for one risk task also produced more outcomes for the other risk task. In addition, there was a positive correlation between the positive outcomes produced for the social risk task and the positive outcomes produced for the health risk task (r = .22, p < .01) as well a positive correlation between the negative outcomes produced for the social risk task and the negative outcomes produced for the health risk task (r = .27, p < .01). However, there was not a significant correlation between the risk choice in the social domain and the risk choice in the health domain (r = .05, p = .46). In other words, participants who rated themselves as more likely to choose the riskier option in one domain were not more likely to choose the riskier option in the other domain.

Personality Measures

Scores for the two sensation seeking scales, the Brief Sensation Seeking Scale (BSSS) and the Need Inventory for Sensation Seeking (NISS), were calculated by adding together the item from each scale. Scores from the BSSS ranged from 11 to 40 (M = 26.68, SD = 5.56) while scores from the NISS ranged from 29 to 72 (M = 51.37, SD = 7.70). Emotion conditions did not have any effects on either the BSSS or the NISS. However, both the BSSS (r = .40, p < .01) and the NISS (r = .32, p < .01) had significant positive correlations with risk preferences for the social risk task such that higher scores on the sensation seeking scales were related to higher likelihoods of choosing the riskier option. Yet, risk preferences on the health risk task did not correlate with either the BSSS (r = .08, p = .25) or the NISS (r = .06, p = .39).

Discussion

In Study 2 we replicated most of the main results from Study 1a on the social risk task. Emotion valence influenced the number of positive outcomes produced (in the expected direction) and in particular, participants generated more positive outcomes for the safer option. However,

while emotion valence also affected the overall risk preference for the social risk scenario, the results were in the opposite direction of Study 1a: whereas positive emotions elicited less risk-seeking in Study 1a, they elicited greater risk-seeking in Study 2. Similar to Study 1a, significant predictors for preferring the riskier option were the positive outcomes for going to the party and the positive outcomes for staying home.

Results for the health risk task were along the same lines as the social risk task. Emotion valence affected the number of positive outcomes such that positive emotions elicited more positive outcomes than negative emotions. However, for the health risk task, participants primed with positive emotions also generated more negative outcomes than participants primed with negative emotions. More specifically, participants primed with positive emotions generated more positive outcomes for the riskier choice and more negative outcomes for the safer choice. All four types of outcomes (positive and negative outcomes for both the riskier and safer programs) predicted program choice in the expected directions. As predicted, participants primed with positive emotions rated themselves as more likely to choose the riskier option.

For both the social and health risk tasks, emotion certainty did not seem to play a role in determining number of outcomes or ultimately risk preferences. However, for the social risk task there was an interaction between emotion valence and emotion certainty on the total number of outcomes indicating there might be a subtler influence of emotion certainty.

Implications and Future Directions

Overall, emotion valence seems to be playing a stronger role in determining both possible outcomes and risk preferences than emotion certainty. Furthermore, positive emotions seem to generally increase the number of outcomes produced. Although this is not what we predicted, these results may be explained by some of the research on positive emotions. Isen, Daubman,

and Nowicki (1987) found that positive affect, as compared to neutral affect, tended to increase creativity. Additionally, the broaden-and-build theory of positive emotions proposes that the main purpose of positive emotions is to expand people's awareness and encourage creativity and varied experience (Fredrickson, 2001). For our risk tasks, participants are asked to generate outcomes and allowed to produce as many or few as they wish which is essentially a creative task. Therefore, our results showing that positive emotions influence the number of outcomes produced may be explained by the broaden-and-build theory.

However, in Study 2, we also found some differences between our social risk task and our health risk task. For the social risk task, the positive emotions only influenced the positive outcomes and the risk preferences were only predicted by the positive outcomes. Whereas for the health risk task, the positive emotions increased the numbers of both positive and negative outcomes and all types of outcomes predicted risk preferences. As we used only one scenario for each type of risk, it is impossible to say whether our results were due solely to the risk domain or if other factors may be involved. For example, our social risk scenario involved a fairly minor risk. Most of the negative outcomes that participants generated involved "being bored," "feeling awkward", "missing out on meeting new friends," or "upsetting your old friends." However the health risk scenario involves a much more serious situation in which negative outcomes included answers such as "knowingly killing 400 people who might have been saved" or "many people will lose family members/peers/friends." So it is possible that the reason that the negative outcomes matter for the health risk but not the social risk is that they were simply more impactful in the health risk scenario. Future research could examine this possibility by comparing a social risk scenario and a health risk scenario that were matched on overall riskiness or by including multiple risk scenarios for each domain across a variety of levels of riskiness.

Regardless of whether the results were driven by risk domain or level of riskiness, they still present an interesting distinction. As evidenced from the differing results of the influence of emotion valence on risk preferences, emotion valence may not always be a good predictor of whether someone will choose a more or less risky option. Rather, the positive mood influences how one thinks about the risky situation which in turn affects the risk preference. In this manner, positive mood might increase or decrease risk-seeking depending on whether one is focused on the safer or the riskier option. In our studies, we cannot determine what caused our participants to focus on one option in one study and more on the other option in the other study, but future research could investigate whether cuing participants in a positive mood to focus on one or the other option might influence whether the participants choose the safer or more risky option.

In addition to exploring more emotion effects, our results open up several other areas of research. While most research on risky decision making focuses only on choices, we chose to examine how people think about risky situations before they have made a decision. By asking participants to come up with possible outcomes for both choices, we were able to assess not just overall emotion effects but also look more closely at a possible mechanism. Using this type of method also allowed us to distinguish between different types of participants. The positive correlation between the number of outcomes produced for the social risk and the number of outcomes produced for the health risk indicated that some people may be more inclined to think of lots of different possibilities whereas other people may only come up with a few possibilities. Since most studies provide the outcomes with the risky decision task, this personality difference can be easily overlooked. However, in most real life situations, the possible outcomes for a risky situation are not usually provided so people may approach the risky choice with different possibilities in mind.

This idea could also be applied to the actual choices as well as the possible outcomes for each option. For example, the current research provided participants with two specific options to choose from, each of which might result in a variety of different alternatives. However, in real life, many times there are more than just two options and sometimes countless numbers of options. Future research might examine how people deal with situations in which they have to generate, not just outcomes, but also alternatives. For instance, participants might be given a broader question such as, "What will you decide to do on Friday night?" and asked to come up with all of their possible options that would inherently vary on their levels of riskiness.

Another possible future direction would be to examine participants' perceptions of outcome probabilities. In Yates' (1992) definition of risk, he highlighted probability as a necessary component of risk. However, in many risk tasks used in psychology, participants are simply told what the probabilities for each outcome are. Whereas in real life, people have to generate these probabilities on their own even though generally, people tend to be poor at estimating probabilities. Additionally, even when people produce negative outcomes for the future, they do not necessarily think they will be unhappier in the future (O'Brien, 2013). This could be because even if they think of negative outcomes, they believe that the positive outcomes are more likely to occur. By asking participants to determine probabilities for each of their self-generated (or even researcher-provided) outcomes, we could clarify whether it is simply the overall number of positive or negative outcomes that influences risk preferences or if there are specific outcomes that participants find especially important and persuasive.

One final future direction that would be interesting to explore would be to further examine how personality factors may relate to risks in different domains. In the current research we examined participants' sensation seeking preferences and found that they were positively

correlated with risk preferences for the social risk task but not for the health risk task. This makes sense as our social risk involved the type of situation that could elicit the emotions generally measured in sensation seeking scales whereas the health risk focused mainly on possible losses which would be unlikely to generate the positive emotions associated with sensation seeking. Whatever the cause, these results highlight another difference between risks in these two domains and future research could further examine whether sensation seeking is more related to all social risks than health risks or if these results were specific to our risky situations. Additionally, other personality factors should be explored as it may be that sensation seeking is more related to social risks but another personality factor could be more related to health risks.

Overall, this research suggests that there may be significant differences in how people make risky decisions in separate domains. As most of the research on the effects of emotions on risky decision-making has concentrated on health or financial domains, it is important for us to expand our research to include other domains to see if the effects generalize across domain or if some effects may be specific to one area of risk. Furthermore, by expanding this research to other risk domains, we may uncover new areas of risky decision making which could be explored.

Figure 3.1

Number of positive outcomes produced for the social risk task in Study 1a. Error bars represent one standard error above and below the mean.

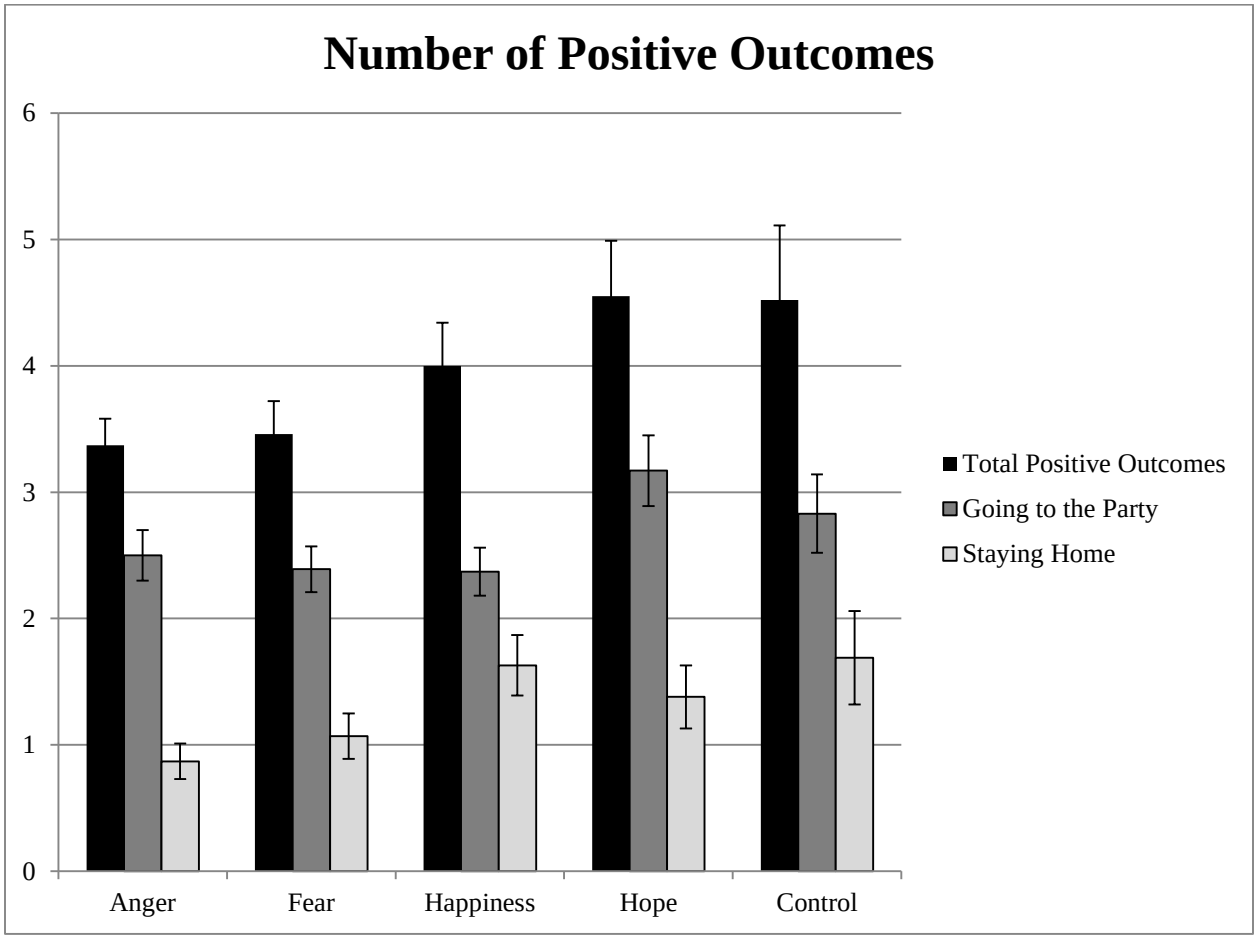


Figure 3.2

Number of negative outcomes produced for the social risk task in Study 1a. Error bars represent one standard error above and below the mean.

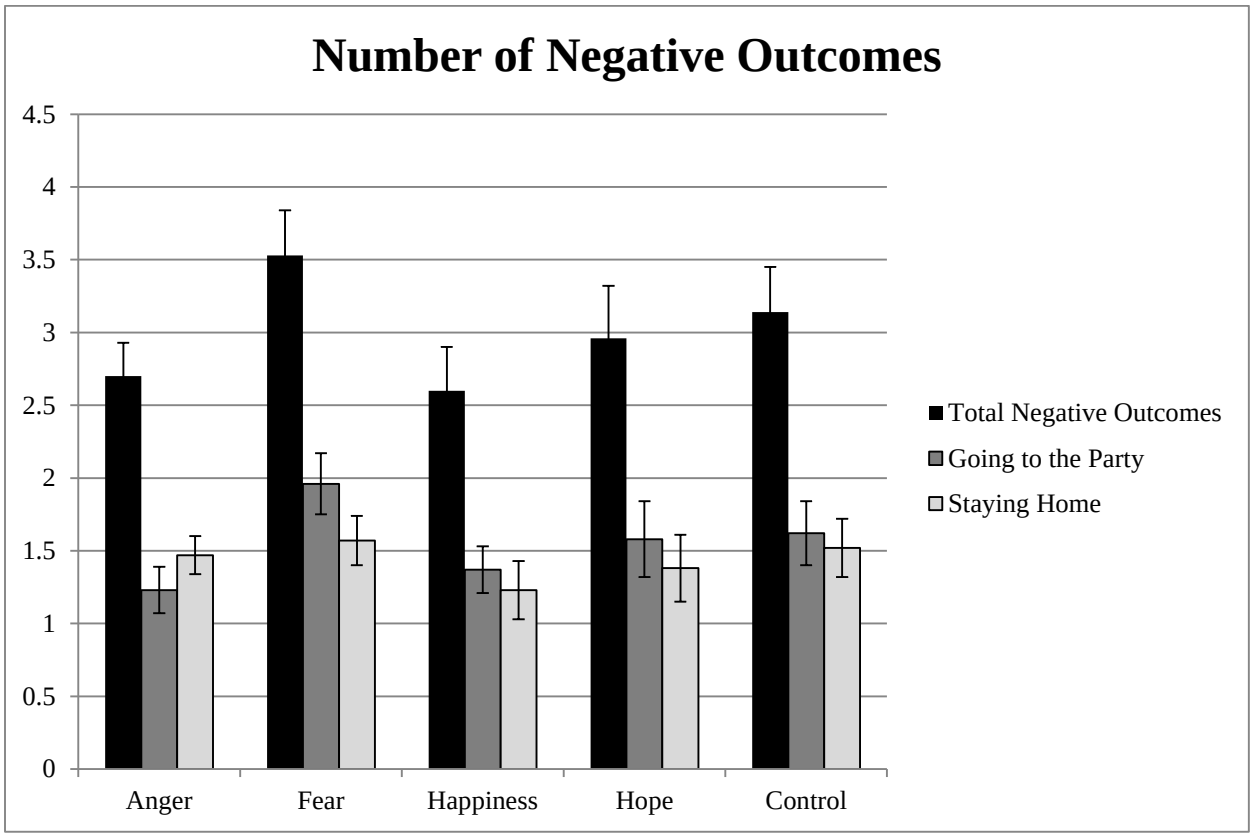


Figure 3.3

Likelihood of choosing the riskier option (attending the party) in Study 1a. Error bars represent one standard error above and below the mean.

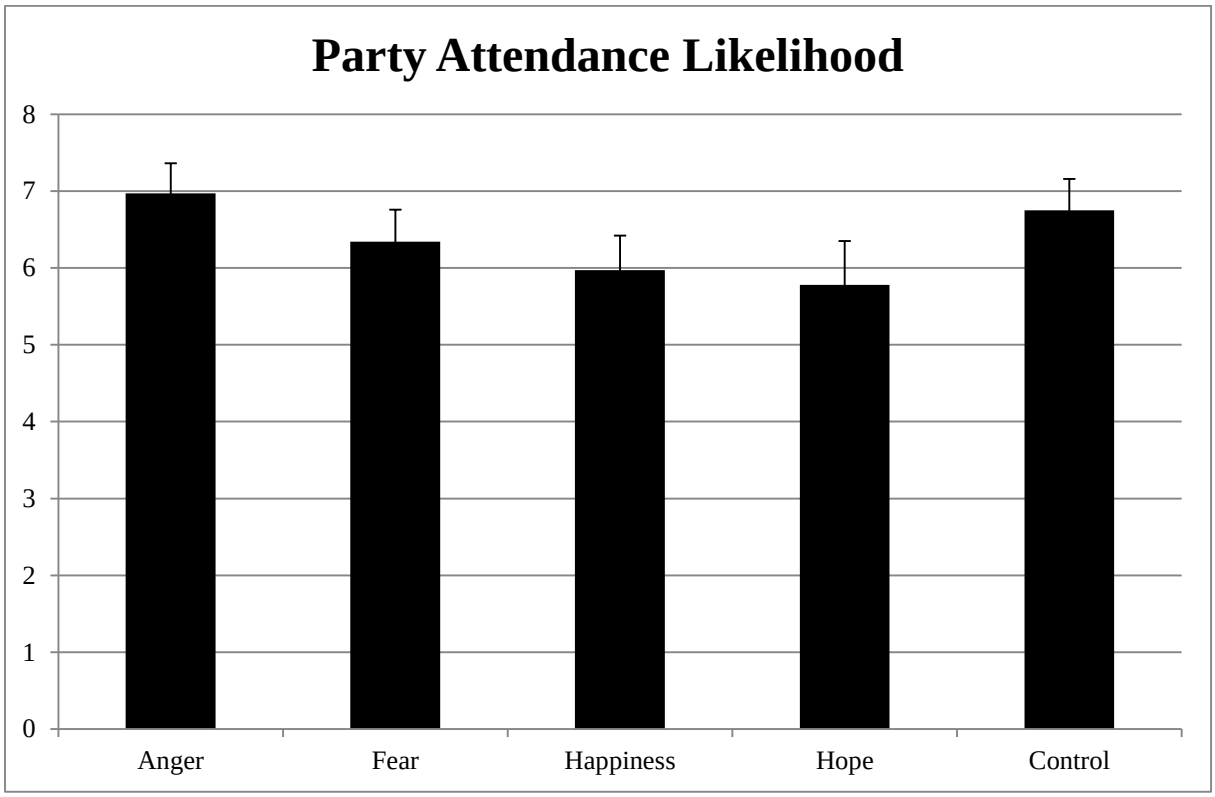


Table 3.1

Regression Analysis for Variables Predicting Party Attendance in Study 1a

Variables	Party Attendance (DV)	Positive Outcomes for Going	Negative Outcomes for Going	Positive Outcomes for Staying	Negative Outcomes for Staying	*B*	*β*
Positive Outcomes for Going	.13					.34**	.18
Negative Outcomes for Going	-.10	.05				-.15	-.07
Positive Outcomes for Staying	-.17	.31	.33			-.32*	-.18
Negative Outcomes for Staying	.13	.09	.22	-.24		.19	.08
Means	6.42	2.64	1.54	1.32	1.43	R^2 = .07	
Standard deviations	2.33	1.26	1.08	1.34	0.99	Adjusted R^2 =.04 R = .27	

Note: *p < .10, **p < .05

Table 3.2

Regression Analysis for Variables Predicting Taking the Internship in Study 1b

Variables	Party Attendance (DV)	Positive Outcomes for taking the internship	Negative Outcomes for taking the internship	Positive Outcomes for not taking the internship	Negative Outcomes for not taking the internship	*B*	*β*
Positive Outcomes for taking the internship	.27					.45**	.32
Negative Outcomes for taking the internship	-.23	-.09				-.22	-12
Positive Outcomes for not taking the internship	-.23	.24	.33			-.46**	-.27
Negative Outcomes for not taking the internship	.07	.23	.36	-.10		.02	.01
Means	7.34	3.93	1.40	2.43	1.43	R^2 = .17	
Standard deviations	2.16	1.55	1.13	1.29	1.17	Adjusted R^2 =.16 R = .42	

Note: **$p < .01$

Figure 3.4

Number of positive outcomes produced for the social risk task in Study 2. Error bars represent one standard error above and below the mean.

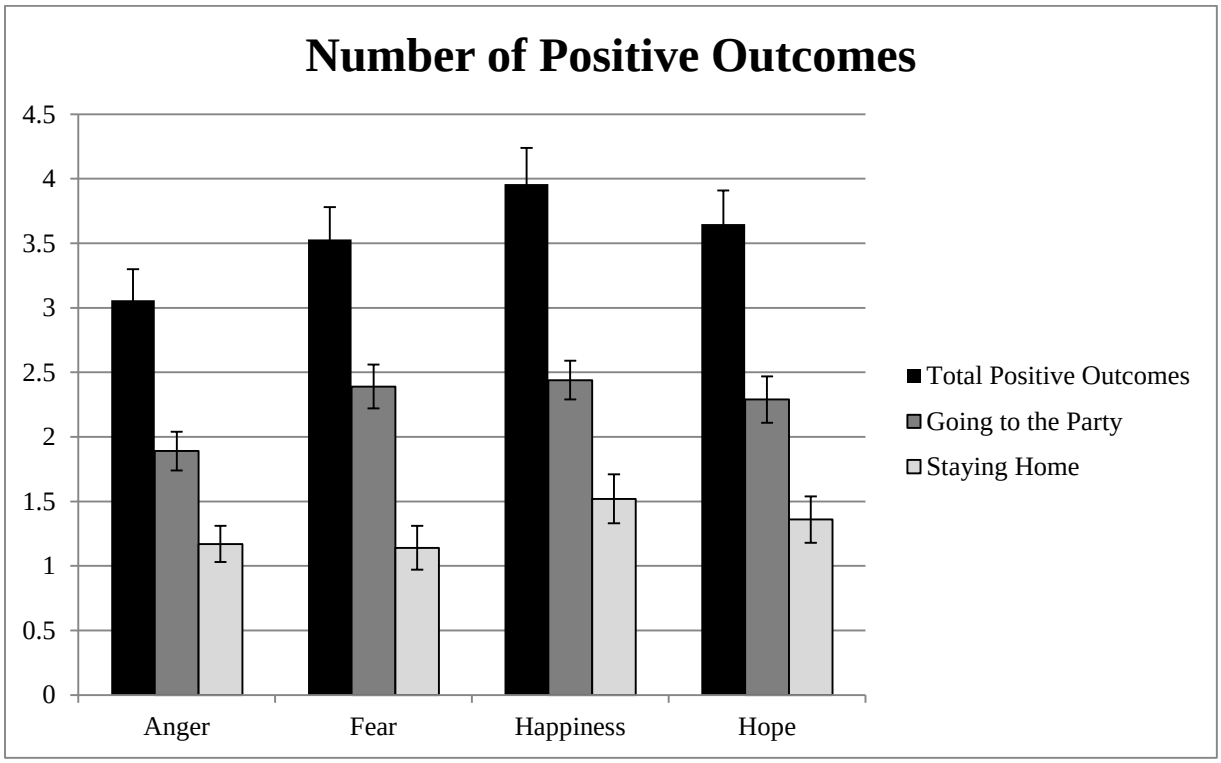


Figure 3.5

Likelihood of choosing the riskier option (attending the party) in Study 2. Error bars represent one standard error above and below the mean.

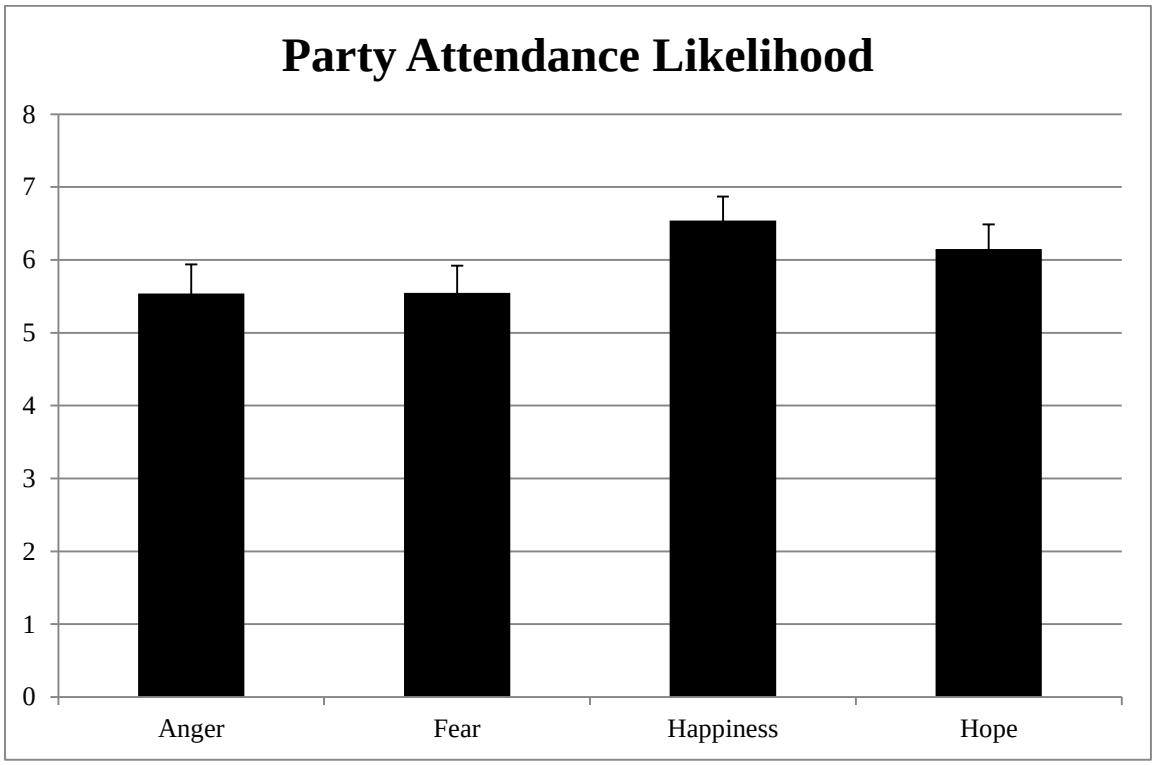


Table 3.3

Regression Analysis for Variables Predicting Party Attendance

Variables	Party Attendance (DV)	Positive Outcomes for Going	Negative Outcomes for Going	Positive Outcomes for Staying	Negative Outcomes for Staying	*B*	*β*
Positive Outcomes for Going	.21					.54**	.24
Negative Outcomes for Going	-.20	-.08				-.28	-.12
Positive Outcomes for Staying	-.16	.23	.31			-.38*	-.18
Negative Outcomes for Staying	.07	.27	.23	-.18		.004	.002
Means	5.95	2.24	1.56	1.30	1.41	R^2 = .10	
Standard deviations	2.64	1.19	1.16	1.23	1.02	Adjusted R^2 =.09 R = .32	

Note: *p < .05, **p < .01

Figure 3.6

Number of positive outcomes produced for the health risk task in Study 2. Error bars represent one standard error above and below the mean.

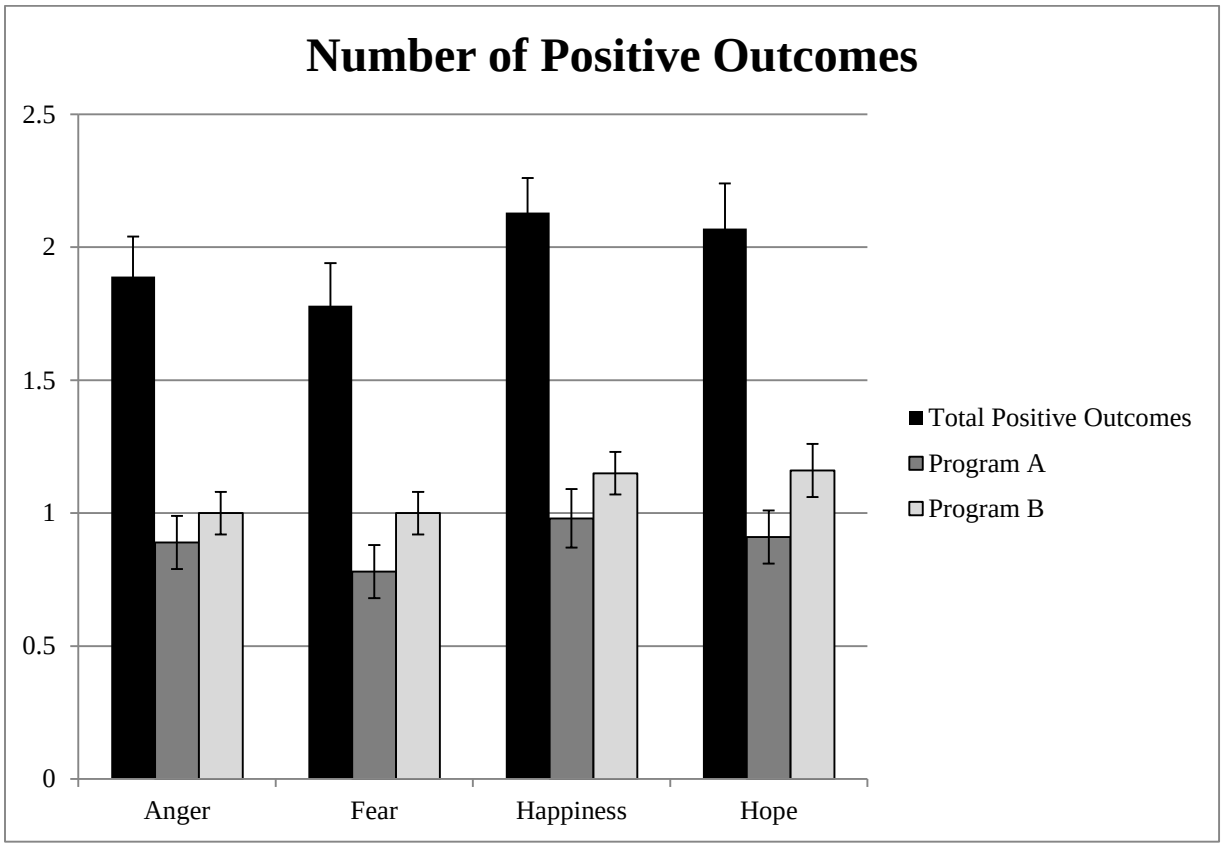


Figure 3.7

Number of negative outcomes produced for the health risk task in Study 2. Error bars represent one standard error above and below the mean.

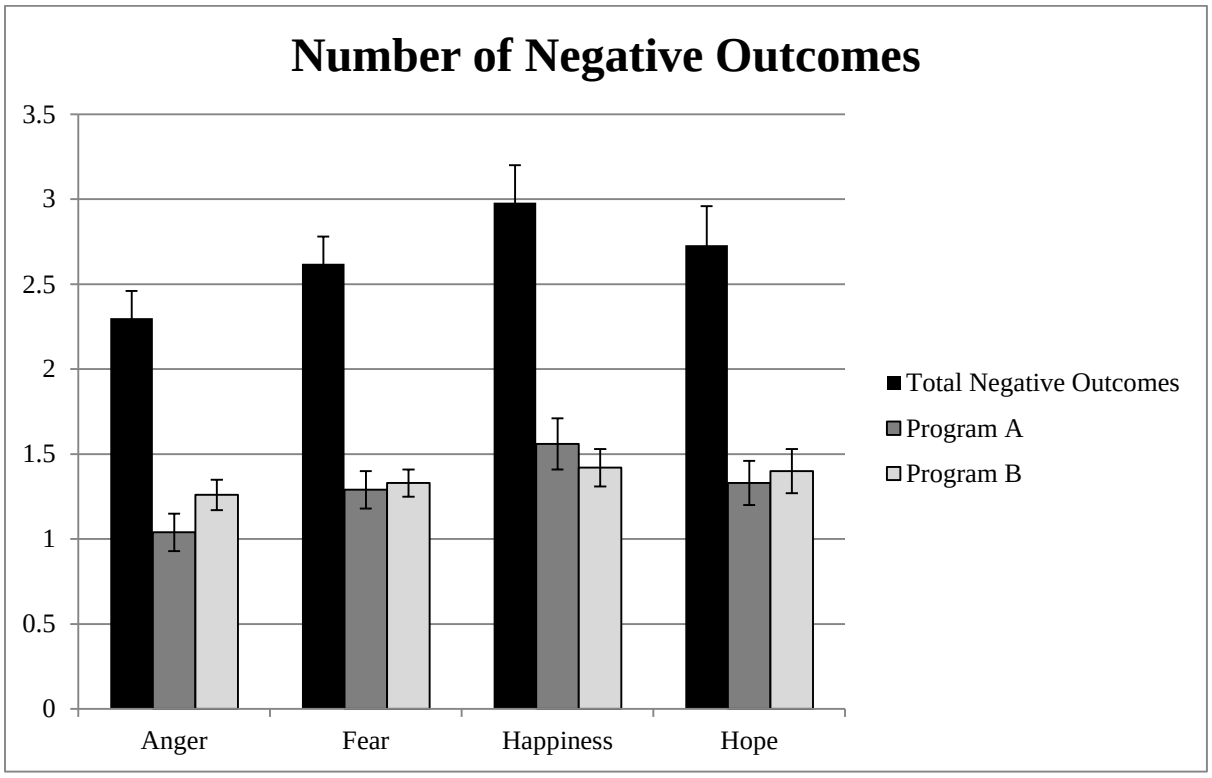


Figure 3.8

Likelihood of choosing the riskier option (Program B) in Study 2. Error bars represent one standard error above and below the mean.

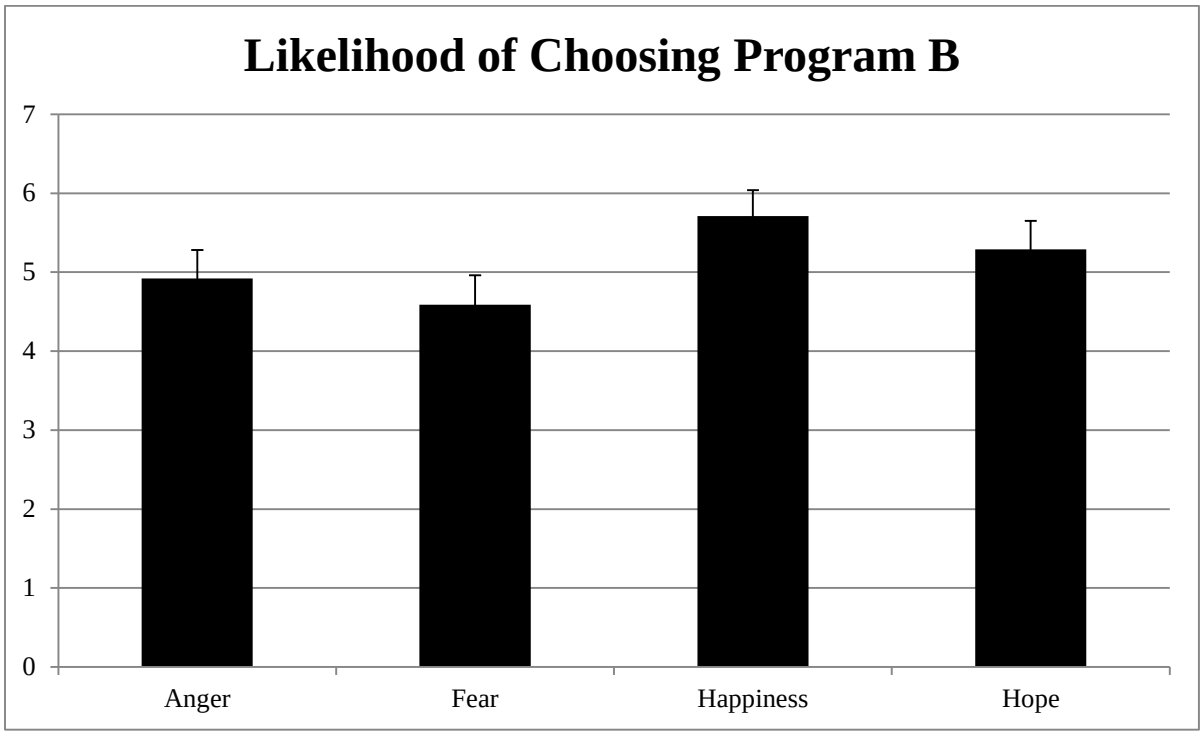


Table 3.4

Regression Analysis for Variables Predicting Taking Program B

Variables	Program Choice (DV)	Positive Outcomes for Program A	Negative Outcomes for Program A	Positive Outcomes for Program B	Negative Outcomes for Program B	*B*	*β*
Positive Outcomes for Program A	-.17					-.56*	-.16
Negative Outcomes for Program A	-.18	-.04				.68**	.24
Positive Outcomes for Program B	.12	.32	.26			.83**	.20
Negative Outcomes for Program B	-.09	.27	.50	.38		-.83**	-.24
Means	5.13	0.89	1.30	1.08	1.36	R^2 = .11	
Standard deviations	2.59	0.75	0.92	0.62	0.75	Adjusted R^2 =.10 R = .34	

Note: *p < .05, **p < .01

CHAPTER IV

A Review of the Influence of Affect on Risk

We all make risky choices every day: whether to wear a seatbelt in the car, whether to buy a lottery ticket, even whether to disagree with a friend. Each time we make one of these choices there are many different factors that can influence how we decide. Traditionally, decision theories assumed that people made risky decisions in a purely cognitive and rational manner. Subjective expected utility theory claims that people calculate the probability and subjective utility of each option and combine these two estimates in a consistent manner to determine the optimal choice (Hastie & Dawes, 2010). For instance, suppose that you get into your car and are choosing whether or not to put on your seatbelt. In order to make that decision (in a very simplified version), you would calculate the odds of getting into a car accident and the odds of getting a ticket for not wearing your seatbelt and weigh that against the discomfort of wearing your seatbelt. Depending on which was larger, you would then either put on your seatbelt or not. However, in general, people are not very adept at estimating probabilities and often overestimate their own abilities and there is lots of evidence that people do not actually use rational strategies when making decisions.

Recently, the role of affect in risky decision making has been an area of increased interest and investigation in the area of judgment and decision making. However, although there is a lot of research on emotions and a lot of research on risky decision making, there is little overlap between these two fields. Furthermore, what research there is focuses mainly on the emotion side; the majority of the research on affect and risky decision making has focused on distinctions

between different types of emotions while ignoring variations on the risk side. While the emotions are carefully specified and differentiated, the risk choices are spoken about more generically as simply "risk-seeking" or "risk-averse" (e.g. Lerner & Keltner, 2001; Cheung & Mikels, 2011; Fessler, Pillsworth & Flamson, 2004; Arkes, Herren & Isen, 1988). Yet, many of the studies examining affect and risk use very different types of risk tasks that should not be conflated. This paper will review the current research on how mood and emotions can influence how people make decisions involving risk in order to demonstrate the importance of considering the type of risk used in this type of research. Additional in this review, I will identify some typical risky decision making tasks that are commonly used in research on affect and risky decision making and discuss their similarities and differences to highlight some of the major flaws in using a single risk task to generalize emotion effects. Finally, I will identify some future directions for area of research including focusing more on risk domain, motivations behind risk taking and the type of uncertainty involved in the risk as well as argue for the inclusion of a wider range of risky decision making tasks.

Affect & Decision Making

When emotion was first included in the study of decision making, the general belief was that all emotion or affect deteriorated decision processes and led to generally worse decisions. Emotions were thought to decrease rationality and lead people to make more intuitive and riskier choices. This is the common lay theory as well: people often assume that emotions cloud their judgment and lead to increased regret. For instance, a couple might fall in love with a house and choose to buy it even though they cannot actually afford it. This may also lead to the couple ultimately regretting their choice when they are forced to give up other expenses such as eating out or going on vacation or if they are unable to make their house payments at all.

On the other hand, many evolutionary psychologists studying emotion propose that emotions exist to grant evolutionary advantage in certain situations (Nesse & Ellsworth, 2009). They propose that positive emotions can signal positive environmental situations and indicate success. For instance, you might anticipate feeling happy in response to eating something pleasant or pride in having achieved a goal. These positive feelings might lead you to eat more of that food or motivate you to pursue a similar goal in the future. Conversely, negative emotions can act as warning signs for negative environmental situations and cause people to avoid harm by escaping the situation and avoiding similar situations in the future. For example, you might feel fear if you if you encounter a snake while walking through the forest or you might feel depressed about your life circumstances. These negative feelings might help you realize that you are in a dangerous or unpleasant situation and motivate you to change your environment.

These two competing theories of the influence of emotions on risky decision making suggest that the relationship between affect and risk may be complicated and that the effects of affect on risky choice may vary depending on the type of emotion and the type of risk involved.

Different types of Emotions/Affect

When affect was first incorporated into decision theory, the focus was on what were called expected or anticipated emotions (Loewenstein & Lerner, 2003). Expected emotions can be defined as people's beliefs about how they will feel once a decision has been made or an action has occurred. For example, if an individual is thinking about buying a lottery ticket, he might think about how he would feel if he won (elated) as well as how he might feel if he did not win (disappointed). Expected emotions are actually cognitions about future emotions; there is not an actual emotional component to the expected emotions. These expected emotions should be differentiated from anticipatory emotions that might occur at the same time as the expected

emotion. Anticipatory emotions, such as hope or fear, are how one currently feels about the future. In the case of the lottery ticket, you might be feeling the anticipatory emotion of hope as well as the expected emotions of elation and disappointment. Anticipatory and expected emotions have been found to be empirically distinct and independently motivate goal-directed behavior (Baumgartner, Pieters & Bagozzi, 2008).

There is much evidence that losses are weighed more heavily than gains in decision making (Kahneman & Tversky, 1984). In other words, we care more about what we could possibly lose than what we might gain in risky situations. Therefore, the most widely studied expected emotions are regret and disappointment as these emotions are directly related to loss. There are a number of decision theories that model decision making in terms of minimizing regret (e.g. Luce & Raiffa, 1957; Savage, 1951). In other words, you would calculate the maximum amount of regret for each possible alternative and then choose the option that would produce the least amount of regret. However, these early theories did not take into account the probability of each outcome (how likely each outcome was to occur). Loomes and Sugden (1982) added the regret concept to standard Expected Utility theory, proposing that the favorability of each option is dependent on not only its individual components but also in comparison to the other options. For instance, an option in which one would win $20 would be more favorable if the other option was gaining $10 than if the other option was gaining $200. Additionally, Zeelenberg (1999) demonstrated that people will become either risk-averse or risk-seeking depending on which will minimize their expected regret (how one would feel based on the difference between what the actual outcome and the potential outcome of the other choice).

Though actually cognitions rather than emotions, expected emotions have helped to bridge the gap between decision theories and affect. However, despite their influence on

behavior, the relationship between expected emotions and future emotions has been found to be rather tenuous. Wilson and Gilbert (2005) demonstrated that while most people are adept at predicting the valence of their future emotions, they overestimate the intensity and duration of the emotions. So while you might realize that not getting tenure would make you unhappy, you would think it would make you much unhappier and last much longer than it actually would. Mellers and McGraw (2001) found that in the case of anticipated pleasure, while laboratory participants were fairly accurate with their predictions, participants in real-world studies on pregnancy and dieting overestimated their displeasure. Women who were given unwanted pregnancy results were less unhappy than they had predicted as were dieters who had gained weight or lost less weight than expected.

After expected emotions, the field expanded to include current feeling states, also known as immediate emotions (including the previously mentioned anticipatory emotions). Immediate emotions are what the layperson might think of as emotions: how we feel at any given moment. While research does suggest that immediate emotions only influence decisions where affect is relevant (e.g. Schwarz, 1990), most important risky decisions in life are subject to affective influences. For instance, most significant decisions such as whether to invest large amounts of money, engage in unsafe sexual behavior, or even disagree with an authority figure could all be vulnerable to emotional effects. Lerner and Tetlock (1999) found that accountability manipulations can decrease the effects of immediate emotions on decision making by increasing cognitive effort but that this does not always improve the decision quality.

Immediate emotions can be divided into two different types of emotions: incidental and integral. Incidental emotions are feelings that are unrelated to the task at hand. An incidental emotion might be a general mood state or a specific emotion caused by an event earlier in the

day. On the other hand, integral emotions are emotion directly caused by the present decision or situation. For instance, if you are deciding whether to go bungee jumping, you might be influenced by an incidental emotion, such as happiness caused by finding $20 on the street, or you might be influenced by an integral emotion, such as a fear of heights. Most research on immediate emotions in decision making has focused on incidental emotions. These incidental moods or emotions are generally elicited using mood induction tasks such as having participants write about emotional experiences or watch an emotional film clip. For example, one such study primed participants with film clips and found that after being primed with incidental anger, individuals recommended harsher punitive sentences for defendants (Lerner et al., 1998). Another method of studying incidental emotions is to examine the effects of dispositional affect which is measured as a personality trait of one's overall tendency to experience specific emotions. Lerner and Keltner (2001) used measures of dispositional anger and fear to look at the effects of these specific emotions on risk perception.

While incidental emotions have been shown to affect decision making, emotions that are related to the decision task at hand should have an even greater impact. However, due to the difficulty of inducing and measuring task-related emotions, these integral emotions, are studied less often than incidental emotions. One method that has been used to induce task-related emotions is to use a gambling task where some of the trials are rigged (e.g. Mellers, Schwartz & Ritov, 1999; Chua, Gonzalez, Taylor, Welsh & Liberzon, 2009). In such tasks, participants are made to win or lose certain trials so that the emotions of happiness and disappointment can be reliably manipulated. Furthermore, by incorporating feedback about alternate choices, researchers can also induce emotions such as regret and rejoicing. Integral emotions have also been studied by simply measuring the emotions rather than manipulating them. Schlosser,

Dunning and Fetchenhauer (2013) found that both immediate integral emotions and anticipated emotions independently predicted gambling choices. Integral and anticipated emotions can also be related. For instance, if you anticipate a great deal of regret if one alternative occurs, you might feel some integral anxiety or fear. Alternatively, if you anticipate happiness or elation at a particular outcome, you might feel some integral hope.

Main Findings of Affect Valence (Positive/Negative) on Risk

Most early studies on the effects of emotion on risk focused more broadly on general affect or mood and looked only at valence (whether an emotion or mood is positive or negative). Many of the studies on mood and risk came out of the literature on mood congruence which is the idea that people's moods can influence their responses to a variety of cognitive and behavioral events (e.g. Bower, 1981; Mayer & Hanson, 1995). For instance, Isen, Shalker, Clark and Karp (1978) found that participants primed with positive mood, as compared to neutral mood, rated products more positively and had better recall of positive information. Kavanagh and Bower (1985) also found that positive mood increased participants' ratings of self-efficacy while negative mood decreased participants' ratings of self-efficacy across a variety of domains including romantic, social skills and athletic abilities. Mood congruency effects have also been found for factors directly related to risk. For instance, participants primed with positive mood reported higher levels of general optimism while participants primed with negative mood reported higher levels of general pessimism (Mayer et al., 1992). So when people are in good moods, they tend to think good things will happen to them but when they are in bad moods, they tend to think bad things will happen to them.

Studies have also examined the direct effects of general mood on risk perception. In their classic study, Johnson and Tversky (1983) had participants read newspaper reports of happy or

tragic events before estimating the frequencies of undesirable events such as natural disasters like tornados or floods, accidents like car or airplane accidents and diseases like leukemia or lung cancer. Participants who were primed with negative affect estimated higher frequencies for the risky items while participants who were primed with positive affect estimated lower frequencies for the risky items, as compared to a neutral prime. Wright and Bower (1992) expanded this paradigm to examine probabilities for both positive and negative events and found that negative mood led to lower probabilities for positive events and higher probabilities for negative events while positive mood led to higher probabilities for positive events and lower probabilities for negative events. In other words, if you are in a good mood, you are more likely to think that good things will happen and less likely to think that bad things will happen whereas the opposite is true if you are in a bad mood. These results suggest that if you are choosing between a more risky and a less risky option, your mood may determine how likely you think the outcomes of each option are likely to occur and consequently which option you would pick.

This research suggests that affect valence is the main determinant of risk preferences. However, the effects of mood on risk seeking may not be as straightforward as positive mood increasing risk taking and negative mood increasing risk aversion. Yuen and Lee (2003) found that while participants in a negative mood did show decreased risk-seeking, participants in a positive mood did not differ from those in a neutral mood on Kogan and Wallach's Choice Dilemmas Questionnaire. Gender differences have also been found in relation to these general mood effects. For example, Fehr-Duda, Epper, Bruhin and Schubert (2011) found that positive mood made women more optimistic but had no effect on men. Comparing two different ways of framing a risk, Arkes and colleagues (1988) found that positive affect can either increase or decrease risk seeking depending on whether the potential loss is emphasized or minimized. One

explanation for these conflicting results on the effects of positive affect on risk is the idea that people in a positive mood are protective of their positive mood and act in ways that will guard against any negativity (e.g. Isen & Simmonds, 1978). Therefore, if the potential loss is emphasized, people in a positive mood would shy away from the risk as they realize that the loss would make them less happy whereas if the potential loss is minimized, people in a positive mood would focus on the potential gains that would support their positive mood and be more likely to take on the bigger risk.

The actuality of the possible loss also seems to make a difference in how affect influences risky choice. Isen and Patrick (1983) compared hypothetical risk tasks (in which participants were given hypothetical dilemmas occurring to other people) to a risk task in which the stakes were real (participants were betting with the course credit they would receive for completing the study). In the hypothetical risk task, participants who were primed with positive mood were found to be more risk-seeking than the control participants for high-risk situations, but in the real stakes risk task, participants primed with positive mood were only more risk seeking for low or moderate risks and actually bet less than control participants in the high risk situation. These results imply that mood may affect participants differently in real-life risky situations than in hypothetical lab scenarios. It may also indicate that mood effects may differ depending on whether the risky situation is occurring for the participant or if they are being asked to make a risky choice for another person.

The main explanation given for many of these general mood effects is the affect-as-information hypothesis which proposes that people use their current affect or mood to determine how they feel about the choices or judgment (e.g. Schwarz & Clore, 1983). According to this theory, people assume that the way that they are feeling is related to the current judgment and

use that information to judge their preferences. However, in most of the studies examining these effects, the mood information actually comes from a different source and is misattributed to the situation at hand. When participants are told to think about why they are feeling a certain way, the mood effects are often eliminated (Keltner, Locke & Audrain, 1993).

Specific Emotions & Emotional Dimensions

Until recently, most research on the effects of emotions on judgment has focused on general mood or affect rather than specific emotions. However, recent research has questioned the validity of focusing solely on the effects of affect valence. Increasing numbers of studies have found differences in the effects of emotions of the same valence. For instance, Small and Lerner (2008) found that incidental sadness and anger influenced judgments about welfare assistance differently such that anger decreased the amount of welfare assistance people were willing to give while sadness increased the amounts. Gender differences have also been found looking at specific emotions. Fessler and colleagues (2004) used a gambling task to show that being primed with specific emotions elicited different effects for men and women. When primed with anger, men were more likely to choose riskier options but the anger prime had no effect on women. On the other hand, when primed with disgust, women were more likely to choose less risky options while the disgust prime had no effect on men as compared to a control condition.

Evolutionary theorists propose that specific emotions are associated with "action tendencies" that help people make the most adaptive responses without depleting their cognitive resources (Frijda, 1986). These action tendencies may occur in response to a specific stimulus but can also bleed into other situations as well (e.g. Keltner, Ellsworth & Edwards, 1993). In addition to simply comparing specific individual emotions, some researchers have used broader categories to study sets of emotions that match on selected variables. For example, Mano (1994)

examined the effects of both valence and arousal on two risk variables: willingness to choose riskier gambles in a lottery and willingness to pay for insurance. In general, participants primed with high levels of arousal were more risk seeking in the lotteries and less willing to pay for insurance while participants primed with emotions with low levels of arousal were more willing to pay for insurance. However, participants primed with both negativity and high levels of arousal were more willing to pay for insurance for large losses.

One type of emotion theory in which emotions can be categorized using a variety of factors is appraisal theory (e.g. Scherer, 1984; Smith & Ellsworth, 1985). There are a number of different appraisal theories but the general idea is that each emotion can be evaluated on a variety of cognitive dimensions to create an overall emotion profile. For example, Smith and Ellsworth (1985) identified six cognitive dimensions that differentiate between emotional experiences: certainty, pleasantness, attentional activity, control, anticipated effort and responsibility. Using these dimensions, two emotions with the same valence could be distinguished using the other cognitive dimensions. For instance, imagine that your brand new iphone was just broken. Regardless of the cause of the breakage, you would feel some negative emotion, but if someone else broke your phone you would probably feel anger whereas if you broke the phone yourself, you would be more likely to feel sadness or guilt. Lerner and Keltner (2000) expanded on appraisal theories to create the Appraisal-Tendency Framework which proposes that each emotion is associated with varying levels of each of the cognitive dimensions and that these associations influence how future events are evaluated. In other words, if you are feeling an emotion that is high on a particular appraisal dimension, that appraisal will be salient when how you interpret new scenarios.

In order to study how these cognitive dimensions may affect risky decision making, emotions are often chosen that match on most appraisal dimensions but differ significantly on one specific appraisal dimension. The appraisal dimension of certainty is the dimension most often studied in the risk literature. The basic theory in comparing emotions associated with high or low levels of certainty is that experiencing emotions that are associated a sense of certainty leads people to feel that they already have enough information to feel confident in their judgments whereas experiencing emotions that are associated with uncertainty can lead people to feel that they should carefully examine all information prior to making their decision. Tiedens and Linton (2001) demonstrated that experiencing emotions associated with certainty tended to lead to more heuristic processing while experiencing emotions associated with uncertainty tended to lead to more systematic processing. Lerner and colleagues (2003) also found that fear and anger (which differ significantly on appraisals of certainty and control but are similar on most other appraisal dimensions) have distinct effects on risk judgments such that fear tends to lead to more pessimistic expectations and risk-avoidance while anger tends to lead to more optimistic expectations and risk-seeking. Finally, in a study on dispositional fear and anger, Lerner and Keltner (2001) found that fear and anger had opposite effects on risk perception such that fearful people were more risk-averse while angry people were more risk-seeking. Furthermore, these effects were mediated by appraisals of certainty and control. All of these results suggest that we cannot judge all pleasant or unpleasant emotions to have similar effects on risk preferences but that it is important to differentiate between each specific emotion.

Risk Measures

As described above, there is quite a lot of research devoted to looking at the effects of different types of mood and specific emotions on how people make judgments and decisions

about risk. However, what is lacking in the current literature of affect and risk is a similarly close look at the risk tasks involved. Results from these studies make broad claims such as " whereas fearful people expressed pessimistic risk estimates and risk-averse choices, angry people expressed optimistic risk estimates and risk-seeking choices" (Lerner & Keltner, 2001, pp.146). However, the types of risk tasks used in these sorts of studies vary significantly and include a variety of different types of measures including personality measures, self-reported questionnaires, and behavioral measures.

Personality Measures

Risk preferences are often thought of a stable personality trait such that some people tend to be risk-seeking and some are more risk-averse. Therefore, personality measures of constructs such as sensation seeking, venturesomeness or impulsivity are often used as a measure of ones' risk tendencies. Zuckerman (1979) defined sensation seeking as a trait that includes the "the need for varied, novel, and complex sensations and experiences and the willingness to take physical and social risks for the sake of such experiences" (p.10). The original sensation seeking scale was created by Zuckerman, Eysenck, and Eysenck (1978) and consisted of a number of statements that participants would mark as true or false. Within the sensation seeking scale, there are several subscales including *Thrill and Adventures Seeking* (e.g. "I often wish I could be a mountain climber"), *Experience Seeking* (e.g. "I like to try new foods that I have never tasted before"), *Disinhibition* (e.g. "I like to have new and exciting experiences and sensations even if they are a little unconventional or illegal") and *Boredom Susceptibility* (e.g. I can't stand watching a movie that I've seen before").

Although the Zuckerman, Eysenck, and Eysenck sensation seeking scale is the most well-known measure, other measures of sensation seeking do exist. Hoyle and colleagues (2002)

created a condensed version of the original scale. This Brief Sensation Seeking Scale (BSSS) decreased the total number of items from 40 to eight. More recently, Roth and Hammelstein (2012) created another sensation seeking scale called the Need Inventory for Sensation Seeking (NISS). As some behaviors are dependent on factors such as age, culture and socioeconomic status, the NISS was created to avoid behaviors altogether, instead focusing more on people's preferences for the feelings involved with risky situations (e.g. "I like feeling totally charged" and "I like to find myself in situations which make my heart beat faster").

Impulsiveness is also a distinct personality trait similar to sensation seeking, which is sometimes used as a measure of risk preferences. One of the earliest measures of impulsiveness was the Barratt Impulsiveness Scale (BIS) which was created in 1959. This scale is currently on its 11th version and includes items such as "I do things without thinking" and "I spend or charge more than I earn." Eysenck, Pearson, Easting & Allsopp (1985) also created an Impulsiveness scale which includes items such as "Do you often buy things on impulse?" and "Do you often do things on the spur of the moment?" Eysenck and colleagues also created a Venturesomeness scale (another personality trait related to risk preferences) which includes items such as "Do you quite enjoy taking risks?" and "Do you welcome new and exciting experiences and sensations even if they are a little frightening and unconventional?"

Traits such as sensation seeking have been found to be correlated with engagement in activities that are high in risk. For instance, sensation seeking has been found to predict sexual risk taking including having unprotected sex, sex with multiple partners, and high-risk sexual encounters (Hoyle, Fefjar, & Miller, 2000). Sensation seeking has also been linked to reckless driving (Heino, van der Molen, & Wilde, 1996) as well as unhealthy behaviors including

smoking (Zuckerman, Ball, & Black, 1990), alcohol use (Stacy, Newcomb, & Bentler, 1993) and substance abuse (e.g. Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993).

Self-Report Questionnaires

In addition to personality measures, another self-reported measure of risk taking involves asking participants to report on their own attitudes towards risky behavior. Weber, Blais and Betz (2002) created the Domain-specific Risk-attitude Scale (DOSPERT) in order to assess people's risk preferences outside a general personality trait. The DOSPERT asks participants to give their risk preferences for a variety of risk domains. One domain is the financial domain is divided into two different types of financial risks: investing (e.g. "Investing 5% of your annual income in a very speculative stock") and gambling (e.g. "Gambling a week's income at a casino). The other four domains are health/safety (e.g. "Not wearing a helmet when riding a motorcycle"), recreational (e.g. "Going whitewater rafting during rapid water flows in the spring"), social (e.g. "Admitting that your tastes are different from those of your friends") and ethical (e.g. "Cheating by a significant amount on your income tax return").

Another type of self-reported questionnaire asks participants not for their risk preferences but rather their perceptions of how risky a situation is. The assumption is that if one perceives less risk in a given situation, then one will be more likely to engage in the risky behavior related to the situation. One of the earliest measures of risk perception in the emotion and risk literature was Johnson and Tversky's (1983) risk perception measure in which they gave participants a list of common causes of death and asked them to estimate the frequencies of each. The causes of death included diseases, such as strokes or lung cancer, violent acts, such as homicide or war, accidental deaths, such as car or airplane accidents, and environmental hazards, such as fire or tornados. Other risk perception measures have focused on risk in a particular domain. For

instance, Lerner and colleagues (2003) looked specifically at the effects of anger and fear on risk judgments of terrorism.

Behavioral Measures

Another common method of testing risky preferences is to have participants actually engage in risk-seeking or risk-averse behavior. The advantage of examining direct behavior rather than self-reports of past behavior or predictions of possible behavior is that self-report can be unreliable, especially in regards to sensitive issues such as substance abuse or unsafe sexual behavior that are often risky behaviors of interest (Sobell & Sobell, 1990).

Eliciting risky behavior in the lab is usually done by asking participants to choose between a more risky and a less risky option. Since asking participants to engage in many risky behaviors would be illegal and unethical, the common practice is to use gambling tasks where participants can win or lose small amounts of money. One commonly used manipulation offers participants the choice between a guaranteed amount of money and the possibility of winning a greater amount of money (e.g. Fessler, Pillsworth & Flamson, 2004). For example, participants might be given the choice between Gamble A where they have a 100% chance of winning $10 and Gamble B where they have a 50% chance of winning $20 and a 50% chance of winning nothing. Alternatively, another type of gambling task offers participants the choice between two options with the same probabilities but different amounts (e.g. Cheung & Mikels, 2011). In this example, participants would choose between Gamble A where they have a 50% chance of winning $1 and a 50% chance of losing $1 and Gamble B where they have a 50% chance of winning $10 and a 50% chance of losing $10.

For these types of gambling tasks, it varies whether or not the choices are real or hypothetical. For instance, some researchers endow participants with a certain amount of money

at the beginning of the study that the participants can add to or lose depending on their choices. Alternatively, often researchers tell participants that they will be doing a number of gambling trials of which one will be randomly selected to use for real money added to or deducted from from participant compensation. Finally, some researchers choose to use totally hypothetical gambling tasks in which the participants' compensation is unrelated to their choices in the gambling task.

Another specific behavioral task that is often used in emotion and risk studies is the Columbia Card Task (CCT). The CCT was created by Figner, Mackinlay, Wilkening, and Weber (2009) and is a gambling task that involves showing participants 32 cards face down and asking the participants to choose which cards to turn over. Each card is either a gain card (in which the participant would gain the number of points shown on the card) or a loss card (in which the participant would lose the number of points shown on the card). The participant can choose to stop at any time and take the amount already won but the game also stops if the participant turns over a loss card. The game can be altered depending on the number of loss cards included (typically 1, 2 or 3 loss cards), the amount of points on each of the gain cards and the amount of points on each loss card. The CCT also has two different versions: a hot version in which participants are given feedback about each card immediately after choosing it and a cold version in which participants are simply asked to pick the total number of cards they would turn over without any immediate feedback about the cards that they would choose.

Another common behavioral risk-taking task often used is the Balloon Analogue Risk Task (BART) created by Lejuez et al. (2002). The BART is a computerized task in which participants are shown a picture of a balloon and a balloon pump and asked to inflate the balloon. For each pump of the balloon, participants receive a small amount of money and they can choose

to stop at any time and take that money. However, each balloon is programmed to explode after a different number of pumps and if the balloon explodes, the participant losses all money for that balloon trial. More nuances can be added to this task; for instance different colored balloons can be programmed to have different probabilities of exploding which participants would have to learn from trial and error.

Although behavioral tasks tend to be mostly focused on financial risks, methods similar to the traditional gambling task have also been used to study other risks in a hypothetical manner. Lerner and Keltner (2001) used responses to the Asian disease problem as their dependent variable when examining differences between anger and fear on risk. The traditional Asian disease problem informs participants that there has been an outbreak of an unusual Asian disease that will probably kill 600. Participants are then asked to choose between two different programs: in Program A, 200 people will definitely be saved and 400 will definitely die and in Program B, there is a 1/3 probability that all 600 will be saved (no one will die) and a 2/3 probability that no one will be saved (600 people will die). Although the typical Asian disease problem asks participants to simply choose one of the programs, when used in this context, participants were asks for the extent to which they would favor one program over another on a 6-point scale.

Risk Task Issues

There are advantages and disadvantages to each of the risk tasks previously discussed. One reason that these many risk tasks are used interchangeably is that many of them have been found to be correlated. For example, the BART has been validated against several risk-related personality measures including Zuckerman's Sensation Seeking Scale, Barratt's Impulsiveness Scale and the Eysenck Impulsiveness and Venturesomeness Scale and was also found to be correlated with self-reported risky behavior including smoking, alcohol consumption and illegal

drug use. However, many of the most commonly used risk tasks have not always been found to predict real-world behavior. Szrek, Chao, Ramlagan and Peltzer (2012) compared the BART, the DOSPERT and a common gambling task (created by Holt & Laury, 2002) as well as a single-question measure (created by Dohmen et al., 2011) on their relationships to self-reported risky behaviors. Szrek and colleagues found that of all of the risk measures, the single-question measure (which asked participants simply "How do you see yourself? Are you generally a person who is fully prepared to take risks or do you try to avoid taking risks?") was the most predictive of self-reported risky behavior.

There are other issues inherent to each of the types of risk tasks as well. Self-reported measures have high face validity but rely on participants reporting honestly as well as being aware of their own propensities and behaviors. Some risky behaviors are often considered socially unacceptable which can lead to social desirability concerns on the part of participants. However, behavioral measures also have some shortcomings. Gambling tasks can only include hypothetical or small amounts of money usually provided by the experimenter. Therefore, the stakes are pretty low for the participants: they cannot lose their own money so the worst that can happen is that they walk out of the study with exactly the same amount of money as they walked in with. Gambling tasks also limit the risky behavior being studied to financial risks which may not align with participants' risk preferences in other domains.

Future Directions

Risk Domain. One important distinction that is rarely made between different types of risk tasks is the domain of the risk. Although risk can exist in any number of domains, most studies use tasks that focus on risks in a single domain. In addition, the majority of the literature has focused only on financial and health domains, which may not generalize to all other domains.

For example, while most people would agree that both riding a motorcycle and betting a large sum of money at a roulette wheel are risky behaviors, it is not clear whether the same people who would ride the motorcycle would also bet the money. In other words, the relationship between risks in different domains has yet to be fully understood. Therefore, if one study uses a risk task focusing on health-related risks, while another study uses a financial risk task, their conflicting results may actually be demonstrating interesting differences between risk domains rather than failures to replicate specific results.

Furthermore, the use of specific domains of risk is confounded with the type of risk task used. Since actual risky behavior is difficult to elicit in a lab setting, the vast majority of behavioral tasks use financial risks. However, if people's risk preferences vary by domain, as suggested by Weber, Blais and Betz (2002), this presents a problem for generalizing these studies to other domains. Furthermore, influences on risky decision making may also vary by domain. For instance, Weber, Blais and Betz found gender differences for risk perceptions in financial and health domains but not for risk perceptions in the social domain. Similar issues might arise for the effects of emotions on risk preferences but it is currently unknown as there are no real studies examining how emotions influence social risk tasks.

Risk Motivations. Another potential issue with the types of risk tasks generally used in the emotions and risk literature is that a large proportion of the studies focus on risk perception tasks rather than looking at actual risk preferences. Although risk perceptions and risk preferences are often correlated, they measure two inherently separate constructs. Risk perception refers to how much risk a person sees in a given behavior or situation while risk preference refers to what a person will choose given the choice between a more risky option and a safer option. While often the more risk people see in a specific choice, the less likely they

would be to choose that option, this is not always the case. For instance, one might fully understand the risks of riding a motorcycle yet still choose to own one because she enjoys riding it and decides that the enjoyment is worth the risk.

Studies on emotion and risk rarely distinguish between risk perception and risk preferences but discuss them similarly and often generalize both concepts to the broader factor of 'risk. This could be dangerous as some emotional influences might affect risk perceptions but not risk preferences or vice versa. If this is the case, then it could be important to examine not only risk perceptions and risk preferences but also the motivations behind the risky decision. In fact, different people may make the same risky choice but for different reasons. For example, imagine that John and Jane both decide to bet $100 in a casino on a single roulette spin. Even supposing that they have equal financial resources and that $100 is a lot of money for both of them, they may have totally different motivations for placing that bet. John is a very impulsive person who scores highly on sensation seeking scales and he is betting his money for the thrill of it. John understands that the possibility of winning is low but if he wins, that would make his elation even greater. Jane, on the other hand, is not an impulsive person at all, and scores low on sensation seeking scales. However Jane thinks that the possibility of winning is high and she has specific plans for the money she would win. From a strictly behavioral point of view, John and Jane's behavior is the same and some might argue that the exact reason that John and Jane made their decision is irrelevant. Yet, if we are interested in how emotions influence risky decision-making, then the motivation behind the behavior is vital. For instance, if emotions do tend to influence people's risk perceptions, they might have different effects on John and Jane since they have different perceptions of the risk to start with. Assuming that priming fear generally

increases perception of risk, priming fear should have a greater effect on Jane than John since Jane believes that she is likely to win while John already has a low expectation of winning.

Type of Uncertainty. Some distinctions are beginning to be made within the types of risk tasks used in emotion and risk research. For instance, Kugler, Connolly and Ordonez (2012) distinguished between two different types of uncertainty involved in a gambling task: uncertainty caused by chance and uncertainty caused by others. A typical gambling task was used in which participants had the choice between a certain option and an uncertain option. In their "lottery risk" conditions, the uncertainty was situational and the outcome was random. However, in their "person-based risk" conditions, the outcome was dependent on the choice of another participant. For instance, if the participant chose Option A, they would receive $10 for sure but if they chose Option B, they would receive $20 if the other participant also chose Option B but they would receive $0 if the other participant chose Option A. Kugler, Connolly and Ordonez found that if the uncertainty was situational, fear made participants more risk-averse when compared to anger as has been found in other studies. However, when the uncertainty was due to another person, the opposite pattern occurred: participants primed with fear were more risk seeking than participants primed with anger. The researchers suggest that the presence of another player introduces variables concerning the payoffs that the participants previously ignored. However, regardless of the explanation, the results suggest significant differences between risky situations due to chance and those that involve the actions of other people.

These results also suggest that the way that the participants appraise the risky situation may be extremely important in determining the effects of an emotion on their risk judgments. In this particular scenario, the researchers manipulated the cause of the uncertainty and it was clear to the participants which type of uncertainty was in each scenario. However, in many of the

other risk tasks the cause of the uncertainty is less clear. For example, in the BART, participants may believe that the program is programmed to randomly explode or they may believe that the experimenters are controlling when the balloon explodes. Additionally, many of the commonly used risk tasks include the more chance-based uncertainty but often in real-life situations, the uncertainty is related to other people. For instance, when deciding whether or not to use a condom in a high-risk sexual encounter, the positivity of the outcome is dependent on the partner's own condom preference and beliefs.

Conclusions

The influence of affect on risky decision making is still a relatively new area of research but it is one which is rapidly expanding. Previous research has made many interesting distinctions between different types of emotions including expected emotions versus immediate emotions, anticipated emotions versus anticipatory emotions, and mood or affect versus specific emotions or emotion dimensions. However, despite all of the consideration of the type of emotion, little attention has been paid to the type of risk involved. Studies on affect and risk generally use a single risk measure which is almost always in a financial or health domain. Additionally, the type of risk measure used is often confounded with the risk domain. For instance, almost all behavioral risk tasks used in these types of studies are financial risks in which participants can lose small amounts of money. However, many of the hypothetical risk tasks focus more on health risks.

Because of these issues in the current research, one important future direction is to focus on risks in different domains. Just as we cannot generalize the results of the effects of fear on a risky choice to all negative emotions, we also cannot generalize the results of the effects of fear on a financial risk to risky decisions in all domains. Research that has focused only on financial

risks should be replicated in other domains in order to demonstrate its validity across risk domains. Additionally, the domain of social risk has largely been ignored but offers a new avenue for future research.

The new research by Kugler, Connolly and Ordonez (2012) also opens up new areas of study in this field. Distinguishing between different types of uncertainty within the risk measures could help resolve some conflicting results as well as provide new avenues to explore. For instance, uncertainty caused by other people may interact with the level of agency associated with each emotion. In other words, people experiencing an emotion high in other agency (such as anger) may react more strongly to uncertainty caused by others than people experiencing an emotion high in self agency (such as guilt). Conversely, in a situation in which the uncertainty is ambiguous, people primed with a high other-agency emotion might be more likely to attribute the uncertainty to another person rather than the situation.

Finally, examining the mechanisms by which emotions impact risky decision making will shed new light on how to help people make better decisions. Although some studies have proposed that specific emotions or emotional dimensions influence the type of thinking that people do (e.g. Tiedens & Linton, 2001), the way that this relates to the risky decision making is unclear. Do people primed with fear avoid risky options because they think the negative outcomes are generally more likely to occur or just more likely to occur to them personally? Are these people also avoiding riskier choices because they do not see the possible benefits? Teasing apart what people are thinking at the time of the decision will allow us to more fully understand how emotions influence risky decision making and when these emotions are beneficial or harmful.

In conclusion, recent research in this area suggests that there may be many factors that influence people's judgments of risky behaviors and that we need to be cautious when generalizing a specific risk task to general risk preferences. In addition, these factors, including risk domain, risk motivations and type of uncertainty should be considered in terms of how we measure risk in studies of affect and risk. As we continue to refine our knowledge of how mood and emotions influence risky decision making, these factors should be contemplated in choosing our risk tasks as well as individually investigated themselves as they offer the opportunities to more fully understand how people make risky choices in all different types of situations.

CHAPTER V
General Discussion

Although the research on risk is extensive, there is still much that we do not know about how people make decisions involving risk. The three projects I have conducted have added to our knowledge but also highlighted certain areas in which more research is required. Taken together, these projects suggest a few key points that should be considered in future research in this area.

Population is Important

My first set of studies (Chapter 2) demonstrated that we need to be more aware of generalizing outside of our specific samples. In this line of research on age differences in risk, we found that despite stereotypes of older adults as always cautious and risk-averse (e.g., Heckhausen, Dixon, & Baltes, 1989), there was an interaction between risk preferences and risk domain. While older adults were more risk-averse than young adults in health/safety and ethical domains, the reverse was true for social risks: older adults actually perceived less risk and were more likely to rate themselves as engaging in social risks. Furthermore, we found differences in motivations for engaging in risky behavior between older and young adults. Our older adults rated risky behaviors from health/safety and ethical domains as less enjoyable and less likely to produce gains than young adults whereas they rated risky behaviors from the social domain as more enjoyable, less unpleasant and less likely to produce losses than young adults.

In addition to the more specific conclusions that can be drawn from these results, there are some broader implications that should be considered. The vast majority of studies on risk are

conducted with young adults, mostly college students, as their sample. Although there is much research on adolescents and risk (e.g. Albert & Steinberg, 2011), the assumption is often that adults, whether they are 18 or 64, act in similar ways. However, our results suggest this may not always be the case. While focusing on young adults may be the easiest route, we cannot assume that older adults, even those similar in racial and economic backgrounds, will have the same risk perceptions and risk preferences as their younger counterparts.

As with all non-longitudinal studies on age, we are unable to determine from our results whether our age differences are demonstrating aging effects or generational differences. It is possible that our older adults had similar health and social risk preferences when they were in their youth, but we believe it is more likely that their preferences have simply changed over time. As people age, their health may deteriorate, causing them to be more concerned with health risks while their social networks may strengthen over time, which allows them to worry less about social risks. However, future research could further examine this issue by tracking the same individuals over time to see if their risk perceptions and risk preferences change or stay the same.

While our studies only examined one variable, age, and its effects on risk perceptions and preferences, there are many other population variables that might affect how one evaluates risky situations. For instance, our normal participant populations are generally college students who, in addition to being young, are also usually very healthy. However, when it comes to medical decision making, the people making the risky choices are often very sick. Therefore, it could be interesting to expand this research to examine unhealthy participants of all ages who may respond to the risks in different ways. For example, a young, unhealthy individual may appear more similar to a healthy older adult than to a healthy young adult.

Risk Domain is Important

In addition to differences in populations, the results of the first set of studies also suggest that risk domain is an important factor to consider in research on risky decision making. Previous research on older adults had looked only at health or financial domains leading some to conclude that older adults were overall less risk-seeking. However, as we found the opposite results for social risks, this suggests that risk perceptions and risk preferences may be domain specific. For instance, people may be more risk-seeking for risks in the health domain and more risk-averse for risks in the social domain or vice versa.

This is also supported by our results from my second set of studies. When we directly compared a social risk scenario and a health risk scenario, we found differences in how emotions influenced them as well as differences in what predicted risk preferences. For the social risk scenario, participants primed with positive emotions produced more positive outcomes for both the safer and more risky options. However, although emotion valence also affected risk preferences, the direction of this result was not consistent between studies indicating that positive emotions might push people to be either more or less risk-seeking depending on what they are thinking about. For the health risk scenario, participants primed with positive emotions again produced more positive outcomes but only for the more risky option. Additionally, they also produced more negative outcomes but only for the safer option. In this health risk scenario, participants primed with positive emotions were more likely to say they would choose the riskier option. Another major difference between the two risk scenarios was what predicted the riskier choice: for the social risk, only the positive outcomes for both the risky and the safer option influenced risk preferences while for the health risk, both negative and positive outcomes for both the risky and the safer option influenced risk preferences.

Although the results from this set of studies are inconsistent, they do suggest that there may be differences in how emotions influence social risks and health risks. As most studies on risk focus on either health or financial risks, the area of social risks has yet to be fully explored. Risk preferences in one domain are usually assumed to generalize to other domains but since few studies even include social risks, this assumption may not hold true. For example, gender effects for risk generally show that females tend to be less risk-seeking than males. However, when looking across a variety of domains, Weber, Blais and Betz (2002) found that these gender differences disappear for social risks.

As there is so little research on social risks, there are many lines of research that could be pursued. For instance, one such path would be to examine how people evaluate and quantify the amount of risk in socially risky situations. In financial risks, the risks are often already quantified or at least usually easy to calculate. However, with social risks, the possible losses and gains may be harder for people to identify and evaluate. Therefore, it may be that people are worse at accurately evaluating the levels of risk in socially risky situations as compared with risky situations in other domains.

Additionally, one key difference between some of the social risks and risks in other domains, especially the health domain, is that some social risks are considered positive. For instance, most health risks involve behavior that is often considered morally wrong and some of them are even illegal, such as using an illegal drug or drinking and driving. Yet, some social risks, such as disagreeing with a friend or attending a social event by yourself, could be considered positive behaviors. In the United States, we are brought up to be very independent and it is considered brave and admirable to stand up for yourself and refuse to back down from your opinions. While there are definitely positive risks in other domains, or negative social risks,

the social desirability of the risk is something that is rarely examined. It is also possible that some risks that are generally considered negative may appear positive to some subsets of people. For example, teens often reinforce some health risks, like binge drinking or drug use, by giving positive feedback to those who engage in these behaviors.

Going Beyond Traditional Risk Tasks

In my last paper (Chapter 4), I focused on one subset of risk studies: studies that examine how affect or emotion influences people's risk perceptions or risk preferences. Although we know a great deal about emotions and a great deal about risk preferences, there is still a disconnect between these two areas of research. The majority of the studies looking at affect and risk focus on the different types of mood or emotions and pay little attention to differences in the type of risk tasks that are used. When emotions were originally studied with respect to risky decision making, they were first examined as cognitions about future emotions (expected emotions). Then general mood effects were investigated, focusing only on emotion valence. Finally, researchers are starting to explore specific emotions or emotion dimensions beyond emotion valence.

As this progression has occurred with the types of emotions involved in risky decision making, a similar progression needs to be considered for the types of risk tasks used. Currently risk tasks are often limited to health or financial domains. Similar to how we originally thought that all negative emotions act similarly, we assume that influences on risky choice will be the same for risks in a social domain as they are for risks in a health domain. Yet, as demonstrated in the empirical work in Chapters 2 and 3, this may not always be the case. These results suggest that we must replicate previous work in other risk domains to determine the generalizability of many of the effects found for financial or health risks.

In addition to simply expanding our current methods of research to new risk domains, future research should investigate further into the how and why of risky decision making. For instance, people of different ages may view risks differently or choose more or less risky options for opposite reasons. Or, people may consider different types of information depending on the risk domain. In order to make steps towards changing people's behavior, we must understand not only what their behavior is likely to be, but also why they making the choices they make. For example, although it is tempting to assume generally that positive emotions always increase risk-taking, the reality seems to be more nuanced. Rather, it seems perhaps that positive emotions may push one towards the riskier or the safer option dependent on other factors.

Taken together, these three projects demonstrate the importance of studying all different types of risky decision making throughout the lifespan. They also suggest a need for greater consideration of participant population and risk domain in studying how people make decisions involving risk.

APPENDICES

Appendix A
Risk Items across Five Domains

Item Number	Risk Wording	Domain
1*†	Admitting that your tastes are different from those of a friend.	Social
2†	Engaging in unprotected sex.	Health/Safety
3*†	Having an affair with someone who is currently in a committed relationship.	Ethical
4	Being exposed to second-hand smoke.	Environmental
5	Owning a handgun.	Other
6*	Riding in a car with a driver who has been drinking.	Health/Safety
7*†	Disagreeing with an authority figure (e.g. professor, boss) on a major issue.	Social
8*†	Driving a car without wearing a seat belt.	Health/Safety
9*†	Passing off somebody else's work as your own.	Ethical
10	Being exposed to nuclear waste.	Environmental
11	Being a victim of violent crime.	Other
12†	Expressing an unpopular opinion in a meeting at work or school.	Social
13†	Riding a bike or motorcycle without a helmet.	Health/Safety
14†	Cheating on an exam.	Ethical
15	Being exposed to pesticides.	Environmental
16	Leaving your car or bike unlocked.	Other
17**	Moving to a city far away from your family.	Social
18†	Sunbathing without sunscreen.	Health/Safety
19*	Downloading or copying music or videos illegally.	Ethical
20	Being exposed to carbon monoxide in your home.	Environmental
21	Leaving your house or apartment unlocked.	Other
22*†	Arguing with a friend about an issue on which he or she has a very different opinion.	Social
23†	Walking home alone at night in an unsafe area of town.	Health/Safety
24*	Regularly eating unhealthy foods.	Health/Safety
25*†	Shoplifting.	Ethical
26*	Drinking out of the same glass as someone else.	Health/Safety
27	Being exposed to harmful bacteria in food.	Environmental
28	Taking a shortcut that may have more traffic instead of going your usual route.	Other
29*	Consuming five or more alcoholic drinks in a single evening.	Health/Safety
30*†	Taking a job that you enjoy over one that is more prestigious but less enjoyable.	Social
31	Using any sort of recreational drug (e.g. marijuana, cocaine, oxycontin).	Health/Safety
32*†	Stealing an additional TV cable connection off the one you pay for.	Ethical
33	Regularly not washing your hands before eating.	Health/Safety
34	Getting caught in a natural disaster (i.e. flood, tornado, hurricane).	Environmental
35	Getting to the airport less than an hour before your flight leaves.	Other
36	Having multiple sexual partners in a short amount of time.	Health/Safety
37*	Going to a social event by yourself.	Social
38	Being exposed to harmful amounts of radiation.	Environmental
39	Regularly driving more than 10 miles an hour over the speed limit.	Other
40	Catching a sexually transmitted disease.	Health/Safety

* Used in Study 2

** Omitted in Study 1

† Taken from the DOSPERT

Appendix B

Social Risk Party Scenario Task

An acquaintance of yours invites you to a party on Friday night. The acquaintance is a member of a group of people that you would like to be a part of, so there might be other people from that group at the party that you would like to meet. However, none of your friends is willing to go to the party with you.

Appendix C

Social Risk Internship Scenario Task

Imagine that you have just finished your junior year of college. You have been offered an internship in a big city for the summer which might help you get a job in your field once you graduate. However, the internship is unpaid and you do not know anyone who lives in the city. Alternatively, you could go back to your hometown where you could probably work at the same place you worked during other summers which is well-paid (though not related to your field).

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