

5-1-2009

# A Positive Development View of Risk-taking : Attachment, mental health, internal control, and life engagement

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<https://doi.org/10.15760/etd.8035>

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A POSITIVE DEVELOPMENT VIEW OF RISK-TAKING:  
ATTACHMENT, MENTAL HEALTH, INTERNAL CONTROL,  
AND LIFE ENGAGEMENT

by

LAUREN MICHELLE DENNISON

A dissertation submitted in partial fulfillment of the  
requirements for the degree of

DOCTOR OF PHILOSOPHY  
in  
APPLIED PSYCHOLOGY

Portland State University  
2009

DISSERTATION APPROVAL

The abstract and dissertation of Lauren Michelle Denneson for the Doctor of Philosophy in Applied Psychology were presented May 1, 2009, and accepted by the dissertation committee and the doctoral program.


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## ABSTRACT

An abstract of the dissertation of Lauren Michelle Denneson for the Doctor of Philosophy in Applied Psychology presented May 1, 2009

Title: A positive development view of risk-taking: Attachment, mental health, internal control, and life engagement

Previous research has primarily focused on potential negative outcomes of risk-taking (e.g., Byrnes, Miller, & Schafer, 1999). However, risk-taking may be beneficial for our mental health. Currently, the United States (U.S.) is seeing an increase in the prevalence and incidence of anxiety and depressive symptoms (NIMH, 2002, 2003, 2006; WHO, 2001). At the same time, individuals in the U.S. spend a large percentage of time in low-energy, “time wasting” activities, such as watching television (United States Department of Labor, 2007), which is in discord with how our stress response functions optimally (Sapolsky, 1998; Dhabhar, 2002).

Furthermore, attachment theory posits a natural developmental pattern of exploration and fear, with felt security from a caregiver (Bowlby, 1951), and securely attached individuals report higher levels of curiosity (Arend, Gove, & Sroufe, 1979) and enjoy fewer anxiety and depressive symptoms than those with a less secure attachment (Lopez, Mauricio, Gormley, Simko, & Berger, 2001). Thus, this exploration process may be naturally beneficial for our mental health.

This study investigated the association between risk-taking and mental health outcomes and worked towards development of a measure of perceptions of riskiness.

Risk-taking was defined as engaging in either a short-lived or long-range activity which evokes some level of fear for the individual while offering an opportunity for personal growth or a valued accomplishment, but also involves chancing loss. Three hundred eighteen adults completed an online survey assessing attachment pattern, internal control, and several mental health and activity-related measures. The perceptions of riskiness scale was found to require further refinement to adequately fit the theoretical structure of risk-taking, and suggestions to this end are presented. Results from this study suggest: 1) risk-taking, as defined by adventurousness, and life engagement, as defined by high activity level, are both positive predictors of mental health, 2) secure attachment and internal control are positive predictors of risk-taking tendencies, and 3) risk-taking tendencies partially mediates the relationship between secure attachment and mental health, as measured by psychological well-being. Future research should address whether participation in adventurous activities could be an effective means by which to improve mental health.

## Acknowledgements

I would like to thank Drs. Gabriela Martorell, Kathryn McDonald, Eric Mankowski, Todd Bodner, and Gary Brodowicz, for their thoughtful guidance in the development and execution of this project as well as their open minds and surprising support of a seemingly unconventional topic. I am extremely grateful for their mentorship.

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## Introduction

“Do one thing every day that scares you.”

*Eleanor Roosevelt (1884-1962)*

A successful woman on many accounts, Eleanor Roosevelt recommended we face our fears every day, presumably because doing so would make our lives, our community, and our selves better in some way. This assertion makes intuitive sense and is implied by many other popular quotes encouraging chance-taking, such as, “If you don’t risk anything, you risk even more,” (Erica Jong), “Only those who risk going too far can possibly find out how far one can go,” (T.S. Elliot), “There are risks and costs to action. But they are far less than the long range risks of comfortable inaction,” (John F. Kennedy), “We must have courage to bet on our ideas, to take the calculated risk, and to act. Everyday living requires courage if life is to be effective and bring happiness” (Maxwell Maltz), and the popular American idiom, “Nothing ventured, nothing gained.” Although the heart of these quotes seem to intimately reflect purely Western ideology of individualism, success, and perseverance, this conventional wisdom also crosses cultures, as evidenced in the Chinese proverb, “A ship in the port is safe, but that is not what ships are for,” and in the Russian quote, “He who doesn’t take risks doesn’t drink champagne.”

The somewhat universal nature of this idea, that taking chances, or risks, leads to growth, happiness, or a greater sense of well-being, begs the question of what truth exists in this conventional wisdom. At the same time, many aspects of our culture seem to be risk-averse; on average, we value safety and security, and we

scrutinize consumer products, policies, and our living spaces to ensure we maintain comfort in our sense of safety. Counter to what the above quotes suggest, many other popular maxims reflect the idea that safety is more important. For example, “It’s better to be safe than sorry,” or, “Measure twice, cut once.” In fact, a quick search in PsychInfo on “risk-taking” brings up a multitude of articles on how to curb risk-taking, but none which reflect promoting risk-taking. What do we know about how risks will affect our lives or our community? Would we be better off (i.e., happier, more successful, more satisfied with our lives) if we embraced risk-taking every once in a while, or engaged in a fear-inducing activity every day, as Roosevelt suggests? Or are those who more often choose ‘safety’ over the potential to be ‘sorry’ living more rewarding lives?

Unfortunately, little empirical research exists to directly address the impact of risk-taking tendencies on health and well-being outcomes. This study seeks to begin work on this topic, by positing that risk-taking tendencies is associated with positive mental health. It points out that the prevalence and incidence of depression and anxiety are increasing in the United States (U.S.) while our lifestyle is stereotypically low-risk, low-activity, and fear-averse. At the same time, fear and acute stress can be beneficial at times and attachment theory posits positive development is characterized by a pattern of exploration and felt security with a caregiver. Furthermore, previous research on concepts conceptually similar to risk-taking and their relationship to mental health is presented as evidence that risk-taking may also be adaptive and healthy.

### *Overview of the Framework*

Previous research on risk-taking has primarily focused either on the decision-making process of individual decisions to engage in a risky behavior or on which risky behaviors (such as substance use) lead to negative health outcomes and how to reduce engagement in these risky behaviors (Byrnes, Miller, & Schafer, 1999). In either case, the focus has been on the potential *negative* outcomes of any risk. Although it is not entirely clear as to why little empirical attention has been given to the relationship between risk-taking and *positive* outcomes, one can certainly speculate. Given psychology's history of being entrenched in the biomedical model, which focuses on alleviating negative outcomes (Maddux, 2002), the field has only recently begun to address antecedents of positive outcomes, such as happiness (e.g., Diener, Emmons, Larsen, & Griffin, 1985), or personal strengths (e.g., Peterson & Seligman, 2004). It may be that this previous orientation is one that has prevented researchers from seeing the value in addressing potential benefits to risk-taking. Even more, the term "risk-taking" culturally connotes a strong potential for negative outcomes, which may have prevented researchers from questioning whether risk-taking could be beneficial at times.

However, risk-taking may indeed be beneficial for our mental health. Currently, the U.S. is seeing an increase in the prevalence and incidence of anxiety and depressive symptoms (NIMH, 2002, 2003, 2006; WHO, 2001). At the same time, individuals in the U.S. spend a large percentage of time engaged in low-energy,

“time wasting” activities, such as watching television (United States Department of Labor, 2007). We are essentially low risk-takers and fear-avoiders and the majority of the stress we experience tends to be chronic in nature (Covey, 1989; Bolger, DeLongis, Kessler, & Schilling, 1989; Dossey, 2003). Meanwhile, there is reason to believe stress and fear is actually beneficial in the right context.

Our stress response may be helpful to our bodies when it is triggered for a well-defined type of stressor (Sapolsky, 1998) and the fear involved in exploration has been posited to be a natural and beneficial component of positive human development (Bowlby, 1951; Sroufe & Waters, 1977). Previous research has found acute stressors to be beneficial to our health (Dhabhar, 2002; Dhabhar & Viswanathan, 2005), while chronic stressors can be detrimental (Biondi, & Zannino, 1997; McEwen, 1998). Also, attachment theory posits a natural developmental pattern of exploration and felt security with a caregiver (Bowlby, 1951; Sroufe & Waters, 1977). This felt security provides a base from which the individual can explore, yet is also a place to which the individual can return if needed. Securely attached individuals have indeed been found to enjoy fewer anxiety and depressive symptoms than those with a less secure attachment (Lopez, Mauricio, Gormley, Simko, & Berger, 2001) while reporting higher levels of curiosity (Arend, Gove, & Sroufe, 1979), so it may follow that this exploration process is naturally beneficial and necessary for optimal mental health.

Although previous research has not yet addressed the link between risk-taking and positive mental health outcomes, evidence is presented here linking

positive mental health outcomes to constructs conceptually similar to risk-taking, specifically: curiosity, novelty-seeking, sensation-seeking, life engagement, and flow. Internal control is also reviewed as a potential predictor of risk-taking tendencies.

This study begins work on the relationship between risk-taking tendencies and mental health and seeks to address the relationships among risk-taking tendencies, perceptions of riskiness, attachment style, internal control, life engagement, and mental health. Specifically, I propose that 1) risk-taking tendencies is positively associated with mental health, 2) general life engagement, or being active, is positively associated with mental health, 3) risk-taking tendencies will positively predict variance in mental health above and beyond that predicted by life engagement, 4) internal control and attachment will both predict risk-taking tendencies, and 5) given secure attachment positively predicts risk-taking, risk-taking tendencies will mediate the relationship between secure attachment and mental health. Figure 1 presents the conceptual map which will guide this work.

#### *Previous Literature on Risk-taking*

Previous work in risk-taking provides a useful starting point in risk-taking measurement, primarily in the field's assertion that an individual's risk taking behavior is domain-specific; individuals are not equally likely to take risks in all of life's situations, but may be more prone to take risks in specific areas. Blais and Weber (2001, 2006) have conceptualized risk-taking to occur in five different

domains: ethical, financial, health/safety, recreational, and social. They subsequently developed a measure of risk-taking which measures both one's personal perception of risk for, as well as likelihood of performing, a variety of behaviors in these five different domains. Other domain theories of risk-taking (Kruger, Wang, & Wilke, 2007) suggest an evolutionary-based model that suggests risk-taking occurs in response to solving evolutionarily specific problems of reproduction and include domains such as between-group competition, within-group competition, mating and resource allocation for mate attraction, environmental risks, and fertility risks. However, other scales used in the field are trait-based and assess one's tendency to take risks as a personality component (e.g., IPIP: Goldberg, 1999; Goldberg et al., 2006). While many of these scales and measures are similar to risk-taking as presented in this paper, they approach risk-taking differently than the approach presented here.

At the heart of the risk literature is a spotlight on what situational and individual variables will predict risk-taking, with some theories focusing on individual characteristics (e.g., Zuckerman, 1991), some focusing on situational characteristics (e.g., Kahneman & Tversky, 1979), and others focusing on individual by situational factors (e.g., Atkinson, 1983). Much of the impetus behind this theorizing is an effort to determine how to prevent risk-taking, given it can result in some very dangerous consequences; if we know *who* is taking risks in what *situations*, we can create interventions to prevent risky behavior, such as drunk driving. This research indicates that males are much more likely to engage in risky



behavior than females (Byrnes, Miller, & Schafer, 1999; Wilson & Daly, 1985), that older individuals are less likely to take risks than younger (Martin & Leary, 2001), and career success has been linked to risk-taking (Seibert, Crant, & Kraimer, 1999). While the risk literature's approach to risk-taking involves determining how to reduce risk taking, it also defines "risk-taking" and "risk" very differently than those definitions used here.

In one review of the risk literature, risk-taking is defined as "the implementation of options that could lead to negative consequences" (Byrnes, Miller, & Schafer, 1999, p.367) and a wide range of activities are conceptualized as "risks," such as "spinning a roulette wheel to win candy," and, "drunk driving" (Byrnes et al., 1999, p. 367). These activities range from very dangerous to mostly innocuous, while also ranging from intentional to unintentional and informed versus uninformed. Arguably, many of the "risks" addressed in the risk literature, especially that work which addresses health outcomes, can be conceptualized as either poor coping behavior, such as drinking or substance abuse (e.g., Sweeting & West, 2003), or as uninformed behaviors, such as not knowing the risks of unprotected sex (e.g., Hoyle, Fejfar, & Miller, 2000). In contrast, this paper sees risk-taking as an intentional, informed act, which has as one of its potential outcomes a *positive* outcome. Little argument could be made that the decision to get behind the wheel after drinking would result in a particularly positive outcome. Thus, the person making the decision is not weighing potential gain with potential loss, a key ingredient in this paper's conceptualization of risk-taking.

*Risk-Taking Defined*

To begin work on the potential benefits of risk-taking, a working definition of risk-taking must be reached. In doing so, we must consider both the objective danger and the subjective assessment of danger (Furby & Beyth-Marom, 1992). Typically, these assessments are not congruent because, first of all, we cannot be sure of the real danger. For example, will challenging your supervisor when you think you have a better solution to an issue threaten your career or highlight your problem-solving capabilities? Will training for a marathon damage your bodily tissues or improve your physical fitness? Secondly, we, as human beings, do not always behave rationally and therefore do not weigh risks appropriately (Tversky & Kahneman, 1986). Even if we know the danger, such as the odds of dying from stroke as compared to the odds of being murdered, we do not accurately assess risk because we take other things, such as what we dread the most, into account (Keyes, 1985). Furthermore, we sometimes rely on heuristics to make decisions, such as the availability heuristic, which can often be fallible (Tversky & Kahneman, 1974). For example, if we see motor-vehicle accidents every morning on the news, while hardly seeing reports of bicycle accidents, we would be more likely to perceive driving as more risky than riding a bicycle. Risk, then, is difficult to define in a broad sense; our sense of risk is mostly personal, “Our sense of risk is based on our fears. To be useful, therefore, our concept of risk must be flexible enough to fit each person’s sense of fear, and danger of possible loss” (Keyes, 1985, p. 24). For this reason,

individual *perception of risk* is an important concept in the study of risk-taking tendencies.

Keyes further defines risk taking as being composed of two levels, Level I and Level II, which correspond to the two levels of fear described later. Level I risk-taking is what people typically think of when they think of risk taking: “highly stimulating, exciting activities that are often dangerous and seldom last very long” (p.41). This category might consist of thrill sports, performing in public, and going to war (p. 41). Level I risk takers seek to avoid boredom, commitment, and routine. Level II risk taking, on the other hand, Keyes defines as, “longer lasting, rarely dramatic, and usually unstimulating activity that involves more danger to the spirit than to the body. This category includes getting married, starting a family, and building a career” (p. 41). Level II risk takers seek to avoid abandonment, chaos, and injury. In his conceptualization of these levels, we are not purely a risk taker at one level or another; we may tend to lean towards taking risks more often at one particular level than another, but, depending on the domain and where we are in life, we may take risks at both levels.

This theoretical structure of risk-taking seems in some ways to be congruent with the personality dimensions of extroversion and openness to experience (McCrae, Zonderman, Costa, Bond, & Paunonen, 1996) and may partially explain the presence of Type I and Type II risk-taking tendencies in the general population. Indeed, previous work has linked personality to risk-taking tendencies (Nicholson, Soane, Fenten-O’Creevy, & Willman, 2005). Extroversion may be positively related to

Type I risk-taking, since it is characterized by excitement-seeking and extroverts tend to have many, not so close friends, while Type II risk-takers may be more introverted, since introversion is characterized by quiet-seeking and introverts tend to have fewer, closer friends. Furthermore, those higher on the openness to experience dimension may be more likely to be Type I risk-takers because they are more open to sensations and immediate experiences. For this reason, it will be important to discern whether the risk-taking typology presented here strongly reflects these personality dimensions.

Though we may take risks at both levels at various points in our lives, Keyes (1985) argues we are typically either a Level I risk-taker or a Level II risk-taker. This tendency is almost trait-like and can be observed from a young age. Developmentally, the tendency to be either a Level I or a Level II risk-taker is likely due to early experiences and environments, as animal-model studies suggest. Animal model studies on behavioral inhibition, which utilize genetically similar (usually sibling) animal subjects, demonstrate support for the idea that trait-like behavioral inhibition develops early in a child's life and remains relatively stable through adulthood, and also that environment plays a larger role in this behavioral development than do genes (Cavigelli & McClintock, 2003; Cavigelli, Yee, & McClintock, 2006). Therefore, risk-taking tendencies are likely to be developed at a young age, due to early experiences, and, unless intervened upon, risk-taking tendencies are likely to remain relatively stable throughout a person's developmental trajectory. This idea is in line with Belsky's view (e.g., Belsky, Steinberg, & Draper,

1991; Freitag & Belsky, 1996) that early individual differences in environmental circumstances, such as those that shape caregiver-infant attachment, are likely predictive of later individual differences. This is one reason why attachment will be examined in this study as a possible predictor of risk-taking tendencies, which will be discussed further in the section on attachment theory.

Level I risk-takers tend to value things such as action, change, excitement, freedom, intensity, speed, and variety. These individuals are more likely to have problems with things such as attention span, drug use, insomnia, maintaining friendships (though not making new ones), manic-depression, and smoking (Keyes, 1985). On the other hand, Level II risk-takers usually value things such as attention to detail, calmness, community, dependability, even temperament, predictability, and security. They may also tend to have problems with things such as agoraphobia, making friends (though not maintaining friendships), being overweight, simple depression, staying awake, and television dependency (Keyes, 1985). Again, no one is strictly a Level I or Level II risk-taker in all situations, but may be more characteristically similar to one or the other. More importantly, this distinction distinguishes which type of risk is valued and for whom; a Level I risk-taker may value excitement and be more likely to engage in sky-diving, so giving up sky-diving to raise a family may indeed be risky, but could end up being frustrating and boring and not worth the risk (Keyes, 1985).

Risk-taking is defined for this study as engaging in either a short-lived or long-range activity which evokes some level of fear for the individual. In the

process, the activity offers an opportunity for personal growth or a valued accomplishment, but also involves chancing loss.

### *Mental Health in the United States*

Since an absence of negative functioning does not necessarily mean the presence of positive functioning (Watson, Clark, & Tellegen, 1988), addressing mental health in the U.S. requires examination of both positive and negative qualities of mental health. Depression and anxiety are two of the most commonly used indicators of mental health, from a public health perspective (e.g., World Health Organization (WHO), 2001), and it appears that the prevalence of these disorders is on the rise (National Institute of Mental Health (NIMH), 2002, 2003, 2006; WHO, 2001). At the same time, accounts of well-being in the U.S. find average levels of both subjective and psychological well-being to be above neutral (Diener & Diener, 1996; Diener et al., 1999).

*Depression.* Depression is most closely associated with sadness or grief (Watson & Kendall, 1989). It is characterized by negative mood; loss of energy and appetite; feelings of worthlessness and indecisiveness; altered sleeping patterns; and loss of pleasure from activities that had previously been enjoyable (Barlow & Durand, 1999). During a major depressive episode, these symptoms are extreme such that the individual experiences a significant interruption of daily activities. During dysthymic disorder, or dysthymia, an individual suffers from depressive symptoms, but is still able to function on a relatively normal basis (NIMH, 2003).

However, although the individual is functioning, these depressive symptoms still cause significant disruption and distress for the individual (NIMH, 2003). An estimated 19 million American adults (9.5% of the U.S. population) suffer from a depressive disorder (including dysthymia) in a given year (NIMH, 2003). According to the World Health Organization (2001) depression was the leading cause of years lived with a disability in 2000 worldwide.

Depression may be caused by genetic predispositions, traumatic life events, learned helplessness, an imbalance of neurotransmitters, or any combination of these factors (Barlow & Durand, 1999). Furthermore, a large majority of the work on depressive symptoms has found that rumination, excessive and repetitive focus on negative events or emotions, has a strong relationship with the onset and persistence of depression (Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998; Nolen-Hoeksema, 1991; Nolen-Hoeksema, 2000).

*Anxiety.* Anxiety is most closely associated with the emotion of fear (Grinde, 2005) and is characterized by a sense of fearfulness and uncertainty (National Institute of Mental Health: NIMH, 2006). Although anxiety and depression are frequently comorbid and are similar in symptoms, onset, and treatment, anxiety is different from depression in that those suffering from anxiety experience high negative affect, but do not necessarily experience low positive affect. In contrast, those suffering from depression more typically experience both high negative affect and low positive affect (Watson & Kendall, 1989). Approximately 40 million American adults (18% of the population) suffer from at least one anxiety-related

disorder in a given year, an increase of approximately 8% since 2002 (NIMH, 2002). Social phobia (affecting 15 million American adults) is estimated to be the most common anxiety-related disorder (NIMH, 2006). Individuals suffering from social phobia dread social situations, such as dating, work meetings, and parties, with a sense of self-consciousness and fear of being evaluated by others (NIMH, 2006). The effect of anxiety on individual lives can range from a somewhat reduced quality of life to completely debilitating, resulting in severely limited mobility or even job loss (Grinde, 2005; NIMH, 2006, Barlow & Durand, 1999). In fact, anxiety has been proposed as one of the most significant health problems in modern societies (Murray & Lopez, 1996).

Debilitating anxiety has been found to be attributed to genes, excessive triggering of the fear response, attentional focus on negative or aversive events, or a combination of these factors (Barlow & Durand, 1999; Grinde, 2005; Nolen-Hoeksema, 2000). Usually, the tendency to feel anxious is inherited and then “turned on” by the environment (Barlow & Durand, 1999). Nolen-Hoeksema (2000) suggests that, similar to depressive symptoms, rumination has a strong relationship with the onset and persistence of anxiety symptoms. Thus, rumination appears to be especially common among individuals with both anxiety and depressive symptoms.

*Well-being.* Positive mental health functioning is indicated by both psychological well-being (PWB) and subjective well-being (SWB). PWB and SWB have been distinguished as related but separate constructs by Ryff, Keyes and colleagues (e.g., Keyes, Shmotkin, & Ryff, 2002). SWB refers essentially to one’s



happiness, or hedonic well-being, and is indicated by measures of satisfaction with life, positive affect, and negative affect (Diener, Suh, Lucas, & Smith, 1999).

Meanwhile, PWB refers to achieving one's potential, or eudaimonic well-being, and consists of self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth (Keyes et al., 2002). Though PWB and SWB are related, the distinction between these two concepts is supported by research suggesting that some individual traits are predictive of eudaimonic well-being, but are not predictive of hedonic well-being (Keyes et al., 2002). Furthermore, one can experience high levels of one and low levels of the other (Keyes et al., 2002).

In general, most people in the U.S. operate at a level of well-being that is above neutral (Diener & Diener, 1996; Diener et al., 1999), if we may think of "neutral" as the average possible score on well-being scales. In a large, national study of successful midlife development, the Midlife in the United States Survey (MIDUS), measures of well-being and its indicators (along with several other measures) were administered to a sample of 7189 non-institutionalized, English-speaking adults (Brim, Ryff, & Kessler, 2004). Overall, the mean score on PWB was 5.51, out of a possible high score of 7. The three components which make up SWB (positive affect, negative affect, and satisfaction with life) also indicated higher than neutral well-being; the mean score for satisfaction with life was 7.65 out of a possible high score of 10, the mean score for positive affect was 3.36 out of a possible high score of 6, and the mean score for negative affect was 1.57 out of a 6-

point scale (with higher numbers meaning more negative affect). Results of this study corroborate that, on average, Americans enjoy higher-than-neutral well-being.

Individual differences such as personality, genes, personal goals or strivings, and coping skills have all been found to influence levels of well-being (Diener, et al., 1999). Although demographics explain little in individual variance in well-being (Campbell, Converse, & Rogers, 1976), culture certainly plays a role in the kinds of variables which lead to well-being (Diener, et al., 1999). For example, in an individualistic culture such as that in the U.S., income may have more to do with well-being than it does in affiliative cultures because personal income holds more value in our culture and therefore comes to mind more readily when we mentally assess how we feel about ourselves and our situation. For this reason, it is important to address demographic characteristics when considering well-being outcomes. Other variables associated with well-being outcomes, such as personal goals and strivings, physical activity, and curiosity are discussed in the section on risk-related concepts and well-being.

*Mental health paradox in the United States.* While most people are happy most of the time, there is a growing prevalence of depression and anxiety in the U.S. One reason this is particularly troubling is that most people in the world enjoy a happiness level above neutral (Biswas-Diener, Vittersø, & Diener, 2005), but rates of depression and anxiety are growing faster in mostly industrialized nations (Neese & Williams, 1994; Murray & Lopez, 1996).

It seems paradoxical that depression would be more common in industrialized countries such as the U.S., where residents experience lower infant mortality, better healthcare, and an infrastructure designed to create comfortable living conditions than many non-industrialized countries. Some suggest this is a result of the discord between our modern environment and cultural constraints and the lifestyle that is the most naturally beneficial (Neese & Williams, 1994; Buss, 2000; Grinde, 2005). For example, we tend to avoid activities which might produce negative emotions, such as fear, thinking that positive emotions are beneficial and negative emotions and stress are detrimental (United States Department of Labor, 2007; Bolger, DeLongis, Kessler, & Schilling, 1989). However, fear and stress can also be beneficial when clearly defined and resolved (Dhabhar, 2002; Dhabhar & Viswanathan, 2005), and in fact, attachment theory posits a natural developmental pattern of exploration and fear with felt security from an adult caregiver (Bowlby, 1951). This discord between our lifestyle and how our bodies benefit from specific types of emotions and stress is explored in the section that follows.

### *The Discords Between How We Live and Optimal Functioning*

*Benefits of experiencing positive and negative emotions.* Given the described severity of anxiety and depression, and their association with the emotions *fear*, *grief*, and *sadness*, it is not surprising that we tend to think that negative emotions are to be avoided. In fact, so much research connects negative thoughts with negative health outcomes, such as heart disease (e.g., Suls & Bunde, 2005), it is no wonder we

are a culture obsessed with avoiding potential negative experiences and emotions. However, in the appropriate context, “negative” emotions such as fear and grief can serve very positive, helpful functions (Grinde, 2005; Davis, Nolen-Hoeksema, & Larson, 1998; Dossey, 2003) and it is adaptive to strike a balance between “positive” and “negative” emotions (Dossey, 2003; Oishi, Diener, Lucas, 2007).

Keyes (1985) describes fear as presenting on two levels: “At a first level, where our nervous systems enjoy short-term stimulation when danger is confronted and transcended; and at a second level, where the long-term need to affiliate with others is a byproduct of feeling scared...In a nutshell: fear provides both a tonic to our body and spirit and an incentive to forge human ties” (p. 33). Theoretically, experiencing either of these two levels of fear is potentially beneficial to our well-being; the short term jolt of fear is arousing and potentially leaves us with a euphoria of adrenaline or an increased sense of self-efficacy, if we successfully conquered the fearful situation (Bandura, 1977, 2001), and the long-term fear facilitates our building strong relationships with others, which has been found to be beneficial on a multitude of levels, especially through social support (e.g., Stroebe & Stroebe, 1996) and psychological sense of community (e.g., Hill, 1996). These two levels of fear coordinate with the two levels of risk-taking, described earlier.

Empirical investigations have found that experiencing a *moderate* amount of fear or anxiety is healthy. In fact, patients with moderate fear of surgery were found to be more prepared for surgery and had a higher stress tolerance than those with low fear (Janis, 1968). Furthermore, the “adrenaline kick” we receive from encountering

a fearful event provides an increase in self-esteem and positive mood (Grinde, 2002; Keyes, 1985), which is perhaps a biological reward for taking a chance on accomplishing something. So, not only does fear serve an instrumental purpose by encouraging information-seeking behavior and promoting social ties, but the experience of the emotion itself appears to be beneficial to our bodies and our minds.

However, fear can also be detrimental. One potential factor which distinguishes the beneficial fear described above from the detrimental fear that turns into anxiety may be our sense of control over a situation: “A scare is typically perceived as pleasant if the individual retains control of the situation, while unpleasant if the situation gets out of control...The brain is designed to induce us to take some chances, otherwise we would never have laid down huge prey or ventured into uncharted land; but it is also designed to stop us from causing harm to ourselves, that is, to avoid hazards” (Grinde, 2002, p.340). Thus, our experience of control helps us balance our desire to take a chance on achieving something great with our desire to keep ourselves out of terminal danger. For example, an individual may be fearful of quitting his or her job to start a new business. It will be that person’s sense of control over the process which will determine, 1) whether he or she will begin the process, as well as 2) whether he or she will flourish or perish during the process.

Just as fear can be both detrimental and beneficial, being happy all of the time is not necessarily positive. The reward centers in our brain which respond to positive feelings and events were adapted at to a time in history, specifically the Paleolithic era (Grinde, 2002), during which we were less able to abuse this system

via artificial means. Drugs, entertainment, and other environmental manipulations can wear out these centers to the point of needing larger doses of the same stimuli for comparable effects, or to the point of rendering these centers completely non-responsive (Buss, 2000; Dossey, 2004; Grinde 2002). Recent findings from Oishi and colleagues (Oishi, Diener, Choi, Kim-Prieto, & Choi, 2007) show that as one's overall well-being increases, so does the impact a single negative event has on decreasing one's daily well-being. So, for those who are really happy most of the time, they need to experience a higher ratio of positive to negative events on a daily basis in order to maintain that level of happiness. For those who are moderately happy overall, negative events are less potent and therefore one negative event may go mostly unnoticed. Furthermore, even though success has been linked with happiness (Lyubomirsky, King, & Diener, 2005), Oishi, Diener, and Lucas (2007) suggest that people can have too much "happiness," that is, those who rate themselves as extremely happy are less successful than those who rate themselves as moderately happy. Therefore, high levels of happiness do not necessarily translate to high levels of functioning; having some degree of negative emotions may prove more adaptive. It may be that experiencing negative emotions, or not being happy, encourages us to keep striving towards new goals and experiences.

Although most people strive to maintain positive emotions while avoiding situations that may cause negative emotions, positive emotions are not purely beneficial and negative emotions are not purely detrimental. Despite our desire to avoid depression and anxiety, emotions such as fear and grief can be extremely

helpful and appropriate in the right situation; avoiding them at all costs could, in fact, be costly. As seen in the research presented, optimal functioning requires experiencing of the range of emotions, as they each serve a unique purpose and they function with one another to promote balance. By following our cultural prescription to avoid situations which may cause fear or anxiety, we may be creating an environment for ourselves in which we experience too few instances of fear for our optimal functioning.

*Optimal functioning of the stress response.* Hans Seyle (1956, 1976) conceptualized *stress* as the physiological response to a *stressor*. When our body is not stressed, it is in a state of allostasis; it is in balance appropriate for that situation (Sapolsky, 1998). However, when we experience a stressor, or even think about something stressful, our body's stress response starts up as an attempt to restore balance (Sapolsky, 1998). This response is helpful in many ways, from an evolutionary perspective, as it prepares us to fight back against the stressor or to remove ourselves from the stressor. The "fight or flight" response (Cannon, 1915) has proven to be adaptive to the survival of our species, especially in response to physical threats, to which it was adapted (Sapolsky, 1998).

However, since humans have the ability to anticipate stressors and worry, we have to include in our definition of stressors the anticipation of, or worrying about, potential and past stressors (Sapolsky, 1998). We experience many more of these *psychological* stressors which do not have a clear beginning or a clearly defined resolution; they do not lend themselves well to being physically fought against or

being removed from our presence. Therefore, our physiological stress response is being repeatedly turned on without being appropriately turned off. This results in chronic levels of low-grade stress and spending most of our time and energy attending to daily urgent, but unimportant hassles (Covey, 1989; Bolger, DeLongis, Kessler, & Schilling, 1989). At this point, when we are balancing a number of stressors, it becomes difficult to find the energy to do any of the more meaningful things we desire to accomplish.

Sapolsky (1998) describes this idea as the “seesaw model” of stress-related disease. Because they weigh little, two small children can easily balance a seesaw, expending little energy. This is the analogy of the body in allostatic balance, when the body easily maintains balance under minimal outside “pressure.” However, two elephants would spend most of their energy trying to balance the seesaw under their enormous weight. This is the analogy of the body in allostatic imbalance, when the body is working hard to restore balance from multiple stressors. When we are in allostatic imbalance, we are spending most of our energy attending to emergencies rather than engaging in work towards long-term goals. This also discourages our bodies from expending precious energy on health maintenance functions; when threatened, the body puts energy towards short-term, safety, functions, because long term health may not even matter if the current emergency cannot be resolved (Sapolsky, 1998).

Indeed, stress has been related to a number of negative health and well-being outcomes. Diabetes, cardiovascular disease, and reproductive disorders have all



been linked to excessive stress (Sapolsky, 1998) as well as viral infections (Solomon, Segerstrom, Grohr, Kemeny, & Fahey, 1997) and a slowed healing of wounds (Kiecolt-Glaser, Page, Marucha, MacCallum, & Glaser, 1998). Mental health problems arising from over-activation of the stress response can include anxious thoughts, memory difficulties, anger, depression, fatigue, or inability to relax (Straub, 2002). However, just as not all negative emotions are detrimental, not all stress is detrimental to one's health, and an important distinction between beneficial stress and detrimental stress may be the length of time that the stress response is activated.

Recent research is beginning to find that acute stress can be health-protective (Dhabhar, 2002; Dhabhar & Viswanathan, 2005), while chronic stress can be detrimental (Biondi, & Zannino, 1997; McEwen, 1998). Dhabhar & Viswanathan (2005) write, "An acute stress response is an evolutionarily adaptive psychophysiological survival mechanism" (p. R738). These researchers in fact found that an acute stress response, induced at the time of vaccination, can improve immune memory and therefore increase the vaccine's success. On the other hand, when the physiological stress response is activated and cannot be turned off, as usually occurs with chronic stressors, disease may ensue: "When we sit around and worry about stressful things, we turn on the same physiological responses – but they are potentially a disaster when provoked chronically. A large body of evidence suggests that stress-related disease emerges, predominantly, out of the fact that we so often activate a physiological system that has evolved for responding to acute

physical emergencies, but we turn it on for months on end, worrying about mortgages, relationships, and promotions” (Sapolsky, 1998, p. 6). It is also at this point where fear may become chronic anxiety. The stress response, which was adapted to best respond to short-term, immediate threats of usually a physical nature, responds the same way whether we are in physical danger or imagined danger. It becomes detrimental to our health and well-being when those imagined dangers do not have a clear end point; we experience no cathartic release and suffer a slowed recovery from the flush of hormones experienced during the stress response (Sapolsky, 1998). Unfortunately, an examination of the modern lifestyle suggests American lives are dominated by psychological, prolonged stressors.

*The typical American lifestyle.* According to a recent report from the United States Department of Labor (2007), Americans spend an average of 7.6 hours a day working, on days they work. Compared to that, they spend an average of 5.09 hours a day in leisure activities. However, 2.58 hours of that time is spent watching television, while only .28 hours is spent engaged in sports, exercise, or recreation. Even socializing, which ranks second in the amount of leisure time spent, only accounts for .76 hours a day. These numbers alone make it clear that the average American has a considerable amount of leisure time available, but spends over half of that time watching television.

Watching television falls into the category of activities Stephen Covey (1994) calls, “not important, not urgent,” or the “quadrant of waste.” Other activities that fall into this category are busywork (such as completing inordinately long forms for

simple tasks), reading junk mail, and escape activities (such as browsing the Internet without real purpose). Americans usually spend their time in either this quadrant or in the “urgent, important” quadrant, which includes crises, medical emergencies, and deadline-driven projects (Covey, 1994). However, the quadrant that gets most neglected, the “not urgent, important” quadrant, is comprised of activities which bring us the most joy, such as relationship-building, exercise, value clarification, and true recreation or relaxation (Covey, 1994). Unfortunately, according to national surveys (e.g., US Department of Labor, 2007) we are spending our leisure time in low-energy, unrewarding activities, such as watching television, instead of engaging in joy-producing activities, such as recreation.

One reason for our lack of engagement in joy-producing activities may be that the “urgent, important” activities take up so much of our energy that we feel overwhelmed in trying to engage in meaningful leisure-time activities. These “urgent, important” activities, along with our stress of thinking about them, may be contributing to the weight of the elephants in the seesaw model of stress described above (Sapolsky, 1998). In fact, these “daily hassles” are what contribute most to our felt stress. It is not the large, stressful experiences which have the most impact on our well-being, but rather it is the small, daily details that impact our well-being most of all (e.g., Bolger, DeLongis, Kessler, & Schilling, 1989). Furthermore, when we choose to spend our leisure time in low-engaging activities during our free time, instead of “not urgent, important” activities, such as relationship building, we forgo

the opportunity to engage in activities which have potential to both bring us joy and reduce our felt stress (Csikszentmihalyi, 1993).

Based on the fact that our physiological stress response was best adapted for short-lived, highly threatening experiences and our current lifestyle is characterized by chronic, low-level daily stressors, it seems there is a discord between how our bodies function optimally and the lives we currently live. In fact, attachment theory posits a natural, positive developmental pattern characterized by periods of exploration from an adult caregiver.

### *Attachment Theory*

Attachment theory (Bowlby, 1951) is a developmental theory which proposes an interaction between genes and the environment in the development of a characteristic pattern of behaviors involved in relationships with others. Specifically, Bowlby (1951) proposed that the initial bond, or attachment, between caregiver and child was qualitatively different from any other relationship and it sets the tone for the child's future interactions with others. Most importantly, he argued that attachment to a caregiver provided a secure base from which to explore. This seems to suggest that our natural tendency is to explore, given we have a secure place to which we can return once the exploring is over. This exploration can be scary, yet rewarding, and we are motivated to do so.

Indeed, Sroufe and Waters (1977) write, "In the absence of threat, the infant may spend little time in physical proximity [to the caregiver], especially with

increasing age (e.g., Rheingold & Eckerman, 1973), though in a novel environment may 'check back' occasionally (Mahler, 1975), visually or vocally or through locomotion. Given their curiosity and affiliative tendencies, infants may even spend more time looking at or interacting with (exploring) an unfamiliar person than they do their caregiver (e.g., Bretherton & Ainsworth, 1974; Rheingold & Eckerman, 1973)" (p. 1186). Keyes (1985) also touches on this idea when he describes how fear plays a role in a child's exploration. He explains that when something fearful happens to the child, the child will return to its mother for reassurance of safety. Once these safety needs are met, the child will feel confident again to explore, "So fear has the paradoxical effect of encouraging a child to seek security, which in turn instills the confidence to go forth and risk being frightened once again" (Keyes, 1985, p. 40).

Mary Ainsworth (1978), who developed the Strange Situation measure of attachment, delineated three attachment patterns describing a person's behavioral tendencies. The three attachment patterns Ainsworth (1978) defined were: 1) secure attachment, 2) avoidant attachment, and 3) anxious-ambivalent, or resistant, attachment. A secure attachment is characterized by high levels of proximity seeking with the caregiver and high levels of maintaining contact with the caregiver if the child is distressed, as well as low levels of avoiding proximity with the caregiver and low levels of resisting contact with the caregiver (Ainsworth, 1978). In essence, the securely attached child is very effective in achieving comfort; he or she may get sufficient comfort via visual contact and may not necessarily need

physical contact. This child will display the typical pattern Bowlby (1951) describes in using the attachment figure (mother) as a base from which to explore, returning to the mother when the child becomes frightened or wishes to seek security reassurance. Approximately two-thirds of children are securely attached (Feldman, 2005). An avoidant attachment pattern is characterized by low levels of proximity seeking with the caregiver and contact with the caregiver, along with high levels of avoiding proximity with the caregiver and low levels of resisting contact with the caregiver. These children appear to react very little to the mother's actions, though their physiological response is similar to that of securely attached children (Feldman, 2005). On the other hand, ambivalently (anxiously) attached children display a confusing pattern of reaction to their mother's actions; they cling to the mother and are fearful of exploring, but will also avoid contact with the mother when she returns after an absence (Ainsworth, 1978). This attachment pattern is characterized by high proximity seeking with the caregiver, high maintenance of contact with the caregiver, low avoidance of proximity with the caregiver, and high resistance of contact with the caregiver (Ainsworth, 1978). Approximately 12 percent of children are classified as ambivalently (anxiously) attached (Cassidy & Berlin, 1994).

Though attachment styles were initially developed in addressing the child's behavior with regard to his or her caregiver, some evidence suggests attachment style is relatively consistent through adulthood (Wei, Shaffer, Young, & Zakalik, 2005; Hazen & Shaver, 1987; Koski & Shaver, 1997). Although a direct link is weak, there are consistencies between an infant's attachment style and that person's

subsequent behavior. For example, a link has been demonstrated between infant attachment and social competence at various points of development, as late as adolescence (Park & Waters, 1989; Urban, Carlson, Egeland, & Sroufe, 1991; Sroufe, Carlson, & Shulman, 1993). These children demonstrated higher levels of positive affectivity with peers, more involvement and activity, and more meaningful friendships (Sroufe et al., 1993). Freitag and Belsky (1996) suggest the link between early attachment and subsequent development of healthy relationships may be mediated by the maintenance of a secure caregiver-child relationship and that this relationship is at least modestly predicted by early attachment. Other work indicates that infant attachment style can be compared to an individual's behavior towards a romantic partner as an adult and can serve as a potential explanation as to the quality of adult romantic relationships (Feldman, 2005; Brennan & Shaver, 1995). As such, attachment patterns may be analogous to the trait-like behavioral inhibition patterns animal models are finding to be so influential in an animal's willingness to explore. Both are developed at an early age, likely due to early environmental experiences, and are relatively stable through adulthood (Cavigelli, & McClintock, 2003).

Since these three attachment patterns suggest differing levels of willingness to explore away from the attachment figure, it seems logical to suggest that attachment style might be somehow related to the quantity as well as the type of risks one takes. For example, securely attached individuals may take risks more often, because they feel a baseline sense of security from which they can explore. On the other hand, ambivalently attached individuals may be more reluctant to take risks

because they already feel insecure; they are perpetually aroused trying to establish the baseline level of security that securely attached individuals already enjoy, leaving little energy for exploration. In fact, securely attached infants scored higher on a measure related to risk-taking, curiosity, than anxiously attached infants in a study by Arend, Gove, and Sroufe (1979). Furthermore, secure attachment has frequently been found to be associated with positive mental health outcomes, while anxious and avoidant attachment patterns have been associated with negative mental health outcomes (Wei, Shaffer, Young, & Zakalik, 2005; Shaver & Hazen, 1989). This suggests that perhaps those with secure attachments are more willing or able to explore, as Bowlby (1951) initially suggested, and that this exploration may lead to positive mental health. It may be that risk-taking tendencies mediate the relationship between attachment pattern and mental health.

Although those with a secure attachment may explore more often, this does not preclude others from also taking risks. A secure attachment, might, however affect what kinds of risks a person would more commonly take. For example, a secure attachment may suggest that relationships are important to an individual, as a secure attachment has been found to be related to healthier relationships (Hazen & Shaver, 1987). If this is true, we might expect those with a secure attachment to be Level II risk-takers; the potential for a rewarding relationship would be worth the risk and fear involved. Keyes (1985) notes, "...as opposed to Level I types who look for peaks to scale to increase their endorphin flow, Level II types try to keep their attachments solid to make sure that their flow isn't decreased. To them there is risk



in the extreme form of the danger of losing such attachments and the endorphins they guarantee” (p. 50). These are the kind of people who take risks like getting married or having children. Those who do not have a secure attachment may be more likely to take Level I risks because they see greater reward in individual pursuits as opposed to affiliative pursuits.

While attachment theory proposes a natural developmental process of exploration, and we are currently living a lifestyle that is in discord with how our body functions optimally, empirical research does not yet exist on the relationship between risk-taking and mental health. However, constructs conceptually similar to risk-taking have been studied and are presented here, with comparisons made between each construct’s definition and the definition of risk-taking used for this study.

#### *Constructs Conceptually Similar to Risk-taking and Associated Well-being Outcomes*

Though there is no known empirical research on the relationship between risk-taking tendencies and health and well-being outcomes, some research has been done investigating concepts that are conceptually similar. Curiosity, novelty-seeking, sensation-seeking, life engagement, and flow all touch on aspects of risk-taking, but are qualitatively different. We can look at research on these topics to gain insight into how risk-taking, conceptualized as engaging in a fear-evoking activity which provides both the opportunity for personal growth as well as a chance at loss, might be similarly related to health and well-being outcomes. We may also

learn more regarding the antecedents of risk-taking activities and the general nature of the act of risk-taking.

*Curiosity.* In the current literature, curiosity has been conceptualized a few different ways. Swan and Carmelli (1996) define curiosity as a “term used to designate a set of hypothetical mechanisms that serve to orient or attract an organism to novel stimuli. Curiosity, or *exploratory behavior*, is viewed by personality theorists and developmental psychologists as a basic human drive to maintain certain reinforcing levels of sensory arousal (Mayes, 1991)” (p. 449). This definition suggests that curiosity is a composite trait, made up of “hypothetical mechanisms,” though we do not know what these mechanisms include, which promotes exploratory behavior. Similarly, Kashdan and Fincham (2004) define curiosity as, “the volitional recognition, pursuit, and self-regulation of novel and challenging opportunities (reflecting intrinsic values and interests)” (p. 483). This definition contributes to the notion that we intentionally direct our curiosity towards stimuli specific to our values and interests, whereas the Swan and Carmelli (1996) definition suggests curiosity is more general in nature. Further distinctions include *state* versus *trait* curiosity, in which those with trait curiosity experience more instances of state curiosity (Kashdan & Steger, 2007) as well as *diversive* curiosity, “actively seeking out varied sources of novelty and challenge,” versus *specific* curiosity, “actively seeking depth in one’s knowledge and experience with a particular stimulus or activity” (Kashdan, Rose, & Fincham, 2004, p. 291). This last distinction between *diversive* and *specific* curiosity is an important one, because most definitions of curiosity imply an element

of novelty. According to this distinction, however, curiosity can be simply the desire to learn more about an already known topic. Peterson and Seligman (2004) define curiosity as involving, “the active recognition, pursuit, and regulation of one’s experience in response to challenging opportunities” (p. 125). Curiosity, they believe, overlaps with interest, novelty-seeking, and openness to experience. Furthermore, curiosity is something all people possess, though to varying degrees.

Taking these definitions together, it seems that *curiosity* can be conceptualized as either a state or a trait which encourages people to explore aspects of their environment, whether they are novel aspects or already somewhat known. Although some people tend to be more curious than others in certain situations, curiosity is an innate characteristic. Risk-taking is similar to this definition of curiosity in that risk-taking is exploratory in nature and thought to be an innate need, but it is different in that curiosity does not necessarily include an element of fear, which is central to the definition of risk-taking.

Curiosity has been found to be related to a variety of positive well-being and developmental outcomes (Arend, Gove, & Sroufe, 1979; Inagaki, 1979). Kashdan and Steger (2007) found that those who score high on trait curiosity reported higher well-being on days they were more curious. It is important to point out that these authors were defining curiosity as engaging in challenging and novel activities which facilitate a sense of growth. Their results suggest that engaging in personally appropriate levels of challenging and novel experiences are related to well-being. In longitudinal research, Swan and Carmelli (1996) conducted a 5-year follow-up with

a sample of elderly adults and found that those with higher initial levels of state and trait curiosity lived significantly longer, even after controlling for age, education and health. Though the pathway from curiosity tendencies to improved health is unknown, it appears there is a link between curious behavior and longevity.

Further evidence of this link can be found in work with animal models. Cavigelli and colleagues (Cavigelli & McClintock, 2003; Cavigelli, Yee, & McClintock, 2006) have investigated novelty-seeking behaviors and mortality in a series of provocative life-span studies with rats. These studies investigated the neophobic behavioral/neuroendocrine response pattern, which is a pattern of responding to novelty with fear and has been found to develop in humans around 14 months (Kagan & Snidman, 1991). One outcome of these studies suggested this behavioral trait to be a relatively stable response pattern over the life-span. Most importantly, these studies found evidence of the link between curious behavior and longevity; those rats who were neophobic (fearful of exploring) died significantly sooner than their neophilic (exploratory) siblings. They suggest the link is hormonal in nature. Those rats who were neophobic had a larger adrenal response to novelty, similar to the one found in fearful children (e.g., Kagan et al., 1988; Schmidt et al., 1997; Tennes et al., 1977). However, the removal of the hormones from the bloodstream did not occur any faster for the neophobic rats, which means the hormone lingered longer in the bloodstream of the neophobic rats than in the bloodstream of the neophilic rats. This suggests that perhaps the burden of prolonged exposure to stress is detrimental to one's health, while acute exposure to

stress hormones may be protective of one's health. These findings line up neatly with what we know about the optimal functioning of the stress-response; it responds best to peak experiences for which there is a resolution or an actionable response available to the individual, rather than experiences that are burdensome, for which there exists no actionable response.

*Sensation-seeking.* Sensation seeking is perhaps the most well-established construct related to risk-taking. It has been generally defined as the need to engage in, "varied, novel, and complex sensations and experience and the willingness to take physical and social risks for the sake of such experience" (Zuckerman, 1979, p. 10). It is also thought to be based in inherited differences in the nervous system (Zuckerman, 1990). This definition of sensation seeking is closely related to Level I risk-taking and seems to omit Level II risk taking; sensation seeking is more conducive to engaging in fast-moving, high adrenaline kinds of activities rather than ongoing challenges. In this way, it is a similar, but insufficient, construct to risk-taking. Also, sensation seeking seems to be conceptualized as a trait which *leads to* risk taking (Zuckerman, 1994), not describing the act of risk-taking.

Zuckerman and colleagues (1964, 1971, 1978) developed the Sensation Seeking Scale (SSS) in order to measure trait sensation seeking. After its most recent revision, into the *SSS V* (Zuckerman, Eysenck, & Eysenck, 1978), the instrument is comprised of four 10-item scales: 1) Thrill and Adventure Seeking (TAS), 2) Experience Seeking (ES), 3) Disinhibition (Dis), and 4) Boredom Susceptibility (BS). The TAS scale taps into one's desire to engage in risky or

adventurous activities and is characterized best by the item, “I sometimes like to do things that are a little frightening.” Experience seeking is best described as a desire to utilize the senses through various activities, relishing the pure experience of them. The items in the Dis scale indicate one’s tendency to engage in activities such as drinking, partying, gambling, and sex. Finally, the BS scale measures one’s aversion to repetitive experience.

Zuckerman and Neeb (1980) found that these scales are moderately correlated with one another (ranging from 0.26 to 0.47) and that all of the subscales are positively correlated with drug use in college and adult populations (Zuckerman, 1979). Although most research on sensation seeking has focused on its potential relationship to negative outcomes such as drug use, risk for sexually transmitted diseases, and criminal activity (e.g., Zuckerman, 2006), sensation seeking has been found to be related to positive mood, especially for those who are high sensation seekers (Johansson, Almay, von Knorring, Terenius, & Astrom, 1979) and it seems to have an antidepressant quality (Keyes, 1985).

Despite the lack of research on positive sensation seeking activities or positive outcomes from sensation seeking, it is interesting to note that Zuckerman (2000) claims his work on sensation seeking affirms the human need for excitement; it is essential for our species’ survival and without it we would stagnate. It seems that although sensation can be detrimental if we direct our need for excitement towards destructive risk-taking behaviors, it is also necessary for our survival and can be beneficial if properly directed towards constructive risk-taking behaviors.

*Life Engagement.* Life engagement is being conceptualized here to include the various ways individuals maintain a sense of engagement in life. This includes working towards short and long-term goals (e.g., personal strivings) as well as being involved in daily activities (e.g., work, school, sports club, volunteering). Those who are engaged in life are more active, rather than passive, in deciding how they spend their free time, and they choose activities which may require more energy upfront (i.e., they will choose to play sports outside rather than play a sports video game). Engagement in goals and other activities have been linked repeatedly to positive mental health.

Emmons (1986) conceptualized personal strivings as an integration of a number of related goals; those things toward which individuals are working, and around which they tend to organize their behavior. McGregor and Little (1998) built on Emmons' work on personal strivings, clarifying personal strivings and projects as goals which provide a sense of purpose in life. They argue this occurs through two avenues: 1) personal projects that are efficacy-supporting, promoting a sense of mastery, and 2) personal projects that are integrity-supporting, promoting a sense of self-knowledge. Personal projects can also be both efficacy-supporting as well as integrity supporting.

Emmons (1986) found that simply having personal strivings is beneficial to one's well-being. One need not necessarily achieve the goal to feel a sense of well-being (Omodei, & Wearing, 1990; Emmons, 1986), but simply having the goal and making progress towards meeting the goal is beneficial: "Movement toward the goal

and the consequent consummation of the goal are accompanied by positive affect, whereas interruption of goal-directed activity is associated with negative affect” (c.f. Emmons, 1986, p. 1058). Utilizing the theoretically-based conceptualization of well-being outlined by Ryff and colleagues (Ryff, 1989; Ryff & Keyes, 1995), McGregor and Little (1998) found evidence to suggest that personal projects contribute to one’s overall sense of well-being (both hedonic and eudaimonic). Based on this research it seems that personally relevant goals provide a sense of purpose in life, which is beneficial to our well-being alone, and that gaining a sense of mastery or self-knowledge from these goals can improve both our feelings of happiness and our sense of meaning in life.

Related to the concept of personal projects, though on a less grand scale, is simply staying involved in activities of interest. Playing a team sport, running, painting, or participating in a knitting circle could all potentially be activities which improve one’s health and well-being (Penedo & Dahn, 2005; Sheldon & Lyubomirsky, 2006). However, the most important of these activities may be maintaining involvement in regular physical activity.

Maintaining a sufficient level of physical activity has been linked to a wide range of health outcomes, both physical and mental. Regular physical activity has been tied to a decrease in the likelihood of physical outcomes such as obesity, diabetes, cancer, cardiovascular disease, arthritis, and even sexual dysfunction (Penedo & Dahn, 2005). Mental health indicators which have been found to be related to participation in physical activity include a reduction in depression, anger,



and tension; an increase in feeling socially supported and general psychological well-being; and the slowing of cognitive deficits (Penedo & Dahn, 2005). Furthermore, regular participation in a physical activity program for older adults was associated with an increase in self-efficacy (McAuley, Elavsky, Jerome, Konopack, & Marquez, 2005) and a study conducted with college students revealed a positive association between physical activity, through both sport and health club usage, and self-esteem (Edwards, Edwards, & Bason, 2004). Being physically active can greatly promote one's overall health and well-being on a number of dimensions.

*Flow.* The concept of “flow” was developed by Mihaly Csikszentmihalyi after observing artists while they worked in order to study the creative process (Csikszentmihalyi, 1993). He noticed how involved the artists were in their work, in an almost trance-like state. He soon realized that artists were not the only ones capable of becoming so engrossed in a task that time and other worries were lost. He labeled the concept “flow” because this is how many people described their experience – as being carried away by a current. Furthermore, he noticed there are well-being benefits to engaging in flow; those who do choose to engage in flow producing activities more often, report lower levels of stress and higher levels of self-esteem. This is just one area where the seemingly paradoxical effect of challenging oneself results in a reduction of stress and an increase in well-being can be observed.

Csikszentmihalyi (1993, p. 178) has determined there are eight characteristics of the flow experience:

1. Clear goals: an objective is distinctly defined; immediate feedback: one knows instantly how well one is doing.
2. The opportunities for acting decisively are relatively high, and they are matched by one's perceived ability to act. In other words, personal skills are well-suited to given challenges.
3. Action and awareness merge; one-pointedness of mind.
4. Concentration on the task at hand; irrelevant stimuli disappear from consciousness, worries and concerns are temporarily suspended.
5. A sense of potential control.
6. Loss of self-consciousness, transcendence of ego boundaries, a sense of growth and being part of some greater entity.
7. Altered sense of time, which usually seems to pass faster.
8. Experience becomes autotelic: If several of the previous conditions are present, what one does becomes autotelic, or worth doing for its own sake.

Engaging in activities that produce these dimensions requires an investment of energy upfront, but the reward is found in achieving greater complexity; we grow as individuals. According to Csikszentmihalyi (1993), we have a natural-born need to seek greater complexity, "In order to ensure their own continuation, our evolutionary processes seem to have built into our nervous systems a preference for complexity. Just as we experience pleasure when we do things that are necessary for survival, as we do when we eat or have sex, so, too, do we experience enjoyment when we take on a project that stretches our skills in new directions, when we recognize and master new challenges. Every human being has this creative urge as his or her birthright" (p. 175). It seems that we are evolutionarily adapted to engage in those activities which produce flow, as they naturally provide us with a sense of enjoyment.

Although almost any activity can produce flow, from playing with one's children to rock-climbing, there are some activities which are known to be less flow-

producing than others. Typically, very active activities are the most likely to produce flow, while television and maintenance functions, such as cleaning or trying to fall asleep, are the least likely to produce flow (Csikszentmihalyi, 1993). We choose to engage in these non-flow producing activities because they require little energy at the forefront, therefore conserving our body's energy resources, but we gain little in the long run in terms of personal growth and development.

Unfortunately, we often choose to participate in activities that require low levels of energy (U.S. Department of Labor, 2007) and fail to grow in complexity.

Other times, we look for flow in destructive activities, such as drugs and crime, perhaps because we are unaware of constructive activities. Csikszentmihalyi (1993) describes how our culture has become almost dependent on passive forms of entertainment in our desire to experience flow and to take our minds off of either the humdrum or stress of our life, "A striking example is the juvenile delinquency that has grown so rapidly in the affluent suburbs of the U.S. It is generally due to the boredom endemic to so many teenagers, who feel they have nothing to do in their sterile neighborhoods" (p. 197). He proposes that these teenagers turn to destructive activities like burglary perhaps because they don't know of other challenges available to them, such as camping, learning to draw, learning a foreign language. In this way, our need to experience flow and to grow as a person can be destructive when it is directed towards activities requiring little skill (Csikszentmihalyi, 1993).

The balance of skills and challenge seem to be at the crux of flow experiences (Csikszentmihalyi, 1993). Low flow-producing activities, such as

watching television, may excite our minds with fear-evoking plots, but require little skill on our parts to meet any challenges we see being portrayed. Varying combinations of skill to challenges creates different experiences, as Csikszentmihalyi (1993) writes, “When both challenge and skills are rated above the person’s average for the week, we say that person is in flow. If both variables are below average, the person is considered to be in a state of apathy. If challenge is rated above average while skill is rated below, the situation is one of anxiety. In the reverse situation, low challenge and high skill, the corresponding state of consciousness is labeled boredom. Many studies show that the ratio of challenges and skills does indeed reflect the expected states of consciousness” (p.198). Furthermore, a perfect balance of skills and challenge produce a sense of complete control, but a state of flow is produced when there is a slight imbalance; one feels *potential* control over the situation, but there exists an essence of uncertainty (Csikszentmihalyi, 1993). This uncertainty is why activities that produce flow require our full attention, so as to not lose concentration and fall from the rock we are climbing, leaving little energy to worry about daily hassles.

Flow appears to be an experience we are evolutionarily adapted to desire and provides us with enjoyment and a sense of personal growth. Furthermore, perceiving a potential sense of control over a situation influences whether an activity will produce flow. Risk taking may be related to flow in that risk experiences potentially produce many of the same situational characteristics from which flow develops. Indeed, those activities that have been found to be the least flow-producing (e.g.,

watching television, reading) are very low in risk (Csikszentmihalyi, 1993). In addition, a perceived sense of control may influence when a risky situation is perceived to be a challenge rather than a threat. Having just the right amount of perceived internal control over a potentially risky situation may produce flow, take our minds off of daily stressors, and improve our well-being.

### *Internal Control*

Individuals differ on the extent to which they perceive events to be within their control (Rotter, 1966). Those with an internal locus of control perceive outcomes to be a direct result of their actions and ability, while those with an external locus of control attribute outcomes to outside forces. While one's perception of control may be more or less consistent across situations, research shows that control attributions can be influenced through experience (Seligman, 1975) as well as situational factors (Langer, 1979), and perceived control can be domain specific (Rapee, Craske, Brown, & Barlow, 1996). Most importantly, perceiving control over one's life has been found to be beneficial (Wortman & Brehm, 1975).

In a famous study by Langer and Rodin (1976), nursing home residents who maintained a sense of control over their daily lives enjoyed greater psychological functioning than those whose sense of control was weakened. In the face of a potential stressor, internal control has been found to reduce the effects of stress; those who feel control over potential stressors report less experienced stress as well

as fewer negative health outcomes than those who do not feel in control of a potential stressor (Averill, 1973; Thompson, 1981). Most interestingly, Helgeson's (1992) work with patients suffering from chronic illness sought to determine the conditions under which perceived control is an adaptive response to stress. Her findings suggest that internal control is a most adaptive response when threat conditions are extreme; the relationship between perceived internal control and subsequent adjustment is most strong when the situation is especially stressful.

Internal control may play a role in whether we perceive a particular situation to be either a threat or a challenge (Averill, 1973), encouraging us to proactively face the task or attempt to avoid the task. Therefore, internal control may also play a role in activities in which we choose to engage and the fears we are willing to face; internal control may influence our tendency to take risks.

### *Conclusion and Rationale*

The disproportionate growth of incidences of depression and anxiety in the U.S. may be due to a discord between our current lifestyle and the life for which we have been adapted. These discords include the incongruence between the necessity of experiencing negative emotions, such as fear, and our cultural desire to avoid situations which may induce negative emotions. Also, we see a potential incongruence between the optimal and protective functioning of our physiological stress response and the overwhelming number of psychological, unending stressors we experience (and the lack of acute stressors). Attachment theory proposes we

develop through a pattern of exploration and felt security with an adult caregiver.

This exploration induces fear, but also provides an opportunity to grow and learn.

Defining risk-taking tendencies in this line of research must take into consideration the fact that perceptions of what constitutes “risk” is very much an individual assessment, which is not necessarily rational- or knowledge-based (Tversky & Kahneman, 1986; Furby & Beyth-Marom, 1992), and engagement in a particular activity may not depend entirely on the individual’s assessment of risk, but may include what the individual values or dreads most (Keyes, 1985; Tversky & Kahneman, 1986). Furthermore, individual risk-taking may occur in patterns based on domain (e.g., social or financial) as well as quality (i.e., Type I or Type II); individuals may be more likely to take risks within particular domains that are of a particular type. Most importantly, the definition of risk-taking for the purposes of this line of work necessitates a potential for a positive, beneficial outcome for the individual. Inherent in risk is the potential for an activity to have a negative consequence, but it also holds potential for a positive consequence. Because this conceptualization of risk-taking has yet to be utilized in empirical work, this study will investigate the use of several measures to this end.

Furthermore, empirical evidence, based on research previously conducted on creativity, life engagement, sensation-seeking, and flow, provides support for the idea that risk-taking may indeed be beneficial for our health and well-being.

Researchers have conceptualized these constructs, especially curiosity and flow, to be innately desired and rewarding, lending support to the idea that risk-taking may

also be an innate need. In addition, research has found that engaging our physiological stress response in a manner for which it has been optimally adapted is health protective, while chronic activation of the stress response without termination is health damaging (Dhabhar, 2002; Dhabhar & Viswanathan, 2005). This suggests that risk-taking may be beneficial for our health because risk-taking involves indulging our curiosity tendencies at an extreme level.

Moreover, just as perceived control was found to play a role in the experience of flow, risk taking may be beneficial for our health and well-being because it requires us to focus all our attention on a difficult task, leaving no attentional resources to ruminate over daily life hassles. Research on anxiety and depression suggests that rumination over daily negative experiences is associated with anxiety and depressive symptoms. By contrast, a large aspect of risk-taking involves focusing control on the task at hand, preventing any energy to be expended on mulling over daily life hassles, which may break the cycle of rumination. However, perceiving no potential control over a risk will reduce the likelihood of engagement in that risk. For this reason, internal control may be predictive of risk-taking tendencies.

Lastly, since a secure attachment is related to exploration of one's environment, it may be that attachment style plays a role in both quantity and type of risk-taking behavior. For example, those with a secure attachment may take more risks overall than those with other attachment styles, since they feel they have a consistent safety-net in times of distress. Also, since it is proposed that risk taking



likely predicts mental health, and attachment style has been known to predict mental health (e.g., Lopez, Mauricio, Gormly, Simko, & Berger, 2001), it may be that risk-taking mediates this relationship. Furthermore, it is of interest to see whether attachment style predicts perceptions of risk in the two types of risk-taking (Type I and Type II). Since attachment theory largely centers on relationships, Type I risks may be viewed as more risky for those who are securely attached because they may value the potential gains of Type II risks more than Type I risks.

### *Purpose of the Current Study*

The purpose of the current study is to begin work investigating the relationship between risk-taking and health and well-being outcomes as well as what promotes risk-taking behavior. As a first step, instruments measuring important constructs in this line of research will be assessed. For this study, the researcher has created a measure of life engagement, the Life Engagement Questionnaire, intended to capture a range of activity levels from a behavioral perspective, and has adapted a measure of perceptions of riskiness, intended to capture individual differences in perceptions of risk in various domains and within the theoretical typology proposed by Keyes (1985). Furthermore, two previously-established scales of risk-taking tendencies will be assessed based on their conceptualization of the construct and their correlations with other key study variables. One of the measures called, "Risk-taking," captures more of a "danger-seeking" orientation and the other, called, "Adventurousness," measures more of a "desire to explore" orientation.

Once construct measures have been addressed, it is of particular interest to explore the relationship between attachment style and risk-taking behavior, how perceived control relates to risk-taking behavior, and whether risk-taking tendencies and life engagement separately predict well-being. Also of interest is whether risk-taking tendencies explains more of the variance in well-being above and beyond that explained by life engagement.

*Research questions and hypotheses.* In addition to psychometric assessment of both the Life Engagement Questionnaire and the Perceptions of Riskiness scale, the following research questions will be addressed:

1. What are the relationships among attachment, perceived control, life engagement, risk-taking, subjective well-being, psychological well-being, anxiety, depression, and stress?
2. Does attachment style predict perceptions of domain-specific risk-taking?
3. Does attachment style predict perceptions of riskiness by type; do securely attached individuals perceive Type I or Type II risks to be more risky?

In addition to the above exploratory questions, the following hypotheses will be tested:

*Hypothesis 1a:* Internal control will predict risk-taking tendencies, such that those higher on internal control will report higher levels of risk-taking tendencies.

*Hypothesis 1b:* Attachment style will predict risk-taking tendencies, such that those higher on secure attachment will report higher levels of risk-taking tendencies.

*Hypothesis 2a:* Risk-taking tendencies and life engagement will be positive significant predictors of mental health.

*Hypothesis 2b:* Risk-taking tendencies will be a positive significant predictor of mental health, controlling for the variance associated with life engagement.

*Hypothesis 3:* Given that attachment predicts risk-taking tendencies, risk-taking tendencies will mediate the previously established relationship between attachment and mental health.

See Figure 1 for a visual concept map of the hypotheses.

## Method

### *Participants and Procedure*

Participants were recruited first through three contacts the researcher has within the local community (i.e., a local rowing club, a non-profit organization, and a for-profit business) and then through 21 postings to an online bulletin boards (craigslist) across the U.S. Recruitment lasted approximately 6 weeks, from November 7 to December 19, 2008. Based on daily survey completion numbers, craigslist postings seemed to be the most effective method of recruitment and the majority of participants were found through this method. An attempt was made to post bulletins equally in the various sections of the United States, and postings were mostly made in urban areas (e.g., Portland, Minneapolis, Chicago, Boston, Phoenix, Atlanta, Houston) in the “volunteer” section. The recruitment email (or bulletin posting) briefly described the nature of the study as a study of leisure time and mental health, explained they would have the opportunity to enter to win one of two \$50 visa gift cards as a thank you for their participation, and contained a link to the online survey. The first page of the survey contained a welcome greeting and the second page contained the consent document. Participants were instructed to select the “next” button if they agreed to consent to the study, which led to the first page of questionnaire items. Approximately 40% of people who followed the link to the survey submitted a completed survey. Unfortunately, the online survey software did not capture incomplete surveys (those not followed through to the last page).

Three hundred eighteen participants completed the survey. Of those 318, 83% (n=265) were female and 17% (n=53) were male. Ages ranged from 18 to 69, with an average age of 35. Most identified as white (79%), held at least a bachelor's degree or higher (37% completed bachelor's degree, 31% completed masters or doctorate), and, approximately 39% reported incomes below \$25,000 a year (17% reported less than \$10,000 a year). Table 1 summarizes the sample demographic characteristics.

### *Measures*

The online survey completed by each participant contained all measures for the study. All reliabilities listed below for each measure are from the current sample, unless otherwise noted.

*Demographic characteristics.* Basic demographic characteristics were collected, including age, race, gender, education, and income. These demographic characteristics are used to describe the sample as well as control for the sometimes large impact these variables have on key study outcomes, especially satisfaction with life (e.g., Diener, Sandvik, Seidlitz, & Diener, 1993).

*Well-being.* In order to address both the hedonic and eudaimonic aspects of well-being, psychological well-being was assessed using 3 of Ryff's (1989) scales of psychological well-being, and subjective well-being was assessed using the Satisfaction with Life Scale (SWLS: Diener, Emmons, Larsen, & Griffin, 1985). Ryff's psychological well-being scales consist of six dimensions: autonomy, environmental mastery, personal growth, positive relations with others, purpose in

life, and self-acceptance. This measure has been widely used and well validated (see Ryff, 1989; Keyes, Shmotkin, & Ryff, 2002). Three of the six scales were used in this study to measure psychological well-being (combined alpha = .95): positive relations with others, personal growth, and purpose in life. The 14-item version of each scale was used, which is the version Ryff and colleagues currently use in their own studies. Only 3 of the 6 scales were used in an attempt to reduce participant fatigue and were selected based on their potential relevance to the other constructs in the study. Participants were asked to indicate the degree to which they presently agreed or disagreed with items, based on a 6-point scale. Sample items include, “I have a sense of purpose and direction in life,” “I enjoy personal and mutual conversations with family members and friends,” and, “I feel good when I think of what I’ve done in the past and what I hope to do in the future.” Higher scores on this measure indicate higher levels of well-being.

Diener and colleagues’ Satisfaction with Life Scale consists of 5 items (alpha = .90) assessing one’s global assessment of life satisfaction and has been widely used and validated. Participants were asked to indicate the degree to which they presently agreed or disagreed with each item, based on a 7-point likert scale. Sample items include, “The conditions of my life are excellent,” and “So far, I have gotten the important things I want in life.” Higher scores on this scale indicate higher levels of well-being.

*Depression, anxiety, and stress.* The Depression Anxiety Stress Scale (DASS: Crawford & Henry, 2003) was used in this study to generally assess

subclinical mental health symptoms. The overall measure ( $\alpha = .94$ ) consists of three 14-item subscales: depression ( $\alpha = .92$ ), anxiety ( $\alpha = .83$ ), and stress ( $\alpha = .86$ ). Participants were asked the extent to which items applied to them in the past month, using a 4-point scale ranging from, “Did not apply to me at all,” to “Applied to me very much, or most of the time.” Sample items include, “I couldn’t seem to experience any positive feelings at all,” “I felt scared without any good reason,” and “I felt I wasn’t worth much as a person.” The measure was used as a single scale and higher scores indicate worse mental health (more depression, anxiety, and stress symptoms).

*Risk-taking.* Finding a well-validated measure that assesses risk-taking as conceptualized in this study proved to be extraordinarily difficult. Therefore, risk-taking was measured using three different instruments. One instrument was used to measure *perceptions of riskiness* in various situations and was adapted from an established measure of domain-specific risk-taking, while the other two scales measure *risk-taking tendencies*, from a trait-perspective.

*Perceptions of riskiness* were assessed using questions adapted from the Domain Specific Risk-Taking scale (DOSPERT: Blais, & Weber, 2006). A measure of riskiness perceptions was included because the riskiness of various situations ultimately depends on the individual’s assessment of risk. The original instrument measures both one’s personal perception of risk for a variety of behaviors in five different domains: ethical, financial, health/safety, recreational, and social. The perceptions of riskiness scale consists of 30 items and measures the participants’

perceptions of risk in activities such as, “going camping in the wilderness,” or “drinking heavily at a social function,” using a 7-point scale ranging from “not at all risky” to “extremely risky.” The adapted measure used in the current study consists of three of the domains, with six questions in each domain: recreational, social, and financial. The items were adapted to increase relevance to the community sample as well as to represent Keyes’s (1985) types of risk-taking; three items in each domain were written to reflect Type I risk-taking and three items were written to reflect Type II risk-taking. Essentially, this adapted measure was designed to capture the theoretical structure of risk perceptions, including domain-specific and type-specific qualities. Higher scores on the perceptions of riskiness scale indicate higher levels of perceived risk. Results will include psychometric analyses on this scale to evaluate its utility in this study as well as assist in future scale development.

*Risk-taking tendencies* were measured using two scales from the International Personality Item Pool (IPIP; Goldberg, 1999; Goldberg et al., 2006). One is formally titled, “Risk-taking” ( $\alpha = .79$ ) and the other is formally titled “Adventurousness” ( $\alpha = .82$ ). Each scale consists of ten items and asks participants to indicate the degree to which various statements describe them, on a five-point scale. Items on the Risk-taking scale include statements such as, “I seek danger,” “I know how to get around the rules,” and, “I avoid dangerous situations.” Items on the Adventurousness scale include statements such as, “I like to visit new places,” “I don't like the idea of change,” and, “I like to begin new things.” Although the items on the “Risk-taking” scale do not adequately represent how this study conceptualizes



risk-taking tendencies, it was included along with the “Adventurousness” scale because it contained items which seemed to at least somehow reflect Type I risk taking, which the Adventurousness scale lacked. The scales were to be assessed for use in analyses separately and used in analyses separately, with the understanding that each captures a different quality of risk-taking. Higher scores on these scales indicate higher levels of risk-taking tendencies.

*Extroversion.* An IPIP Extroversion scale (Goldberg, 1999; Goldberg et al., 2006) was used to measure extroversion. The scale consists of ten items asking participants to indicate the degree to which various statements described them, on a five-point scale. Items on the extroversion scale ( $\alpha = .90$ ) include, “I am the life of the party,” “I have little to say,” and, “I start conversations.” Higher scores on the scale indicate higher levels of extroversion. Extroversion was measured in order to lend assistance in evaluating the theoretical typology of risk-taking; to evaluate whether Type I/Type II risk-taking are essentially reflections of an extroversion/introversion dimension.

*Openness to experience.* An IPIP Openness to Experience scale (Goldberg, 1999; Goldberg et al., 2006) was used to measure openness to experience. The scale consists of ten items asking participants to indicate the degree to which various statements described them, on a five-point scale. Items on the Openness to Experience scale ( $\alpha = .77$ ) include, “I have a vivid imagination,” “I carry the conversation to a higher level,” and, “I avoid philosophical discussions.” Higher scores on the scale indicate higher levels of openness to experience. Openness to

experience was measured in order to assist evaluation of the theoretical typology of risk-taking; to evaluate whether Type I/Type II risk-taking are essentially reflections of an openness to experience dimension

*Life engagement.* Life engagement was measured to capture each individual's general activity level. It was difficult to find a single measure which captured life engagement at a behavioral level, so this construct was measured with two instruments: a behavioral measure developed by the researcher and a trait-based measure with already-established validity.

The Life Engagement scale ( $\alpha = .58$ ), is the behavioral measure developed by the researcher in an attempt to measure life engagement as conceptualized in this study, to include participation in sports, social outings, and general daily tasks. The measure consists of twenty items asking participants to indicate how often they engaged in a variety of activities in the past month, using a 5-point scale ranging from, "rarely/never," to, "almost every day." The items varied in the extent to which they require physical movement or the involvement of social others; they include simple activities, such as, "watched television or a movie alone," as well as complex activities, such as "participated in a sport or physical activity that involves others." See appendix A for the complete measure. This measure was developed based on items used on national surveys of leisure time and leisure-time activities assessed in well-being literature. The items were then evaluated and rated by 8 undergraduate and graduate students and one faculty member on level of 'engagement' to ensure a range of activities were included. Results will include

psychometric analyses on this scale to evaluate its utility in this study as well as assist in future scale development.

The Activity Level scale ( $\alpha = .88$ ) from the IPIP (Goldberg, 1999; Goldberg et al., 2006) is a trait-based scale of life engagement, which was included as an already-established measure of life engagement. The inclusion of this scale was dual-purpose: it was to be used to assist in evaluating the construct validity of the Life Engagement scale and it was to also be used in analyses as the measure of “life engagement” if the Life Engagement scale were to be found psychometrically unsound. This measure consists of ten items, asking participants to indicate the degree to which various statements described them, on a five-point scale. Items include statements such as, “I can manage many things at the same time,” “I hang around doing nothing,” and, “I accomplish a lot of work.” Higher scores on this scale indicate higher levels of activity.

*Attachment style.* Attachment style was measured using the relationship structures questionnaire (RS: Fraley, Niedenthal, Marks, Brumbaugh, & Vicary, in press), which has been adapted from the Experiences in Close Relationships Questionnaire Revised (ECR-R: Fraley, Waller, & Brennan, 2000). This instrument measures attachment patterns across specified relationships (mother-like figure, father-like figure, marital or dating partner, and best friend) and consists of 10 items, such as, “I find it easy to depend on this person,” or, “I am afraid this person will abandon me.” Participants are asked to indicate the degree to which they agree or disagree with each statement (on a 7-point scale) with regard to each specific

relationship target. For the purpose of this study, two relationship targets were used and were amended to read, “parent or main childhood caregiver,” and, “best friend or close partner.” Avoidance scores ( $\alpha = .87$ ) were computed by averaging those items referring to avoidance, with a higher number indicating a more avoidant attachment style. Anxious scores ( $\alpha = .85$ ) were computed in the same manner, using the items referring to anxious attachment, and higher scores indicate a more anxious attachment style. While the original measure states that secure attachment is indicated by low scores on each the anxious and avoidance scales, in this study, secure attachment was computed by reverse-scoring and averaging the items on these scales ( $\alpha = .91$ ). Higher numbers on the Secure attachment scale indicated a more secure attachment style.

*Internal control.* Internal control was measured using the Internal Control Index (ICI: Duttweiler, 1984). The instrument consists of 28 items ( $\alpha = .86$ ) and asks participants to indicate, on a 5-point scale ranging from “rarely” to “usually,” how often the statement is congruent with their usual attitude or behavior. Example items include, “I like jobs where I can make decisions and be responsible for my own work,” and “When something is going to affect me, I learn as much as I can about it.” Higher scores on this scale indicate a more internal sense of control, as opposed to external. Although Rotter (1966) is famed for developing the construct of locus of control, a comparison of Rotter’s (1966) Internal-External Scale of Locus of Control to Duttweiler’s (1984) Internal Control Index determined the ICI to be a better measure of locus of control (Meyers & Wong, 1988).

## Results

Data analysis began with a thorough screening and cleaning of the data for each measure of interest. No more than 5% of data were missing on any given measure, so no action was taken to replace missing data (Mertler & Vannatta, 2002). Severe outliers were defined as those scores more than three standard deviations from the mean and outlier scores were truncated by replacing the actual score with the outer limit score (equal to three standard deviations from the mean) (Mertler & Vannatta, 2002). This affected scores on thirteen cases. Where appropriate, variables were checked for normality, homoscedasticity, and sufficient variance (Tabachnick & Fidell, 2001). Although some measures were found to be slightly skewed (i.e., DASS, anxious attachment scale, and avoidant attachment scale), no transformations of the data were completed since violation from normal was minimal and these measures are not expected to be normally distributed in a general public population (Mertler & Vannatta, 2002). Table 2 summarizes descriptive statistics of the key study variables. Demographics were included as covariates in the analyses due to the previously established links between demographic characteristics and risk-taking (e.g., Wilson & Daly, 1985; Martin & Leary, 2001) and mental health outcomes (e.g., Diener, Sandvik, Seidlitz, & Diener, 1993)

### *Psychometrics and scale assessment*

*Perceptions of riskiness.* The theoretical factor structure of the perceptions of riskiness scale was tested through confirmatory factor analysis (CFA), conducted in AMOS (Arbuckle, 2006). Specifically, a model containing the three domains of

risk-taking (social, recreational, and financial) as well as the two types (Type I and Type II) of risk-taking tendencies was fit (see Figure 2). Unfortunately, this resulted in a not positive definite model, regarding the correlation between the Type I and Type II factors, and the Type II items were not significantly correlated with the Type II factor. Although the model did not converge, the model fit was poor,  $\chi^2 = 323.99$ ,  $p < .001$ , RMSEA = .08 (Kline, 2005). Table 3 presents correlations and covariances for each factor and its indicators.

In an attempt to understand the problem, two three-factor solutions were tested. The first model contained only items from the Type II scale and the structure of the three domains (social, financial, and recreational). This model also did not converge and produced a correlation between financial and social domains larger than 1 ( $r = 1.03$ ). This model also fit poorly,  $\chi^2 = 144.15$ ,  $p < .001$ , RMSEA = .13. The second three-factor model included only the Type I items with the three domain structure and did produce an admissible solution. The model fit reasonably well,  $\chi^2 = 53.63$ ,  $p < .001$ , RMSEA = .06, but the correlations among the factors were only moderate in size (median .27). This indicates the three-factor structure would only weakly load onto a second order factor, "Type I risk-taking." Table 4 presents the chi-square and fit indices for the three models.

Given these problems, the scale was not used in subsequent analyses (i.e., research questions 2 and 3) and was not compared to the personality dimensions of extroversion and openness to experience, but these psychometric results will be revisited in the discussion section to aid future development of a scale measuring

perceptions of riskiness with the theoretical 5-factor structure of two types of risk-taking in three domains.

*Life Engagement Questionnaire.* Cronbach's alpha indicated unsuitable reliability ( $\alpha = .58$ ). As a result, this measure was not used in remaining analyses, but the Activity Level Scale (Goldberg, 1999; Goldberg et al., 2006) will be used as the indicator of life engagement instead.

For future scale development purposes, the correlations between items on the Life Engagement scale and the Activity Level scale were examined as a means of uncovering behavioral correlates to the more trait-based measure. Results suggest some items have little relation to an active lifestyle, such as watching television, while others have a negative correlation to an active lifestyle, such as playing video games or browsing the Internet without purpose. Those items which would be useful in a future behavioral measure of life engagement include, "Set a challenging goal for myself," "Participate in a physical activity alone (such as running)," "Learn or try something new," and "Volunteer." Table 5 presents the correlation coefficients.

*Risk-taking tendencies.* The usefulness of both the Risk-taking and the Adventurousness scale as a measure of risk-taking tendencies was assessed through examination of the scale items (see Appendix A) and correlations with other study variables (see Table 6). In close examination of the Risk-taking scale items, it was determined this scale seems to measure a danger-seeking, sly personality and was not correlated with a number of other study variables. Adventurousness, however, was correlated with most of the other study variables and after close examination of the

scale items, it was determined this scale measures a general exploratory personality. For the purpose of this study, it was determined the adventurousness scale would be used as an indicator of risk-taking in the analyses, with the understanding that risk-taking was conceptualized as a general “exploratory” personality trait.

#### *Research Question 1*

In exploration of the relationships among attachment, perceived control, life engagement, risk-taking, subjective well-being, psychological well-being, anxiety, depression, and stress, a correlation matrix using these variables was computed. Table 6 presents these correlations. Most correlations were in the expected direction and many were significant. However, the risk-taking scale was surprisingly not correlated with most of the study variables, except it was significantly positively correlated with adventurousness ( $r=.38$ ), openness to experience ( $r=.20$ ), and extroversion ( $r=.37$ ). These three measures, however, were significantly correlated with most of the other study variables.

#### *Research Question 2*

Given the problems with the factor structure of the perceptions of riskiness scale, the question of the relationship between attachment style and perceptions of riskiness by domain of risk-taking could not be addressed with this data (see *Psychometrics* section above).

#### *Research Question 3*

Given the problems with the factor structure of the perceptions of riskiness scale, the question of the relationship between attachment style and perceptions of



riskiness by type of risk-taking could not be addressed with this data (see *Psychometrics* section above).

#### *Hypothesis 1a*

In order to determine whether perceived internal control predicts risk-taking tendencies, a multiple regression model was computed and assessed based on coefficient direction, size of  $R^2$ , model significance (p-value), and predictor significance (p-value). Demographics (age, race, education, sex, and income) and internal control were entered as predictors, and risk-taking tendencies (adventurousness) was entered as the dependent variable. Model summary results indicate the model significantly predicts risk-taking tendencies,  $F(6, 295) = 6.58$ ,  $p < .001$ ,  $R^2 = .12$ . Internal control was a significant predictor in the model,  $\beta = .30$ ,  $t(295) = 4.99$ ,  $p < .001$ , and its calculated effect size was medium in magnitude (Cohen, 1988),  $d = 0.6$ . These results suggest internal control has a meaningfully strong, positive relationship with risk-taking tendencies (adventurousness) after adjusting for demographics. See Table 7.

#### *Hypothesis 1b*

In order to assess whether attachment style predicts risk-taking tendencies, a multiple regression model was computed and assessed based on coefficient direction, size of  $R^2$ , model significance (p-value), and predictor significance (p-value). For the regression, demographic characteristics (age, race, education, sex, and income) and attachment style (secure attachment) were entered as predictors, and risk-taking tendencies (adventurousness) was entered as the dependent variable. Model

summary results indicate the model significantly predicted risk-taking tendencies,  $F(6, 284) = 4.64, p < .001, R^2 = .09$ . At the predictor level, attachment style was a significant positive predictor,  $\beta = .19, t(284) = 3.16, p < .01$ , and its calculated effect size was medium in magnitude,  $d = 0.4$ . These results suggest a secure attachment style is positively related to risk-taking tendencies after adjusting for demographics. See Table 8.

### *Hypotheses 2a and 2b*

To assess whether life engagement successfully predicts mental health, three hierarchical multiple regressions were computed and assessed based on coefficient direction, size of  $R^2$  and subsequent  $R^2$  change, model significance (p-value), and predictor significance (p-value). Demographic characteristics (age, race, education, sex, and income) and life engagement (activity level) were entered as predictors into the first step for each regression equation, and risk-taking tendencies (adventurousness) was entered into the second step. The outcome variables were measures of mental health: Satisfaction with Life (SWL) for the first model, Psychological well-being (PWB) for the second model, and scores on the DASS (depression, anxiety, and stress symptoms) for the third model. Model summary results indicate the models for SWL,  $F(7, 287) = 13.6, p < .001, R^2 = .25$ , PWB,  $F(7, 273) = 37.55, p < .001, R^2 = .50$ , and DASS,  $F(7, 274) = 10.53, p < .001, R^2 = .22$ , all significantly predicted mental health. Examination of the individual predictors shows that life engagement significantly contributed to the models for SWL,  $\beta = .34, t(7, 287) = 5.97, p < .001$ , PWB,  $\beta = .52, t(7, 273) = 10.75, p < .001$ , and DASS,  $\beta = -$

.32,  $t(7, 274) = -5.29$ ,  $p < .001$ . Risk-taking tendencies also significantly contributed to the models for PWB,  $\beta = .27$ ,  $t(7, 273) = 5.89$ ,  $p < .001$ , and DASS,  $\beta = -.13$ ,  $t(7, 274) = -2.23$ ,  $p < .05$ , but not for SWL,  $\beta = .34$ ,  $t(7, 287) = 1.22$ ,  $p = .26$ . However, risk-taking tendencies explained a significant amount of the variance in mental health, above and beyond that explained by demographic characteristics and life engagement for both PWB,  $R^2$  change = .07,  $F$ change = 34.64,  $p < .001$  and DASS,  $R^2$  change = .02,  $F$ change = 4.96,  $p < .05$ . The effect size for risk-taking in the PWB model was large in magnitude,  $d = 0.6$ , while the effect size for DASS,  $d = 0.2$ , was small. Risk-taking tendencies did not explain any more variance in the SWL model,  $R^2$  change = .00,  $F$ change = 1.48,  $p = .23$ , and its effect size in this model indicated little to no effect,  $d = 0.0$ . Tables 9-11 present the full model summaries.

### *Hypothesis 3*

To further extend the first two hypotheses, it was hypothesized that risk-taking tendencies may mediate the previously established relationship between attachment pattern and mental health outcomes (e.g., Wei et al, 2005; Shaver & Hazen, 1989). The Baron and Kenny (1986) method for testing mediation was used to determine whether risk-taking mediates the relationship between attachment and mental health. This method involves four steps, 1) determining whether the initial variable, secure attachment, is associated with the outcome variable, mental health, to see if there is a relationship to be mediated, 2) determining whether the initial variable, secure attachment, is associated with the mediating variable, risk-taking tendencies, 3) determining if the mediating variable is associated with the outcome

variable, mental health, in the presence of the initial variable, secure attachment, and 4) determining if the association between the initial variable, secure attachment, is not associated with the outcome variable, mental health, in the presence of the mediating variable, risk-taking tendencies. In the case that step 4 is true, the path coefficient for secure attachment would be zero, or at least non-significant. If there is partial mediation, then we would expect to see at least a reduction in the path coefficient (closer to zero) from step 1 to step 4. Regression equations were used to compute the associations for each step.

Since three measures of mental health were assessed (SWL, PWB, and DASS), the process to test mediation was completed for each outcome separately. Tables 12-14 summarize the results of each step for each mental health outcome. First, three multiple regressions were computed, with demographics and secure attachment as predictors and mental health as the dependent variable, one equation each for SWL,  $F(6, 285)=12.43, p<.001$ , PWB,  $F(6, 267)=25.15, p<.001$ , and DASS,  $F(6, 270)= 11.41, p<.001$ . Attachment proved to be a significant contributor to the model for SWL,  $\beta = .30, t(6, 285) = 5.48$ , PWB,  $\beta = .50, t(6, 267) = 9.9, p<.001, p<.001$ , and DASS,  $\beta = -.32, t(6, 270) = -5.60, p<.001$ . Second, since a significant effect was found, another regression was computed, with demographics and secure attachment as the predictors and risk-taking tendencies as the outcome variable,  $F(6, 284) = 4.64, p<.001$ . Attachment proved to be a significant contributor to the model,  $\beta = .19, t(6, 284) = 3.16, p<.01$ . Third, since a significant effect was found, three more regression equations were computed with demographics, attachment, and risk-

taking tendencies entered as predictors and mental health as the outcome, one equation each for SWL,  $F(7, 279)=10.31, p<.001$ , PWB,  $F(7, 263)=30.40, p<.001$ , and DASS,  $F(7, 264)=10.06, p<.001$ . At this step, the association between risk-taking tendencies and mental health was non-significant for both SWL and DASS, indicating that risk-taking tendencies does not mediate the relationship between secure attachment and these mental health outcomes.

However, risk-taking tendencies was associated with PWB in this step, which led to assessing the fourth step (presented with the same equation as step 3), a test of whether the association between secure attachment and PWB no longer remained in the presence of risk-taking tendencies. The relationship was significant, however, indicating that risk-taking tendencies did not fully mediate the relationship between attachment and mental health. Lastly, evidence of partial mediation was assessed. Examination of the path coefficient for secure attachment in this step and step 1 indicate the path coefficient is closer to zero in the fourth step, so risk-taking tendencies may partially mediate the relationship between secure attachment and psychological well-being.

## Discussion

### *Overview*

Our current lifestyle is characterized by low levels of engagement in meaningful activities and high levels of low-grade daily hassles (U.S. Department of Labor, 2007; Csikszentmihalyi, 1993; Covey, 1994). At the same time, the prevalence of anxiety-related disorders, depression, chronic stress, and stress-related diseases in the population is high (NIMH, 2002, 2003, 2006; WHO, 2001). Some have theorized that this pattern of maladaptive response to stress is due to a discord between what our bodies were adapted to do and the demands of modern life (e.g., Grinde, 2005). In other words, our physiological stress response system is selected to respond to high, but relatively brief, periods of stress. Unfortunately, the constant bombardment of daily hassles we experience is psychologically and physiologically incompatible with the optimal and adaptive functioning of our stress system (Sapolsky, 1998).

Certainly the chronic stressors of modern life are rightly recognized as negative and as potentially leading to maladaptive physiological or psychological consequences. Partly as a result of this, our culture emphasizes the reduction of all risks and the avoidance of emotions such as fear or grief. However, it is possible that taking risks and experiencing emotions such as fear may serve a positive function in certain cases. When we engage in risky activities, our physiological system is performing in the manner for which it was designed. Furthermore, the successful conquering of fears and completion of risky activities may be followed by

a sense of relief, increased psychological well-being, increased self-efficacy, and decreased anxiety. This study began empirical work exploring these possible relationships. Specifically, this study addressed the relationship between risk-taking and mental health, whether internal control and attachment style predict risk-taking tendencies, and whether attachment style predicts perceptions of riskiness, and whether risk-taking mediates the relationship between secure attachment and mental health. While risk-taking was a significant positive predictor of mental health, both attachment and internal control predicted risk-taking tendencies, and risk-taking partially mediated the relationship between attachment and one aspect of mental health, psychological well-being. Unfortunately, problems with the factor structure of the perceptions of riskiness scale prevented exploring whether attachment style predicts perceptions of riskiness.

### *Perceptions of Riskiness*

The perceptions of riskiness scale was adapted from the Domain Specific Risk-Taking Scale (DOSPERT: Blais & Weber, 2001) to include items more relevant to a general community sample as well as to incorporate the theoretical typology of two types of risk-taking tendencies. As Keyes (1985) explains, individuals are typically either Type I or Type II risk-takers; individuals either typically engage in short-lived, highly exciting risks or typically engage in longer-term, lower-excitement risks. The number of domains of risk taking was also reduced to three: Social, Financial, and Recreational. The resulting measure of

perceptions of riskiness contained items that were each thought to load on one of three domains and one of two types of risk. In order to explore this theoretical typology, a confirmatory factor analysis of the perceptions of riskiness scale was conducted. This produced a model which did not converge. Further exploration of potential second-order factors of Type I and Type II risk-taking also produced unfavorable models, with the Type II model not converging.

Although the risk literature strongly supports the idea that risk-taking tendencies and perceptions of riskiness shift depending on the situation (i.e., are not necessarily trait-based), perhaps this is true for risk in the manner the risk literature defines it, with a greater focus on dangerous risk. This makes some sense in that the Type I-item, 3-factor model fit reasonably well and the Type I items were written to reflect the more short-lived, high excitement type of risk-taking. Perhaps if the items had been written with more specificity, I would have found a better model fit. Furthermore, in order to capture domain-specific riskiness perceptions, items were written in a way that reflects specific activities. Unfortunately, these activities invoke other responses in participants, along with their perceptions of riskiness, such as affective responses, value responses, and a response of familiarity or knowledge of the particular activity. While all of these individual responses are valid in a person's real-life assessment of risk, fewer items will be less accurate in capturing the domain for any one person and will better capture perceptions of risk on specific tasks. For this reason, future scales should include more items for the domain-



specific factors in an attempt to capture a wider range of activities within each domain.

In general, the items need to be re-written with more specificity towards the factors they are intended to measure. One reason for non-convergence in a confirmatory factor analysis is redundancy, or too much shared variance (Wothke, 1993). Some suggest reducing the number of factors when this happens as well as conducting a principle components analysis in SPSS to see which items load onto multiple factors and removing them (Munro, 2004). Future scale development could approach the task of creating a scale of perceptions of riskiness by starting with item development that reflects a general population's perceptions of risk. Open-ended responses to questions such as, "What activities do you think are risky?" could be compiled, with common items used in scale development.

Furthermore, Keyes' (1985) conceptualization of Type I and Type II risk-taking is trait-based, which is in opposition to the risk literature's emphasis on domain-specific risk. For this reason, two separate scales could be created, one that measures domain-specific risk-taking and includes activity-specific items, and one that measures the two types of risk-taking and includes general, trait-based items. This would also help to reduce potential redundancy problems.

While perceptions of riskiness and risk-taking tendencies measures exist, they do not adequately capture risk-taking as it is conceptualized here. If work is to move forward in this area of risk-taking, a valid and reliable measure of risk-taking perceptions will be an important first step. Given that perception of riskiness is an

individual assessment, understanding risk perception will help us understand the extent to which individual perception of risk influences the relationship between risk-taking and mental health. As it stands, we do not know whether people are less likely to engage in activities they view as highly risky or whether they are engaging in risks they view as only moderately risky or even not at all risky.

*Correlations among Risk-Taking, Attachment, Internal control, Life Engagement, and Mental Health (Research Question 1)*

The correlations among the key study variables, risk-taking attachment, internal control, life engagement, satisfaction with life, psychological well-being, depression, anxiety, and stress indicated many of these constructs were significantly related. Of special note was the positive relationship between adventurousness, which was the measure used to represent risk-taking for the study's main analyses, and psychological well-being and the negative relationship between adventurousness and depression, anxiety, and stress. These correlations lend support to the idea that risk-taking tendencies operate alongside positive mental health and are present within an individual at the same time. Interestingly, activity level was also negatively related to depression, anxiety, and stress. One would think that being very active would create stress, but these correlations provide further evidence for the idea that activity may actually reduce stress.

*Risk-taking Tendencies: Secure Attachment and Internal Control (Hypotheses 1a and 1b)*

Attachment theory points to the securely-attached child's balance between exploration and proximity-seeking (Sroufe & Waters, 1977). Risk-taking can be seen as representing an adult analogue of exploration, leading to the prediction that adults might be more likely to explore their environment as a function of felt security. As such, I expected a positive link between security in adulthood and the likelihood of risk-taking. Attachment style was indeed a significant predictor of risk-taking, suggesting a more secure attachment style is associated with higher risk-taking tendencies.

In addition to attachment style, I hypothesized that one may not feel comfortable exploring or trying new things if they do not feel a sense of internal control over their environment and their actions. Previous work on *flow* indicated that perceived control over a task was required in successful completion of that task (Csikszentmihalyi, 1993). Regression results indicated this was the case; those individuals who perceived a greater sense of internal control were also those who tended to endorse higher risk-taking tendencies.

These results follow developmental theory that securely attached individuals engage in more exploratory behavior, given they have a secure base from which to explore, and suggests two individual factors which may play a role in risk-taking tendencies. These two constructs may also play a role in how individuals perceive particular tasks and should be considered in any future research on risk-taking

tendencies. These may also be especially important in any form of intervention development. For example, an intervention that focuses on increasing activity levels of individuals may induce too much stress over the task if the individual does not feel a sense of internal control. An intervention which addresses both of these issues may be more beneficial at improving mental health.

*Risk-taking, Life Engagement, and Mental Health (Hypotheses 2a and 2b)*

Previous research on goal-setting (e.g., Emmons, 1986) and physical activity (e.g., Penedo & Dahn, 2005) has found that being engaged in an active lifestyle is positively related to mental health. It was therefore hypothesized that activity level, or life engagement, would be a significant and positive predictor of mental health. Also, since risk-taking was conceptualized to be a specific type of life engagement, namely involvement in an activity that has the potential for both negative and positive consequences, risk-taking was hypothesized to be a significant positive predictor of mental health, even after controlling for general life engagement.

In an attempt to measure life engagement, the researcher developed a life engagement questionnaire asking participants to indicate how often in the previous month they engaged in various activities, from browsing the internet without purpose, to setting a challenging goal for themselves. A trait-based activity level scale was also included as a measure of life engagement in order to assist in evaluating the researcher-developed measure, and to be used as the life engagement measure in subsequent analyses in the event the life engagement questionnaire was

found to be psychometrically unsound. The life engagement questionnaire did prove to be unreliable, so the activity level scale was used as the measure of life engagement in subsequent analyses. Furthermore, two trait-based scales of risk-taking tendencies were included in data collection, one called “Risk-taking,” and the other called, “Adventurousness.” Upon examination of the items for face validity as well as the correlation of the scales with other key study variables, the scale called, “Adventurousness” was used in analyses as the measure of risk-taking tendencies. The items in this scale seem to measure a degree of exploratory personality.

Both life engagement and risk-taking tendencies were found to be significantly positively correlated with psychological well-being (PWB) and satisfaction with life (SWL), and found to be significantly negatively correlated with depression, anxiety, and stress (DASS). The models also explained a meaningfully large proportion of variance in mental health, especially the model predicting PWB. This model explained half of the variance in PWB, a very large proportion in human models. Furthermore, risk-taking tendencies significantly predicted two dimensions of mental health, PWB and DASS, after controlling for demographics and life engagement. These results suggest a link between risk-taking tendencies and mental health. However, it is unclear from these analyses whether risk-taking impacts mental health or whether those with better mental health tend to take more risks. It may be that those who tend to take more risks enjoy better mental health because the mental resources they spend focusing on risks they have chosen to take leave fewer mental resources to ruminate over mundane psychological stressors. This kind of

rumination has been linked to both anxiety and depression (Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998; Nolen-Hoeksema, 1991; Nolen-Hoeksema, 2000). It is also likely that those who waste less time ruminating free up more mental resources needed to take risks. Future research will have to further inspect this relationship.

*Mediation of Secure Attachment and Mental Health by Risk-taking Tendencies*

*(Hypothesis 3)*

Attachment theory posits a natural developmental pattern of exploration and felt security with an adult caregiver (Bowlby, 1951). Furthermore, previous research has reliably established a link between attachment style and mental health outcomes (Shaver & Hazen, 1989; Wei et al., 2005) and securely attached individuals have been found to report higher levels of curiosity (Arend, Gove, & Sroufe, 1979). It was therefore hypothesized that risk-taking tendencies would mediate the relationship between attachment and mental health. While this was not the case when mental health is defined by satisfaction with life or a measure of depression, anxiety, and stress symptoms, a partial mediation was found for the relationship between secure attachment and psychological well-being. In general, the strongest relationship between risk-taking tendencies and mental health in this study have been found with the measure of psychological well-being than with the other two measures of health outcomes, suggesting risk-taking may tap specifically into this unique aspect of mental health.

Well-being research indicates that optimal well-being does not simply mean a lack of ill health, such as depression, anxiety or stress (Watson, Clark, & Tellegen, 1988), but also requires a presence of well-being, such as satisfaction with life or psychological well-being. Improving well-being does not necessarily reduce depression, while reducing depression does not necessarily increase well-being (Watson, Clark, & Tellegen, 1988). Furthermore, satisfaction with life and psychological well-being are two related, yet distinct, components of well-being (Ryff, 1989). The results in this study provide support for these distinctions and suggest that risk-taking may be uniquely related to our sense of psychological well-being.

#### *Sample Considerations*

Participants for this study were recruited between November 7 and December 19, 2008. This time frame was unique as it was part of the holiday season, which can be very busy and stressful for many, and it was the beginning of winter, which is associated with seasonal affective disorder and higher levels of depressive symptoms. Even more, data collection for this study coincided with severe drops in the stock market, growing levels of unemployment, and increasing fears over the national and world economies. This may at least partially explain the unusually high level of depression, anxiety, and stress felt in this sample (mean = 32.3), relative to normative data (mean = 18.38), as well as the paradoxically low-income to high-education comparison observed in this sample. Over two-thirds of the sample held at

least a bachelor's degree, while almost 40 percent of the sample earned below \$25,000 a year.

Study variables, such as perceptions of riskiness and risk-taking tendencies, might have been affected by participant current life situations. For example, items on the perceptions of riskiness scale ask about quitting one's job to travel. Something like this would appear to be extremely risky in a volatile economy, when individuals are more likely to desire to hang on to their current employment. These items might also not have been personally relevant to a number of people responding to craigslist postings, as they might have already been out of work and searching for jobs. Furthermore, previous research in risk-taking has linked unstable career situations (e.g., many employers) with risk-taking tendencies, indicating that maybe a more unstable employment situation may impact risk-taking tendencies by either encouraging risk-taking or limiting risk-taking behavior. The effects of these individual and circumstantial variables on the results of this study are unfortunately unknown.

### *Limitations*

This study has several limitations. Because the research is cross-sectional, the causal relationship between mental health and risk-taking tendencies is unclear. It may be that those who already enjoy good mental health are simply more likely to engage in risk-taking behavior and those who experience depression or anxiety are less likely to engage in risk-taking behavior. Furthermore, the proposed mediation



between secure attachment and positive mental health by risk-taking was not tested longitudinally, so we could not see risk-taking chronologically develop from attachment and mental health develop from risk-taking. More research is needed to fully understand the relationships observed here.

Additionally, several issues regarding the measurements and measurement quality the instruments should be kept in mind. The instruments used to measure “risk-taking tendencies” and “life engagement” were trait-based, rather than behaviorally based, so we cannot know the nature of the participants’ activities; they may perceive themselves to be extremely active, yet feel they have little free time because they spend most of their time watching television or mindlessly browsing the internet. Furthermore, the scale used to measure “risk-taking tendencies” in this study was titled, “Adventurousness” and approximated the conceptualization of risk-taking presented in the study, but does not represent the theoretical typology presented. It assumed a one-type, trait-based idea of risk-taking instead of the two types and domain-specific risk-taking presented here. For this reason, it may not have captured specific nuances of risk-taking tendencies and fewer people may have identified with the items presented.

### *Implications and Future Directions*

For the purpose of this study, *risk-taking* was defined as engagement in an activity which is personally viewed as risky, evoking emotions such as fear, anxiety, apprehension, or nervousness. Perceptions of riskiness were further conceptualized

to differ by domain (social, financial, and recreational) and individuals were thought to perceive more risk in one of two types of risk (either short-lived, highly exciting or longer-term, higher commitment). Although risk-taking evokes what are thought of as “negative” emotions, these emotions are an adaptive component of human functioning; they serve the same purpose any “positive” emotion serves, providing information about our surroundings and abilities (Grinde, 2002). Conquering our fears and seeing what we are capable of may alter our perceived sense of control, either reinforcing or promoting the development of an internal locus of control (Rotter, 1966). This strengthened sense of internal locus of control may then influence our likelihood of future risk-taking as we begin to see more situations as a challenge rather than an outright threat.

Unfortunately, these results do not shed light on whether risk-taking precipitates mental health, or whether better mental health leads to increased risk-taking. However, previous reports of interventions utilizing a physical activity component have had some success in improving recovery from stress (Chafin, Christenfeld, & Gerin, 2008) and mental health outcomes (Rejeski, Thompson, Brubaker, & Miller, 1992; Hurwitz, Morgenstern, & Chiao, 2005). In combination with this previous research, the results from this study suggest that risk-taking may also improve mental health and it gives hope for the development and testing of such an intervention on non-clinical populations.

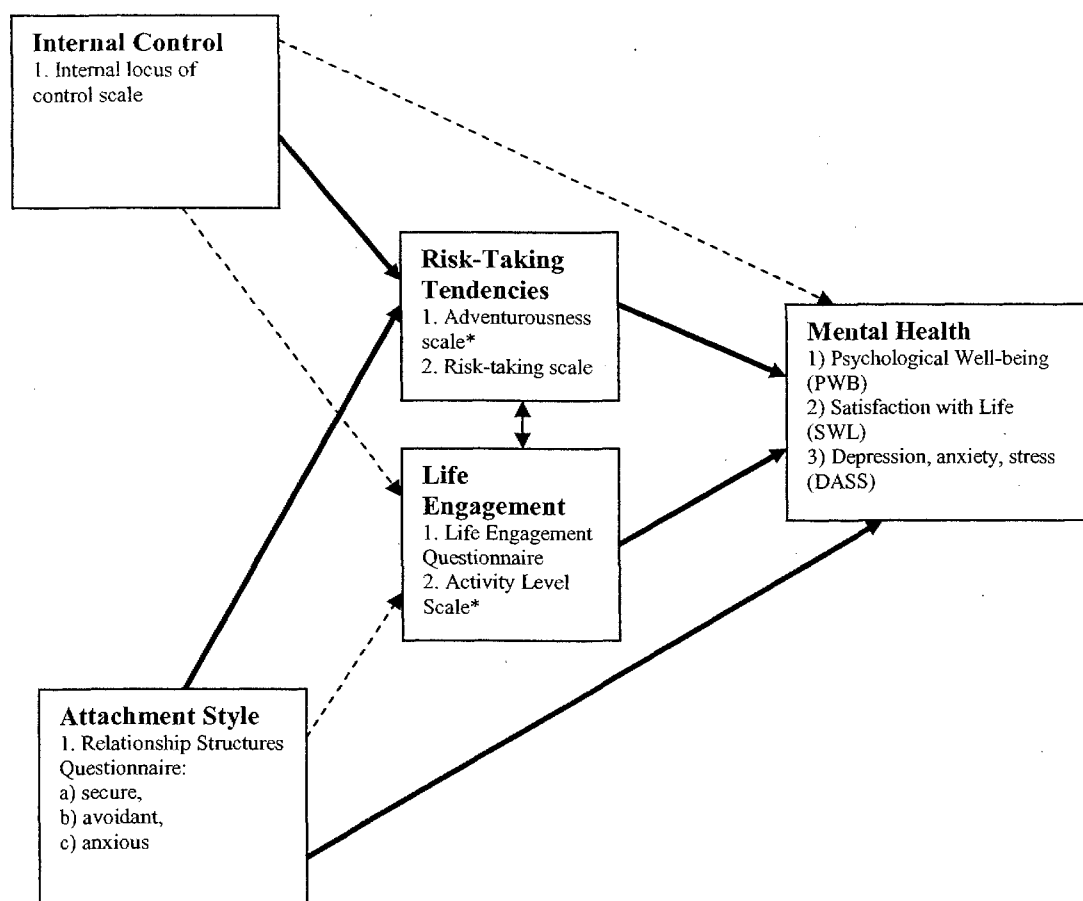
Within the larger risk-taking literature, these results draw attention to the need to consider potentially positive outcomes of risk-taking. In this study, mental

health was positively related to risk-taking tendencies, indicating risk-taking and mental health are, in some manner, functioning together within individuals regardless which comes first. Prior to this, risk-taking has only been considered as something associated with negative outcomes, yet these results give cause to question this assumption. Instead of working towards understanding risk-taking as a means to prevent it, future research can work towards understanding risk-taking as a means to take advantage of its potential positive outcomes for individuals. Future research should further investigate the pathways of the relationship between mental health and risk-taking as well as potential relationships between risk-taking and other positive outcomes, such as self-esteem or self-efficacy.

### *Conclusion*

This study began work to address potential positive outcomes to risk-taking. Specifically, risk-taking tendencies were found to be positively predicted by both internal control and secure attachment style, and mental health was positively predicted by risk-taking tendencies. Furthermore, risk-taking tendencies partially mediated the observed positive relationship with the psychological well-being aspect of mental health. The associations found in this study provide a foundation upon which to build future research on the relationship between risk-taking tendencies and mental health, and informs the risk-taking literature in that risk-taking may have very positive outcomes and should at times be encouraged, rather than discouraged.

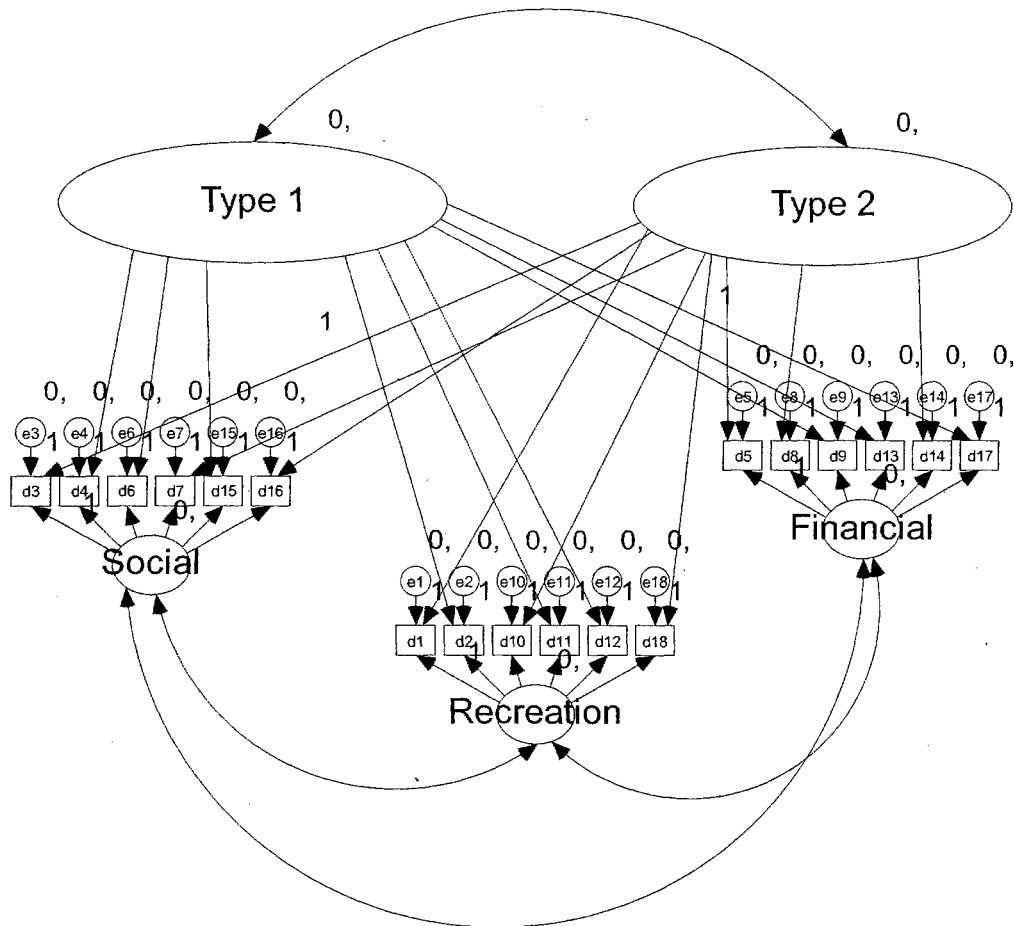
Figure 1: Concept map of hypotheses



\*After measures of risk-taking tendencies and life engagement were investigated, these scales were chosen to measure the respective construct for study analyses

Note: The proposed mediated relationship between attachment style and mental health is indicated with bold-line arrows; all other tested relationships are indicated with solid-line arrows; and all dashed-line arrows were non-tested relationships.

Figure 2. Factor structure of perceptions of riskiness 5-factor model



**Note:** Type 1 = Type I perceptions of riskiness, Type 2 = Type II perceptions of riskiness, Social = Social perceptions of riskiness, Recreation = Recreational perceptions of riskiness, Financial = financial perceptions of riskiness; Measured items are rectangular boxes labeled with d1 through d18; Double-headed arrows represent correlations (indirect effects) and single-headed arrows represent factor loadings (direct effects).

Table 1: Demographic characteristics of study participants

<b>Measure</b>	<b>Count(%)</b>
<i>Gender (n=318)</i>	
Male	53(16.7)
Female	265(83.3)
<i>Education (n=317)</i>	
Less than high school	1(.3)
High School Diploma/GED	21(6.6)
Some college/technical training	81(25.6)
Bachelor's degree (four year degree)	117(36.9)
Post graduate (Masters or Doctorate)	97(30.6)
<i>Income (n=316)</i>	
Less than \$10,000 annually	55(17.4)
\$10,001-25,000 annually	68(21.5)
\$25,001-40,000 annually	63(19.9)
\$40,001-55,000 annually	50(15.8)
\$55,001-70,000 annually	31(9.8)
\$70,001-85,000 annually	11(3.5)
\$85,001-100,000 annually	16(5.1)
More than \$100,001 annually	22(7.0)
<i>Race/Ethnicity (n=317)</i>	
White	249(78.5)
Black	9(2.8)
Pacific Islander	1(.3)
Asian American	17(5.4)
Hispanic	15(4.7)
Multiple race	20(6.3)
Other	6(1.9)
<i>Age (n=314)</i>	
Mean(sd)	34.8(12.2)
Range(min-max)	51(18-69)

*Note.* Results are count and percent unless otherwise noted

Table 2: Descriptive statistics of key study variables, n=318

Measure	Mean(sd)	Min	Max	Highest possible*	Normed mean†
<b>Attachment scales</b>					
Avoidant attachment (n=303)	2.9(1.2)	1.0	6.0	7.0	NA
Anxious attachment (n=305)	2.1(1.1)	1.0	5.7	7.0	NA
Secure attachment (n=296)	5.4(1.1)	2.9	7.0	7.0	NA
<b>Well-being scales</b>					
Psychological well-being (n=294)	195.1(32.5)	97	251	6.0	NA
Satisfaction with Life (n=311)	4.2(1.5)	1.0	7.0	7.0	4.7
DASS (n=296)	32.3(23.7)	0.0	103.0	126.0	18.38
<b>Risk-taking scales</b>					
Riskiness perceptions (n=312)	42.1(12.9)	9.0	90.0	108.0	NA
Risk-taking (n=310)	2.6(0.7)	1.0	4.7	5.0	NA
Adventurousness (n=312)	3.7(0.6)	1.8	5.0	5.0	NA
<b>Life Engagement scales</b>					
Activity Level (n=307)	3.5(.88)	1.2	5.0	5.0	NA
Life Engagement Questionnaire (n=302)	36.5(8.6)	11.0	69.0	80	NA
<b>Internal control</b>					
Internal control Index (n=308)	105.3(13.0)	66.0	139.0	140	105.9
<b>Personality dimensions</b>					
Extroversion (n=315)	3.13(.88)	1.00	5.00	5.00	NA
Openness to Experience (n=309)	4.08(.61)	2.20	5.00	5.00	NA

Note. DASS = Depression, anxiety, and stress scale

\*The highest possible score on the measure

† Average scores from general populations, where available.

Table 3: Unstandardized and standardized loadings for 5-factor confirmatory model of perceptions of riskiness, n=318

Item	Unstandardized(SE)	Standardized
<b>Type I perceptions of riskiness</b>		
Skydiving	-1.11(.42)	-.19
Admitting your views are different from a close friend	.60(.25)	.14
Challenging an authority figure	.37(.25)	.07
Rock climbing	-.03(.32)	-.01
Placing a large bet on a sporting event (more than a day's income)	-1.17(.39)	-.22
Talking with the passenger next to you on the bus/train/plane	1.53(.42)	.41
Riding/driving a motorcycle	-.85(.38)	-.15
Spending more than you think you should on an impulse purchase	1.00	.18
Buying a lottery ticket	.48(.27)	.10
<b>Type II perceptions of riskiness</b>		
Learning a new physical activity, such as surfing or hip hop dancing	2.26(2.42)	.18
Moving across the country, away from family and friends	1.00	.06
Getting married/divorced	1.04(1.19)	.06
Quitting your job to travel for 3 months	.54(1.00)	.03
Going (back) to school for another (or your first) degree	5.20(5.36)	.42
Training for a marathon	3.46(3.60)	.28
Quitting job to start a new business	-2.71(3.40)	-.20
Learning a new skill, such as painting or woodworking	4.92(5.22)	.68
Having children	4.22(4.40)	.24
<b>Social perceptions of riskiness</b>		
Moving across the country, away from family and friends	1.000	.61
Admitting your views are different from a close friend	.40(.08)	.34
Challenging an authority figure	.85(.10)	.60
Getting married/divorced	.99(.12)	.60
Talking with the passenger next to you on the bus/train/plane	.22(.06)	.22
Having children	.48(.11)	.27



Table 3(cont): Unstandardized and standardized loadings for 5-factor confirmatory model of perceptions of riskiness, n=318

Item	Unstandardized(SE)	Standardized
<b>Recreation perceptions of riskiness</b>		
Learning a new physical activity, such as surfing or hip hop dancing	1.000	.40
Skydiving	1.69(.31)	.56
Training for a marathon	1.41(.24)	.58
Rock climbing	2.26(.37)	.73
Riding/driving a motorcycle	2.03(.35)	.67
Learning a new skill, such as painting or woodworking	.14(.10)	.10
<b>Financial perceptions of riskiness</b>		
Quitting your job to travel for 3 months	1.000	.61
Quitting job to start a new business	1.07(.11)	.78
Placing a large bet on a sporting event (more than a day's income)	.25 (.09)	.18
Going (back) to school for another (or your first) degree	.46(.08)	.37
Spending more than you think you should on an impulse purchase	.31(.09)	.21
Buying a lottery ticket	.02(.08)	.02

Table 4: Goodness of fit indicators for confirmatory models of the perceptions of riskiness scale, n=318

Model	$\chi^2$	<i>df</i>	$\chi^2/df$	RMSEA
5-factor	323.99**	113	2.87	.08
3-factor, Type I items	144.15**	24	6.01	.13
3-factor, Type II items	53.63**	24	2.24	.06

*Note.* The five-factor model includes Type I, Type II, Social, Recreational, and Financial perceptions of riskiness factors; the 3-factor with Type I items includes Social, Recreational, and Financial domains for the Type I items only; the 3-factor with Type II items includes Social, Recreational, and Financial domains for the Type II items only.

\*\*p<.001

Table 5: Correlations between life engagement items and activity level scale, n=318

Life Engagement Item	Correlation
Watch television or a movie alone	-.11
Talk with a friend or family member over the phone, email, or face-to-face	.17**
Play video/computer games alone	-.13*
Read for pleasure	.14*
Watch television or a movie with others	.10
Set a challenging goal for myself	.31**
Participate in a sport or other physical activity that involves others	.18**
Travel	.19**
Work on a creative project (e.g., painting, knitting)	.11
Play video/computer games with others	.02
Participate in a physical activity alone (such as running)	.23**
Participate in religious or civic activities	.14*
Participate in educational activities (e.g., visit a museum)	.17**
Learn or try something new	.23**
Go shopping with friends/family (other than grocery shopping)	.11
Commute in traffic	.21**
Participate in something that evokes fear or anxiety	-.14*
Volunteer	.22**
Perform household activities (e.g., laundry, dishes, grocery shopping)	.13*
Browse the Internet without purpose	-.21**

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

Table 6: Correlations among key study variables, n=318

	1	2	3	4	5	6	7	8	9	10	11	12
1. Internal control	1											
2. Activity	.43**	1										
3. SWL	.32**	.42**	1									
4. PWB	.55**	.63**	.60**	1								
5. Anxiety	-.38**	-.24**	-.45**	-.47**	1							
6. Depression	-.42**	-.51**	-.57**	-.65**	.65**	1						
7. Stress	-.35**	-.27**	-.45**	-.45**	.71**	.68**	1					
8. Secure	.20**	.27**	.36**	.55**	-.34**	-.40**	-.20**	1				
9. Risk-taking	.07	.13*	.11	.11	.08	.03	.03	.02	1			
10. Adventurous	.34**	.26**	.16**	.44**	-.15**	-.19**	-.25**	.21**	.38**	1		
11. Extroversion	.35**	.37**	.28**	.49**	-.16**	-.22**	-.16**	.24**	.37**	.35**	1	
12. Openness	.32**	.12*	.08	.29**	-.07	-.08	-.08	.12	.20**	.45**	.25**	1

Note. \*\* Correlation is significant at the 0.01 level (2-tailed), \* Correlation is significant at the 0.05 level (2-tailed).

Activity=Activity level scale (used as Life Engagement measure), SWL=Satisfaction with Life, PWB=Psychological Well-being, Secure=Secure attachment, Openness=Openness to experience

Table 7: Regression model of internal control predicting risk-taking tendencies, n=295

Predictor	B	SE	$\beta$	<i>p</i>
Race	.02	.02	.08	.17
Education	.03	.04	.04	.47
Sex	.08	.10	.05	.41
Income	.02	.02	.05	.43
Age	.00	.00	.03	.71
Internal Control	.02	.00	.30	.00

Note. Model  $R^2 = .12$

Table 8: Regression model of secure attachment predicting risk-taking tendencies, n=284

Predictor	B	SE	$\beta$	<i>p</i>
Race	.03	.02	.11	.06
Education	.05	.04	.07	.25
Sex	.04	.10	.03	.66
Income	.02	.02	.07	.29
Age	.01	.00	.14	.04
Secure Attachment	.11	.04	.19	.00

*Note.* Model  $R^2 = .09$

Table 9: Hierarchical multiple regression model of risk-taking tendencies and life engagement predicting PWB, n=273

Predictor	B	SE	$\beta$	p	Tolerance
<b>Step 1</b>					
Race	.32	.75	.02	.67	.93
Education	3.67	1.75	.11	.04	.86
Sex	7.75	4.30	.08	.07	.98
Income	.57	.950	.03	.55	.66
Age	.18	.15	.07	.23	.73
Life engagement	21.83	1.83	.59	.00	.88
<b>Step 2</b>					
Race	-.20	.71	-.01	.78	.92
Education	3.55	1.65	.10	.03	.86
Sex	7.02	4.06	.08	.09	.98
Income	.32	.90	.02	.73	.66
Age	.11	.14	.04	.45	.72
Life engagement	19.15	1.78	.51	.00	.82
Risk-taking tendencies	13.81	2.35	.27	.00	.89

Note. Step 1 model  $R^2 = .43$ , Step 2 model  $R^2 = .49$ , change  $R^2 = .07$ ,  $p < .001$ ;  
PWB=psychological well-being

Table 10: Hierarchical multiple regression model of risk-taking tendencies and life engagement predicting DASS, n=274

Predictor	B	SE	$\beta$	<i>p</i>	Tolerance
<b>Step 1</b>					
Race	-.32	.63	-.03	.61	.93
Education	.49	1.51	.02	.75	.84
Sex	-1.42	3.56	-.02	.69	.99
Income	-1.51	.80	-.13	.06	.65
Age	-.24	.13	-.12	.06	.73
Life engagement	-9.31	1.58	-.35	.00	.86
<b>Step 2</b>					
Race	-.13	.63	-.01	.84	.91
Education	.55	1.50	.02	.72	.84
Sex	-1.31	3.54	-.02	.71	.99
Income	-1.39	.80	-.18	.08	.65
Age	-.22	.13	-.11	.08	.73
Life engagement	-8.51	1.61	-.32	.00	.81
Risk-taking tendencies	-4.62	2.08	-.13	.03	.90

Note. Step 1 model  $R^2 = .20$ , Step 2 model  $R^2 = .22$ , change  $R^2 = .02$ ,  $p < .05$ . DASS=depression, anxiety, and stress



Table 11: Hierarchical multiple regression model of risk-taking tendencies and life engagement predicting SWL, n=287

Predictor	B	SE	$\beta$	<i>p</i>	Tolerance
<b>Step 1</b>					
Race	.01	.04	.01	.84	.93
Education	.21	.09	.13	.02	.86
Sex	-.05	.22	-.01	.81	.98
Income	.18	.05	.24	.00	.66
Age	-.03	.01	-.21	.00	.74
Life engagement	.62	.10	.35	.00	.87
<b>Step 2</b>					
Race	.00	.04	.00	.97	.91
Education	.21	.09	.12	.03	.86
Sex	-.06	.22	-.01	.79	.98
Income	.18	.05	.23	.00	.66
Age	-.03	.01	-.22	.00	.74
Life engagement	.60	.10	.34	.00	.83
Risk-taking tendencies	.16	.13	.07	.23	.90

Note. Step 1 model  $R^2 = .25$ , Step 2 model  $R^2 = .25$ , change  $R^2 = .00$ ,  $p = .23$ . SWL = Satisfaction with Life

Table 12: Baron and Kenny Method for testing whether risk-taking tendencies mediate the association between secure attachment and psychological well-being (PWB)

Predictor	B	SE	$\beta$	<i>p</i>
<b>Step 1 (model R<sup>2</sup>=.37)</b>				
Race	.02	.80	.00	.98
Education	3.68	1.89	.10	.05
Sex	5.13	4.39	.06	.24
Income	1.87	.96	.11	.05
Age	.39	.16	.14	.01
Secure attachment	15.23	1.54	.50	.00
<b>Step 2 (model R<sup>2</sup>=.09)</b>				
Race	.03	.02	.11	.06
Education	.05	.04	.07	.25
Sex	.04	.10	.03	.66
Income	.02	.02	.07	.29
Age	.01	.00	.14	.04
Secure attachment	.11	.04	.19	.00
<b>Steps 3 &amp; 4 (model R<sup>2</sup> = .45)</b>				
Race	-.52	.75	-.03	.49
Education	3.11	1.77	.08	.08
Sex	4.63	4.21	.05	.27
Income	1.45	.91	.09	.11
Age	.24	.15	.09	.12
Secure attachment	13.76	1.47	.45	.00
Risk-taking tendencies	16.38	2.51	.32	.00

*Note.* Step 1 assesses whether secure attachment predicts PWB, Step 2 assess whether secure attachment predicts risk-taking tendencies, Step 3 assesses whether risk-taking predicts PWB in the presence of secure attachment, and Step 4 (computed in the same equation) assesses whether secure attachment is no longer associated with PWB in the presence of risk-taking tendencies

Table 13: Baron and Kenny Method for testing whether risk-taking tendencies mediate the association between secure attachment and satisfaction with life (SWL)

Predictor	B	SE	$\beta$	<i>p</i>
<b>Step 1 (model R<sup>2</sup>=.21)</b>				
Race	-.01	.04	-.01	.90
Education	.24	.10	.15	.01
Sex	-.08	.22	-.02	.72
Income	.18	.05	.24	.00
Age	-.02	.01	-.14	.02
Secure attachment	.43	.08	.30	.00
<b>Step 2 (model R<sup>2</sup>=.09)</b>				
Race	.03	.02	.11	.06
Education	.05	.04	.07	.25
Sex	.04	.10	.03	.66
Income	.02	.02	.07	.29
Age	.01	.00	.14	.04
Secure attachment	.11	.04	.19	.00
<b>Step 3 (model R<sup>2</sup> =.21)</b>				
Race	-.01	.04	-.02	.76
Education	.23	.10	.14	.02
Sex	-.03	.23	-.01	.89
Income	.18	.05	.24	.00
Age	-.02	.01	-.16	.01
Secure attachment	.40	.08	.28	.00
Risk-taking tendencies	.18	.13	.08	.18

*Note.* Step 1 assesses whether secure attachment predicts SWL, Step 2 assess whether secure attachment predicts risk-taking tendencies, and Step 3 assesses whether risk-taking predicts SWL in the presence of secure attachment.

Table 14: Baron and Kenny Method for testing whether risk-taking tendencies mediate the association between secure attachment and depression, anxiety, and stress (DASS)

Predictor	B	SE	$\beta$	<i>p</i>
<b>Step 1</b> (model $R^2=.21$ )				
Race	-.03	.64	-.00	.97
Education	.12	1.57	.01	.94
Sex	-1.61	3.49	-.03	.65
Income	-2.04	.76	-.17	.01
Age	-.34	.12	-.17	.01
Secure attachment	-7.15	1.28	-.32	.00
<b>Step 2</b> (model $R^2=.09$ )				
Race	.03	.02	.11	.06
Education	.05	.04	.07	.25
Sex	.04	.10	.03	.66
Income	.02	.02	.07	.29
Age	.01	.00	.14	.04
Secure attachment	.11	.04	.19	.00
<b>Step 3</b> (model $R^2=.22$ )				
Race	.12	.64	.01	.86
Education	.62	1.57	.02	.69
Sex	-1.70	3.54	-.03	.63
Income	-1.92	.78	-.16	.02
Age	-.32	.13	-.16	.01
Secure attachment	-6.66	1.31	-.30	.00
Risk-taking	-4.05	2.14	-.11	.06

*Note.* Step 1 assesses whether secure attachment predicts DASS, Step 2 assess whether secure attachment predicts risk-taking tendencies, and Step 3 assesses whether risk-taking predicts DASS in the presence of secure attachment

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## Appendix A: Selected study measures

**Life Engagement**

**Instructions:** For the following items, please indicate how often you engage in each activity during an *average month*.

	Rarely/never	About once a month	A few times a month	About once a week	Almost every day
Watch television or a movie alone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Talk with a friend or family member over the phone, email, or face-to-face	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Play video/computer games alone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Read for pleasure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Watch television or a movie with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Rarely/never	About once a month	A few times a month	About once a week	Almost every day
Set a challenging goal for myself	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participate in a sport or other physical activity that involves others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Travel	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Work on a creative project (e.g., painting, knitting)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Play video/computer games with others	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Rarely/never	About once a month	A few times a month	About once a week	Almost every day
Participate in a physical activity alone (such as running)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participate in religious or civic activities	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participate in educational activities (beyond what is required for school, e.g., visit a museum)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Learn or try something new	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Go shopping with friends/family (other than grocery shopping)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Rarely/never	About once a month	A few times a month	About once a week	Almost every day
Commute in traffic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Participate in something that evokes fear or anxiety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Volunteer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Perform household activities (e.g., laundry, dishes, grocery shopping)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Browse the Internet without purpose	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Activity Level

**Instructions:** The following statements are phrases describing people's behaviors. Please use the options provided to rate how accurately each statement describes *you*. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Please read each statement carefully, and select the response that corresponds best to your self-description.

	Very inaccurate	Moderately inaccurate	Neither inaccurate nor accurate	Moderately accurate	Very accurate
I can manage many things at the same time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am always busy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do a lot in my spare time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I need a push to get started.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am easily discouraged.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Very inaccurate	Moderately inaccurate	Neither inaccurate nor accurate	Moderately accurate	Very accurate
I am always on the go.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I accomplish a lot of work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I do too little work.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I hang around doing nothing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have a slow pace to my life.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Risk-taking**

**Instructions:** The following statements are phrases describing people's behaviors. Please use the options provided to rate how accurately each statement describes *you*. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Please read each statement carefully, and select the response that corresponds best to your self-description.

	Very inaccurate	Moderately inaccurate	Neither inaccurate nor accurate	Moderately accurate	Very accurate
I enjoy being reckless.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I take risks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would never go hang-gliding or bungee-jumping.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I know how to get around the rules.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I avoid dangerous situations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Very inaccurate	Moderately inaccurate	Neither inaccurate nor accurate	Moderately accurate	Very accurate
I am willing to try anything once.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I seek adventure.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I seek danger.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would never make a high risk investment.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I stick to the rules.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Adventurousness

**Instructions:** The following statements are phrases describing people's behaviors. Please use the options provided to rate how accurately each statement describes *you*. Describe yourself as you generally are now, not as you wish to be in the future. Describe yourself as you honestly see yourself, in relation to other people you know of the same sex as you are, and roughly your same age. So that you can describe yourself in an honest manner, your responses will be kept in absolute confidence. Please read each statement carefully, and select the response that corresponds best to your self-description.

	Very inaccurate	Moderately inaccurate	Neither inaccurate nor accurate	Moderately accurate	Very accurate
I prefer variety to routine.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to visit new places.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I dislike changes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am interested in many things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I prefer to stick with things that I know.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Very inaccurate	Moderately inaccurate	Neither inaccurate nor accurate	Moderately accurate	Very accurate
I don't like the idea of change.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am a creature of habit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I dislike new foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I like to begin new things.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am attached to conventional ways.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



