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entitled

Risky Decision-making among Subgroups of Socially Anxious Individuals

by

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Submitted to the Graduate Faculty as partial fulfillment of the requirements for the

Master of Arts Degree in Psychology

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An Abstract of

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Social anxiety represents an important individual characteristic that may moderate an individual's decision to engage in risky behavior. Research indicates that there are two distinct groups of socially anxious individuals, an avoidance-oriented, risk-averse group, and an approach-oriented, risk-taking group. Recent theoretical and empirical work suggests that social comparison information affects the extent to which non-anxious and socially anxious individuals decide to engage in risk. Given that socially anxious individuals are hyper-sensitive to social concerns, subgroups of socially anxious individuals may differ from each other and from non-anxious individuals in their risk-taking provided social comparison information. Undergraduate psychology students completed risky word problems under various social conditions in which their decision to engage in risk may or may not be public knowledge. It was hypothesized that social anxiety, approach behavior, and condition would interact to predict increased risk-taking on risky word problems. Multiple regression analyses were not consistent with the hypothesis. A 3-way interaction between social anxiety x approach behavior x condition was not found; however, a significant main effect for condition was found.

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List of Abbreviations

APA ....American Psychiatric Association

SAD ....Social Anxiety Disorder

Chapter One

Introduction

According to the Diagnostic and Statistical Manual- Fourth Edition- Text

Revision (DSM-IV-TR), the key feature of social anxiety disorder (SAD) is "a marked

and persistent fear of social or performance situations in which embarrassment may

occur" (American Psychiatric Association [APA], 2000, p. 450). Furthermore, SAD is

one of the most prevalent anxiety disorders with lifetime prevalence rates of 12.1%

(Kessler et al., 2005b). Typically, adults and adolescents diagnosed with SAD are aware

that their social fears are excessive and unreasonable; however, individuals often avoid

their feared stimulus or endure the situation with great psychological distress (APA,

2000). To meet diagnostic criteria for SAD, individuals must evidence a pattern of fear or

anxiety, avoidance, and interference in their daily functioning. Although a clinical

diagnosis of SAD indicates more severe fear of social interactions and situations, sub-

clinical levels of social anxiety may also be distressing (Bruch, 1989; Essau, Conradt, &

Petermann, 1999; Rapee & Heimberg, 1997; Storch, Masia-Warner, Crisp, & Klein,

2005). SAD is also highly comorbid with other mental disorders including internalizing

disorders such as major depressive disorder which would theoretically be expected to co-

occur with SAD; however, SAD is also comorbid with externalizing disorders (e.g.,

substance use disorders) which may seem inconsistent with the symptoms of SAD upon

initial investigation (Kessler et al., 2005b; Seligman & Gahr, in press). Due to the

pervasive avoidance and intense anxiety of social situations across the social anxiety

continuum, individuals with social anxiety have typically been conceptualized as

avoidance-oriented, shy, and inhibited; however, recent research suggests substantial

heterogeneity in the presentation of SAD (Kashdan, Collins, & Elhai, 2006; Leary,

Kowalski, & Campbell, 1988; Rapee & Heimberg, 1997).

Heterogeneity of Social Anxiety

Despite the traditional conceptualization of socially anxious individuals (i.e.,

avoidance-oriented, behaviorally inhibited, risk-averse), a recent series of studies in both

general community and clinical samples indicate that a subgroup of socially anxious

individuals are approach-oriented, behaviorally disinhibited, and risk-taking. Approach-

oriented socially anxious individuals are more likely to engage in a variety of risky health

behaviors such as substance use, aggression, and risky sexual behavior (Kachin, 2001;

Kashdan et al., 2006). Since the advent of this line of research, researchers have

attempted to classify socially anxious individuals into subgroups using a variety of

differentiating factors. For instance, Kashdan, Elhai, and Breen (2008) evaluated socially

anxious individuals' perception of potential threat (e.g., "I would view this situation as

anxiety provoking."), curiosity (e.g., "I would view this situation as an opportunity to

satisfy my curiosity."), and perceptions of possible social rank enhancement (e.g., being

more popular or superior relative to others as a result of the behavior) in relation to risky

behavior. In a sample of undergraduates, the results of cluster analyses on social anxiety

scores, threat, curiosity, and novelty appraisals for each risky activity, and social status

enhancements for each risky activity revealed three qualitatively different groups of

socially anxious individuals: 1) a minimal anxiety control group characterized by weak

appraisals for threat, curiosity, and social rank enhancements across all social activities,

2) an approach-oriented group characterized by moderate social anxiety and strong threat,

curiosity, and high perceptions of social rank enhancements for social activities in

general and, more specifically, risky behaviors (i.e., sexual behaviors, aggression, substance use), and 3) an avoidance-oriented group which was also characterized by moderate levels of social anxiety and by normative threat, curiosity, and social rank enhancement for social activities and risky behaviors. Consistent with the traditional conceptualization of social anxiety, the avoidance-oriented group accounted for the greatest percentage of the sample (n = 104; 37.1%). However, the approach-oriented group was nearly equally represented in the sample, accounting for 34.6% of the sample. As hypothesized, the approach-oriented group reported engaging in risky behaviors more frequently than both the avoidance-oriented group and minimal anxiety group at a 3-month follow-up. Overall, these results indicate that, contrary to popular conceptions of social anxiety, there is a distinct group of socially anxious individuals characterized by a pattern of behavioral disinhibition (Kashdan et al., 2008); however, the generalizability of these results could be called into question by the relatively small sample size and the use of an undergraduate population.

Extending this line of research, however, Kashdan and Hofmann (2008) investigated the relationship between social anxiety and behavioral disinhibition within a clinical sample. More specifically, they evaluated social anxiety symptoms and personality traits (i.e., novelty seeking, harm-avoidance) in a sample of 82 outpatient participants diagnosed with SAD. Cluster analyses based on personality measures again identified a high-novelty seeking group and a low-novelty seeking group. The high novelty-seeking group was characterized by elevated scores on excitability, impulsivity, extravagance, and disorderliness subscales relative to normative samples. In contrast, the low-novelty seeking group was characterized by lower scores on excitability and

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impulsivity scores relative to normative samples. In conjunction with previous findings, Kashdan and Hofmann's (2008) results suggest that there may be a group of socially anxious individuals, present within clinical and non-clinical samples that evidence a behavioral pattern and personality characteristics which increase their probability of engaging in risky behavior. Again, however, this study examined a relatively small sample of individuals with SAD.

However, research in a large-scale epidemiological study also found evidence for these two subgroups of socially anxious individuals. That is, in an effort to further examine heterogeneity in SAD, Kashdan, McKnight, Richey, and Hofmann (2009) examined levels of social anxiety and risky behavior among an epidemiological sample of 679 individuals diagnosed with generalized SAD in the National Comorbidity Study-Replication (NCS-R; Kessler et al., 2005a). Results from a latent class analysis were consistent with previous research such that two groups of socially anxious individuals were identified: an avoidance-oriented group (79% of the sample of individuals with SAD) characterized by low aggression, sexual impulsivity, and substance use and an approach-oriented group (21% of the sample of individuals with SAD) characterized by moderate aggression, anger, sexual impulsivity, and substance use.

Although this line of research suggests some socially anxious individuals are prone to engage in risky behaviors, it stands to reason that subgroups of socially anxious individuals may evidence different behavioral patterns (i.e., avoidant, approach) as a function of the severity of their social anxiety. That is, it may be that the avoidance-oriented subtype simply represents a more severe form of SAD; however, research indicates that the two subgroups of socially anxious individuals do not differ on severity

of social anxiety symptoms. For example, among the three socially anxious groups (i.e., minimal anxiety, approach-oriented, avoidance-oriented) identified by Kashdan et al. (2008), both approach-oriented and avoidance-oriented groups evidenced moderate levels of social anxiety symptoms; furthermore, Kashdan and Hofmann (2008) found that subgroups of socially anxious individuals who evidenced patterns of high novelty-seeking behaviors did not differ from those who evidenced patterns of low-novelty seeking behaviors in regards to severity of social anxiety symptoms. Importantly, as indicated in the above review, approach-oriented and avoidance-oriented socially anxious individuals have been found in clinical samples as well as general community samples also indicating that approach and avoidance strategies do not differ as a function of social anxiety severity.

In sum, despite the traditional conceptualization of socially anxious individuals as avoidance-oriented, behaviorally inhibited, and risk-averse, empirical studies suggest that there are actually two distinct behavioral patterns associated with SAD – approach-oriented and avoidance-oriented (Kashdan et al. 2006; Kashdan et al. 2008; Kashdan & Hofmann 2008; Kashdan et al., 2009). The empirical support for these two distinct groups has been established across multiple studies despite variable methodology (e.g., type of sample, instruments used to describe and diagnose groups). It is not clear under what circumstances socially anxious individuals employ approach-oriented or avoidance-oriented strategies; however, there is a substantial body of literature concerning risk-taking and risk-aversion in decision-making that can be informative in this regard. Understanding decision-making processes of socially anxious individuals may inform the

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understanding the phenomenology of SAD, broadly, and the heterogeneity within SAD, more specifically.

Decision-Making

The differential patterns of approach and avoidance strategies in relation to potential risk situations are well established throughout the non-human primate literature as well as in the psychological literature within both clinical and non-clinical samples. These overarching theories inform when people in general will be approach-oriented and risk-taking as opposed to avoidance-oriented and risk-averse. For example, it has consistently been found that when faced with potential for reward (e.g., a raise), people in general prefer certain, less variable outcomes relative to more risky outcomes, indicating a general risk-averse stance (Hill & Buss, 2010; Kahneman & Tversky, 1979). More specifically, studies have shown that individuals will choose a smaller monetary gain (e.g., $300) with a higher probability (e.g., 80%) as opposed to a greater monetary gain (e.g., $500) with a lesser probability (e.g., 50%). In contrast to decisions regarding gains, individuals are typically risk-taking in regard to losses (i.e., to attempt to avoid a loss). For example, Kahneman and Tversky (1979) found that people prefer a situation in which they have an 80% chance of losing $4,000 as opposed to the certainty of losing $3,000. This general risk-aversion with gains and risk-taking with losses has been found in multiple studies (e.g., Barberis, Huang, & Santos, 2001; Kahneman & Tversky, 1979; Verhoef, De Haan, & Van Daal, 1994). However, people often deviate from theoretical expectations by choosing to engage in risky behavior when presented with a potential gain (e.g., gambling, stock market), suggesting that there are potential moderators for risky decision-making.

Evolutionary theory and approach-avoidance strategies in risk situations.

During the past decade, several researchers have used evolutionary theory to further inform Kahneman & Tversky's (1979) model of decision-making and guide subsequent hypotheses regarding when risk-taking will occur. Using animal models as a basis, more recent research considers the role of social rank or status in the decision to avoid or engage in risk. More specifically, Ermer, Cosmides, and Tooby (2008) consider dominance theory which states that, in general, risky behavior is dictated by the importance and value associated with resources (e.g., food, mates) as well as the ability of competitors to physically injure each other (Hammerstein & Parker, 1982). In general, submission by one competitor occurs when there are obvious differences in social rank, the resource is valued equally by competitors, and the higher-ranking individual can cause harm to the subordinate (Ermer et al., 2008). Risk-taking increases, however, when individuals value the resource equally, are of similar social rank, and have a greater probability of beating their competitor due to being more evenly matched.

Although the potential threat of physical harm does not typically transfer to most social interactions and social hierarchies among people, Ermer et al. (2008) extend dominance theory to situations in which social harms may occur. Social harms are described as situations in which a higher-ranking individual can ostracize a person from socially beneficial experiences (e.g., friendships, social interactions) or stop cooperating with the individual. Ermer et al. (2008) generalize dominance theory to people and assert that males, in particular, will be most motivated to take risks when in competition with a male of equal social status who desires a specified resource equally.

Importantly, males are more affected by social status struggles than females as social status is a significant determining factor in males' ability to access the ultimate fitness-relevant resource: mates. Within the non-human primate literature and general psychological literature, women are more attracted to men of higher status who can theoretically provide resources for themselves and their offspring. In contrast to males, social status is not an integral factor of intrasexual competition for females (Ermer et al., 2008). Males traditionally compete for access to females rather than females competing for access to males. Even when males are more selective of their mates, female mates are chosen on the basis of their fertility and ability to produce healthy offspring; therefore, from an evolutionary perspective, social status and subsequent ability to attract a mate is more important for males than females (Buss, 1989). Because social status should be more important in attaining fitness-relevant resources (e.g., mates) for males than females, Ermer et al. (2008) hypothesized that males should have evolved to be more affected by status concerns than females; females' risk-taking should not be as affected by social status.

Social evaluation, loss, and risky decision-making. To test the generalizability of dominance theory to people, Ermer et al. (2008) conducted a series of studies examining the effect of social evaluation on the risky behavior of men and women in both gain and loss situations. Consistent with previous studies, risky decision word problems were used to test hypotheses. Initially, 94 students (n = 42 males; mean age = 19.6 years) were randomly assigned to conditions in which they were told a same-sex peer of higher, equal, or lower status would be evaluating their decisions on the word problems. Furthermore, participants were given problems relating to a monetary loss

(which is relevant to social status) and a medical loss problem (i.e., probability of surviving a fatal disease), which served as the control. This resulted in a 2x3x2 factorial design (Sex: male/female x Social status condition: higher status/equal status/lower status x Situation: socially relevant/control) for Study 1. Results of the monetary problem indicated that men's decisions were significantly affected by relative social status concerns. More specifically, men who were "evaluated" by equal status peers were significantly more likely to choose the riskier option as compared to men who thought they were being evaluated by someone of lower or higher status (Ermer et al., 2008).

This pattern of results supports dominance theory as an explanation for risky decision-making for potential loss; men only significantly increase their risk-taking when being evaluated by someone of equal status. As discussed by Ermer et al. (2008), losing a resource to one competitor may put an organism at risk of being challenged by others. Therefore, individuals are risk-taking in the presence of equals only in that they neither want to lose a resource to one individual nor be challenged by others who may view them as an equal or potential inferior following the loss of status. A competitor of equal status affords an individual a greater probability of avoiding loss than when faced with a competitor of obviously higher status; furthermore, there is nothing to be gained when faced with a competitor of lower status as the target individual is already of higher status. As hypothesized, relative status of evaluators did not affect men's risky decision-making when presented with the control problem. Similarly, women's risky decision-making was not affected by their relative social status in either the monetary or medical loss problems (Ermer et al., 2008).

In a follow-up study, Ermer et al. (2008, Study 2) presented participants with situations that should not activate competitive concerns (i.e., situations describing a possible gain in a cooperative scenario) in addition to the standard loss problems. As hypothesized, responses to gain problems, which do not activate competitive concerns indicated that social status concerns did not affect men's decision to engage in risk. In fact, in the gain condition, participants preferred the risky decision and certain decision equally. Similar to findings with males, social status did not affect women's risk taking in the gain condition.

In regards to monetary loss problems, the results of the initial study were replicated such that relative social status significantly affected men's risky decision-making. More specifically, men chose the riskier decision when told someone of equal status was evaluating them. However, in contrast to previous findings (e.g., Ermer et al., 2008, Study 1), results from the Study 2 indicated that relative social status concerns significantly affected women's risky decision making on resource loss problems as well; however the findings were contrary to hypotheses and largely inconsistent with dominance theory. A second follow-up study (e.g., Ermer et al., 2008, Study 2a), however, did not replicate the positive results found for females.

Relative social rank, gains, and risky decision-making. Neither Kahneman and Tversky's (1979) theory nor Ermer et al.'s (2008) findings explain situations in which people engage in risk-taking behavior for gains, however. As Hill and Buss (2010) state, Kahneman and Tversky's (1979) theory fails to explain situations in which individuals make risky decisions such that there is a less certain probability of making large gains (e.g., gambling, stock markets). To elucidate mechanisms that may account for risky

decision making in regards to gains, Hill and Buss (2010) evaluated the role of relative

social rank in decision making processes. In general, people prefer options which will

increase their fitness overall. However, the fitness gains of an individual relative to other

competitors should be considered in addition to overall individual fitness gains (Hill &

Buss, 2010). Taking an evolutionary approach, Hill and Buss (2010) posit that decision-

making will be influenced by an individual's relative position to others such that an

individual may be more likely to make a risky decision if that decision could afford him

or her resources above and beyond competitors. In sum, they predict that people will

prefer riskier outcomes to certain outcomes when the riskier option enhances their rank

relative to others, when the decision is relevant to fitness goals (e.g., attaining mates), and

when the decision concerns gains rather than losses. In general, when relative fitness

goals are not a concern, riskier decisions are more likely, especially when the certain

option does not meet basic needs; however, when relative position to others is important,

individuals should still choose the riskier option even when basic needs are met by the

certain option (Hill & Buss, 2010).

To investigate the influence of relative social rank or comparison on decision-

making, Hill and Buss (2010) randomly assigned 334 undergraduate students (n = 147

males) to an experimental or control group in which they had to decide between forced-

option risky word problems. The control group answered word problems consistent with

Kahneman and Tversky's (1979) original paradigm such that they were given values and

corresponding probabilities for gain and loss situations. Participants in the experimental

condition were given similar questions, but the questions were put into the context of

positional gains or losses relative to coworkers. That is, in contrast to Ermer et al.'s

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(2008) methodology, Hill and Buss (2010) presented participants in the experimental

condition with problems in which they were explicitly told whether their loss or gain

would position them above a competitor (e.g., coworker, neighbor). For example, Hill

and Buss (2010) presented participants with the following gain problem:

> You are allowed to choose one of the following schemes for your new job's
> salary. Which income would you most prefer?
> **A**. You have a:
> 66% chance of getting paid $2400 a month
> 33% chance of getting paid $2500 a month
> Your coworkers get paid:
> $1000 a month with certainty
> **B**. You get paid:
> $2400 a month with certainty
> Your coworkers get paid:
> $3000 a month with certainty (p. 222)

Consistent with hypotheses, relative social information increased participants'

tendency to prefer riskier outcomes. Participants in the experimental condition who were

given relative social information were significantly more risk-taking than individuals in

the control condition (Hill & Buss, 2010). For example, in a specific question related to

monetary gain, 70% of individuals in the experimental group chose the higher risk,

positionally better option as opposed to 34% of participants in the control condition;

participants in the experimental condition were significantly more likely to choose the

riskier option. Participants in the experimental condition were consistently more risk-

taking than controls across multiple question topics such as receiving a holiday bonus,

inheritance, or pay raise. However, although social comparison information influenced

decision-making in terms of gains, the experimental and control conditions did not differ

when faced with loss-related decisions (Hill & Buss, 2010). As predicted, participants in

both conditions were risk-seeking in terms of losses such that participants typically chose the less probable possibility of losing less money rather than a certain yet monetarily greater loss. Overall, Hill and Buss's (2010) findings indicate that individuals do not always prefer certain outcomes, especially when riskier options can afford them advantages above and beyond his or her peers. Hill and Buss's (2010) findings are particularly relevant in that they demonstrate a specific circumstance in which people will choose a riskier option over a certain outcome in relation to potential reward.

Social Anxiety and Risky Decision-making

  Dominance theory. Although researchers have begun to independently attend to risk-taking among socially anxious individuals in addition to examining social information's influence on risky-decision making, the effects of social anxiety on risky decision-making have not yet been investigated. However, social anxiety may change how individuals view loss and gain scenarios. Taken together, dominance theory and relative fitness theory suggest that social information increases risk-taking for both gains and losses among non-selected samples; however, socially anxious individuals may not evidence the same risk-taking patterns in similar scenarios. Dominance theory suggests that individuals should take more risks in social situations when (1) they are unsatisfied with their current social status and (2) they are in a competition with an individual of approximately equal social rank; moreover, these effects should be particularly pronounced for men. Research indicates that socially anxious individuals view themselves as innately inferior and social situations as inherently competitive; therefore, socially anxious individuals should be risk-averse in the traditional conceptualization of dominance theory (Gilbert, 2001). According to dominance theory, however, risk-taking

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can be moderated by the value of the potential reward and/or the cost associated with attaining that potential reward (Hammerstein & Parker, 1982). Approach-oriented socially anxious individuals have been shown to evidence increased curiosity and social rank enhancements for risky situations (Kashdan et al., 2008). Therefore, approach-oriented individuals may value the potential rare social rewards associated with risk-taking behavior (e.g., being "cool", gaining friends) more than their competitors, perceive the benefits of engaging in risks as outweighing the potential costs (e.g., embarrassing him or herself, irritating others), and subsequently increase their risk-taking even in the presence of a "superior" individual. On the other hand, avoidance-oriented individuals evidence decreased curiosity and social rank enhancement appraisals relative to approach-oriented individuals (Kashdan et al., 2008); thus, avoidance-oriented individuals may perceive the cost of attaining potential rewards as outweighing the potential benefits and subsequently reduce their risk-taking (Gilbert, 2001). In contrast to a non-selected sample, socially anxious individuals view social situations as inherently competitive; therefore, socially anxious individuals risk-taking should differentially increase or decrease when facing a gain or loss scenario in the presence of others (i.e., a socially evaluative situation).

Relative fitness theory. Although dominance theory accounts for the differential risk-taking of approach-oriented and avoidance-oriented individuals (i.e., cost-benefit ratio), relative fitness theory does not. Taken together, Hill and Buss (2010) and Ermer et al.'s (2008) findings indicate that when given social information and asked to make a public or private decision (i.e., direct social evaluation, private social comparison), people will employ more approach-oriented strategies and be more likely to engage in

risky behavior. Thus, this research suggests that the extent to which people engage in risk is influenced by the situation; however, the degree to which people find themselves in these situations is not random because outside the laboratory the degree of social information available to the individual is partially driven by the person's schemas about social situations. That is, people are not equally aware of or concerned with social status or social comparisons. In fact, evidence suggests that the extent to which a person engages in social comparison can be viewed as a relatively stable personality characteristic; furthermore, individuals who tend to engage in social comparison are characterized by self-consciousness, negative affect, and neuroticism (Buunk & Gibbons, 2007). This description closely maps on to the phenomenology of SAD (Rapee & Heimberg, 1997). It naturally follows, therefore, that socially anxious individuals will evidence greater patterns of social comparison.

An increased tendency to engage in social comparison is not the only characteristic that should theoretically predispose all socially anxious individuals to engage in risk behavior when provided with social comparison information, however. Research suggests that socially anxious individuals are hyper-aware of social hierarchies, view social situations as innately competitive, and view themselves as inferior relative to others in social situations (Gilbert, 2000; Rapee & Heimberg, 1997). This self-view is especially problematic because socially anxious individuals perceive their inferior rank to be "involuntary and unwanted" (Gilbert, 2000, p. 175); furthermore, socially anxious individuals desire positive appraisals from others (Rapee & Heimberg, 1997). It could thus be expected that individuals with SAD would be highly motivated to improve their social status; moreover, the theory that socially anxious individuals view themselves as

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inferior and are hypersensitive to social rank concerns is not without empirical support.

For instance, Hope, Sigler, Penn, & Meier (1998) evaluated 110 undergraduates'

perceptions of a 5-minute conversation with a confederate. Socially anxious participants

evaluated the interaction as more competitive relative to non-anxious individuals and also

viewed themselves as unable to compete with their conversation partners. Given that

socially anxious individuals are hypersensitive to social rank issues, view themselves as

innately inferior, and tend to engage in social comparisons, according to relative fitness

theory, social anxiety should increase risk taking when a socially-relevant gain is

available in a socially comparative situation because socially anxious individuals are

more likely to focus on social status and social comparison in social interactions (Gilbert,

2001; Rapee & Heimberg, 1997).

      Summary. Thus taken together, the research and theory on the phenomenology of

SAD and on decision-making suggest that socially anxious individuals' risk-taking

should be differentially affected by public social comparison situations in which others

could directly evaluate the outcome of their decisions. More specifically, risk-taking

should be moderated by the benefits of a potential reward and the potential cost of

attaining that reward. Earlier research began to approximate this relationship in that,

among a non-selected sample of undergraduates, positive outcome expectancies for

engaging in risky behavior moderated the relationship between social anxiety and

engagement in risky behaviors (Kashdan et al., 2006). Although dominance theory can

account for risk-taking and risk-aversion among socially anxious individuals, relative

fitness theory suggests that all socially anxious individuals should have a propensity

toward risk-taking behavior when provided with socially relevant information. In

contrast, however, research indicates that some socially anxious individuals will evidence avoidance-oriented, risk-averse strategies in the presence of potential risk whereas others will evidence an approach-oriented, risk-taking strategy.

The key characteristic of SAD and social anxiety in general is fear of negative evaluation in social situations (APA, 2000). Fear of a negative evaluation should not equally affect a socially anxious individual's responses to all social information, however, especially in regards to decision-making. Although the paradigms established by Hill and Buss (2010) and Ermer et al. (2008) affected non-selected samples in approximately the same manner, on average, in that the presence of social information increased risk-taking behavior, there are important differences between the two paradigms in relation to socially anxious individuals. Hill and Buss (2010) presented participants with social comparison information that, despite being relevant to social rank or status, had minimal potential costs associated with engaging in risk. In fact, the risky word problems did not explicitly state if outcomes would be public knowledge. Therefore, the risk of positive or negative social consequences from their decisions was minimal or non-existent (Hill & Buss, 2010). In contrast, Ermer et al. (2008) presented participants with a situation in which their peers would directly evaluate them and could subsequently judge their decision. This distinction is critical to socially anxious individuals. Social information that is provided and responded to privately should not differentially affect socially anxious individuals' risk-taking. Social information that is public and subsequently evaluative in nature, on the other hand, can activate a socially anxious individual's fear of negative evaluation, put them at risk for embarrassment and humiliation, and ultimately affect his or her risk-taking behavior depending on the

individual's cost-benefit ratio for the situation. When faced with social evaluation, therefore, subgroups of socially anxious individuals may employ different strategies in response to making public decisions using social comparison information. Although intrinsically appealing, this idea has not been empirically tested.

In addition to clarifying the situations in which socially anxious individuals employ differential behavior strategies, the potential moderators of their decision-making also need to be clarified. More specifically, the benefits and costs associated with risk-taking among subgroups of socially anxious individuals need to be explored. Although positive outcome expectancies have been evaluated among a non-selected sample of socially anxious undergraduates, the extent to which positive outcome expectancies differ across groups has not been established. Based on dominance theory, approach-oriented and avoidance-oriented socially anxious individuals may differ in their risk-taking as a function of their positive outcome expectancies for risk-taking as well as the costs they associate with taking a specific risk. In addition to differences regarding benefits and costs for a risk, self-efficacy, or the extent to which an individual believes they can successfully engage in a task, may also influence risk-taking among socially anxious individuals. Self-efficacy has been found to be associated with risk-taking and risk-aversion, especially in relation to condom use (Barta, Tennen, & Kiene, 2010; Lescano, Brown, Miller, & Puster, 2007). For socially anxious individuals, self-efficacy may be particularly relevant to engaging in risky behaviors within a social context (e.g., at parties, in romantic relationships). Although investigating potential moderators of risky decision-making among socially anxious individuals is relevant, it is beyond the scope of the current project. Differentiating potential situations in which risk-taking is more likely

to occur and the interaction between situational characteristics and more stable, personality characteristics (e.g., approach-oriented, avoidance-oriented) is the focus of the proposed study.

The Current Study

With this backdrop, the current study aims to examine the relationship between the public or private nature of a decision made with social comparison information and the risk-taking of socially anxious individuals who vary in their approach-avoidance orientation. Based on theory and empirical precedent, it is hypothesized that:

(1) Everyone should engage in greater risk-taking when given social information (public or private). However, this should be qualified by individual level of social anxiety and approach-avoidance orientation, as specified below.

(2) Individuals who evidence increased social anxiety and are also more approach-oriented should be more risk-taking relative to individuals who are more avoidance-oriented (and also evidence increased levels of social anxiety) when presented with a public decision but not when presented with a private decision.

(3) Individuals who evidence increased social anxiety and are also more approach-oriented should be more risk-taking relative to non-anxious individuals when presented with a public decision but not when presented with a private decision.

Individuals who evidence increased social anxiety and are more avoidance-oriented should engage in less risk-taking relative to non-anxious individuals

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when presented with a public decision but not when presented with a private

decision.

Chapter Two

Methods

Participants and Design

Participants were 456 (n = 138 males; M_{age} = 20.31 years, *SD* = 3.74) undergraduate psychology students. The sample was primarily Caucasian (79%) with the majority of participants (56.6%) reporting an income in the middle class or higher (> $45,000). Thirty-four participants were subsequently excluded from data analysis due to missing greater than 75% of data on primary measures (Drukker, 2011).

Based on the results of Ermer et al. (2008) the expected effect size was estimated to be a medium to large effect. A power analysis suggested that 122 participants were needed to detect a medium effect size (f^2 = 0.15) with power of 0.80 and alpha of 0.05 (Erdfelder, Faul, & Buchner, 1996). The observed power for the multiple regression analyses of the overall sample was .99 for a medium effect size (f^2 = 0.15) with a probability of 0.05. For the analyses of female and male participants, the observed power was .99 and .85, respectively, for a medium effect size (f^2 = 0.15) and alpha of 0.05.

Participants were randomly assigned to one of three experimental conditions: public (n= 137) private (n= 155), or no social information (n= 130). The details of the manipulation are described under "Decision Problems". Social anxiety and approach behavior were subject variables, measured using the Liebowitz Social Anxiety Scale and the Cognitive Appraisal of Risky Events questionnaire, respectively (described below).

Procedures

All procedures were approved by the University of Toledo's Institutional Review Board. Participants were recruited from the University of Toledo's online research system, SONA, completed measures on Psychdata, an online data collection system, and were given course credit for their participation. Participants were randomly assigned to an experimental condition and completed a battery of self-report questionnaires.

Measures

Liebowitz social anxiety scale. *(LSAS*; Liebowitz, 1987*).* The LSAS is a 24 item self-report questionnaire used to assess the presence of social anxiety symptomatology. Participants rate their fear or anxiety as well as avoidance of different social situations (e.g., going to a party, drinking with others in public places). Fear or anxiety is rated on a 4-point Likert-type ranging from 0 to 3, with higher scores indicating more anxiety. Similarly, frequency of avoidance is rated on a 4-point Likert-type ranging from 0 to 3, with higher scores indicating increased avoidance. Therefore, total scores, a sum of fear and avoidance ratings, range from 0 to 144, with higher scores indicating greater social anxiety. The LSAS is a widely used measure of social anxiety and evidences excellent psychometric properties. More specifically, the LSAS evidences excellent test-retest reliability ($r = .83$, $p < .01$), internal consistency ($\alpha = .95$), and convergent and discriminant validity with the LSAS- clinician administered version and Anxiety Sensitivity Index (with measures of 0.85 and 0.20, respectively) among clinical and non-anxious control samples (Baker Heinrichs, Kim, & Hofmann, 2002; Fresco et al., 2001). Internal consistency in the current study was consistent with previous research ($\alpha = .94$.)

**Cognitive appraisals of risky events questionnaire. (*CARE;* Fromme, Katz, & Rivers, 1997*).* The Cognitive Appraisals of Risky Events Questionnaire (CARE) was used to assess participants' risk-taking behavior in the previous six months for six different risky behaviors (i.e., risky sexual behavior, heavy drinking, illicit drug use, aggressive and illegal behaviors, irresponsible academic/work behaviors, and high risk sports). The CARE also has questions pertaining to expected benefits, expected risks, and expected involvement in risky behavior; however, for the purposes of this study, only the past frequency scale was used to determine approach or avoidance strategies. The past frequency portion of the questionnaire contains 30 items. Participants are asked open-ended questions to indicate how many times they have participated in each risky behavior during the past six months, with a higher number indicating increased risk-taking and approach behavior. Responses for each item were summed to create a total summary score. Normative data for CARE have not been published; nor have data on the reliability or validity of the past frequency score.[1]

Decision problems. Participants were presented with variations of 6 word problems modeled after those of Kahneman and Tversky (1979), Ermer et al. (2008), and Hill and Buss (2010). More specifically, the items required participants to choose between two options in which they have the possibility of monetary gain. Problems were presented in balanced frames, in that options were presented using both positive and negative frames (i.e., probability of winning and probability of not winning) (Ermer et al., 2008). Participants in the private condition were given social comparison information about their peers (e.g., co-workers, neighbors) that did not stipulate that his or her

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[1] Efforts were made to contact the authors of the CARE but were unsuccessful.

decision will be made public. In contrast, participants in the public condition were

provided with social comparison information and asked to make a public decision in that

their peers would know the outcome of their decision. The control group received the

same questions without any social information provided. For example:

Participants in the public condition were presented with:

> You are allowed to choose one of the following schemes for your new job's
> salary**. Your boss will present you as a new employee and announce your
> starting salary at the next department meeting**. Which of the following
> incomes would you most prefer?
>
> A. You have a:
>   o 66% chance of getting paid $2,400 a month
>   o 33% chance of getting paid $2,500 a month
>   o 1% chance of getting paid $1,000 a month
> Your co-workers get paid:
>   o $1,000 a month with certainty
>
> B. You get paid:
>   o $2,400 a month with certainty
> Your co-workers get paid:
>   o $3,000 a month with certainty

Participants in the private condition were presented with:

> You are allowed to choose one of the following schemes for your new job's
> salary. Which of the following incomes would you most prefer?
> A. You have a:
>   o 66% chance of getting paid $2,400 a month
>   o 33% chance of getting paid $2,500 a month
>   o 1% chance of getting paid $1,000 a month
>
> Your co-workers get paid:
>   o $1,000 a month with certainty
>
> B. You get paid:
>   o $2,400 a month with certainty
>
> Your co-workers get paid:
>   o $3,000 a month with certainty

Risk associated with each option is determined mathematically. For instance, choosing the option of having a 50% chance of winning a $3000 shopping spree is objectively riskier than choosing to win a $1000 shopping spree for certain in that the former scenario introduces a 50% chance of winning nothing. A higher frequency of risky decisions indicates increased risk-taking behavior. For a complete list of word problems, please see *Appendix C*.

Results

Preliminary Analyses

Table 1 presents an overview of descriptive statistics for the continuous predictor

variables and the dependent variable analyzed. As can be seen in Table 1, on average

participants evidenced minimal levels of social anxiety consistent with past research from

large undergraduate samples (Russell & Shaw, 2009) and also evidenced adequate

variability (range = 0 - 107). Females also reported significantly more social anxiety than

males (t (425) = -3.4, p < .01). On average, participants reported engaging in

approximately 50 incidences of risky behavior during the past 6 months with a large

amount of variability (range = 0 – 413). Regarding the outcome variable, risk-taking,

overall, participants chose the riskier option 26% of the time, suggesting that overall the

sample was generally risk-averse. Table 2 presents on an overview of descriptive

statistics by condition. Groups did not differ significantly on social anxiety or approach

behavior.

Primary Analyses

A multiple regression analysis was conducted to examine the ability of condition

(i.e., public, private, no social information), approach behavior, and social anxiety to

predict risk-taking. More specifically, condition was dummy coded using two vectors and

risk-taking was regressed on social anxiety, approach behavior, condition, and all

interactions, resulting in the following model.

Risk-taking = b_0 + b_1DummyVector1 + b_2DummyVector2 + b_3 Social
Anxiety + b_4 Approach Behavior + b_5 (DummyVector1 x Social Anxiety)
+ b_6 (DummyVector2 x Social Anxiety) + b_7 (DummyVector1 x Approach
Behavior) + b_8 (DummyVector2 x Approach Behavior) + b_9 (Social

Anxiety x Approach Behavior) + b_{10} (DummyVector1 x Social Anxiety x Approach Behavior) + b_{11} (DummyVector2 x Social Anxiety x Approach Behavior)

All variables met assumptions of normality and were within standard benchmark values of skewness and kurtosis (i.e., 2 and 7, respectively) with the exception of approach behavior. To correct for skewness and establish a more linear relationship with the outcome variable, a log transformation was conducted on approach behavior (Field, 2009; Lynch, 2003). The log transformation was successful in that the log-transformed variable met standard benchmarks and scatter plots indicated a more linear relationship with the dependent variable.

For the overall sample, the regression model significantly predicted risk-taking ($R^2 = .074$, F (11, 410) = 2.99, $p < .01$; See Table 3). Joint tests were conducted to test the combined effects of the dummy coded variable and indicated that there was a significant overall main effect for condition ($R^2_\Delta = .056$, F_Δ (2, 410) = 12.44, $p < .01$). More specifically, participants in the public condition engaged in significantly more risk-taking relative to individuals in the private and no social information conditions. In addition, participants in the private condition were significantly more risk-taking than those in the no social information condition (See Figure 1). Condition did not interact with social anxiety ($R^2_\Delta = .007$, F_Δ (2, 410) = 1.44, $p = .238$) or approach behavior (($R^2_\Delta = .006$, F_Δ (2, 410) = 1.34, $p = .261$). Contrary to hypotheses, the interaction between social anxiety, approach behavior, and condition was not significant ($R^2_\Delta = .003$, F_Δ (2, 410) = .628, $p = .534$).

Given that theory suggests males should be particularly affected by this social comparison information when gaining resources, separate multiple regression analyses

were conducted separately for males and females. Contrary to hypotheses, the overall regression model for males was not significant (R^2 = .097, F (11, 123) = 1.20, p = .293; See Table 4). Similarly, there was not an overall main effect for condition (R^2 =.031, F_Δ (2, 123) = 2.14, p = .122). Condition also did not significantly interact with social anxiety (R^2_Δ =.007, F_Δ (2, 123) = .455, p = .636) or approach behavior (R^2_Δ =.022, F_Δ (2, 123) = 1.48, p = .231). Lastly, a significant 3-way interaction between condition x social anxiety x approach behavior was not found (R^2_Δ = .003 F_Δ (2, 123) = .227, p = .797).

Interestingly, analyses for females reflected those for the overall sample such that the overall regression model significantly predicted risk-taking behavior (R^2 = .104, F (11, 275) = 2.89, p < .01; See Table 5). More specifically, a significant overall main effect for condition was found (R^2_Δ = .073, F_Δ (2, 275) = 11.25, p < .01). Female participants in the public condition were significantly more risk-taking than female participants in the private condition and no social information condition (See Table 2). Risk-taking did not significantly differ between the private condition and no social information condition, however (See Figure 2). Similar to results with the overall sample, condition did not interact with social anxiety or approach behavior (R^2_Δ = .008, F_Δ (2, 275) = 1.25, p = .288; R^2_Δ = .006, F_Δ (2, 275) = .973, p = .379). The three way interaction between social anxiety x approach behavior x condition was also not significant (R^2_Δ = .001, F_Δ (2, 275) = .101, p = .904).

Given that three of the six risky word problems were created specifically for this study, analyses were also conducted using only previously published risky word problems; results did not differ.

Chapter Four

Discussion

The current study was designed to investigate potential reasons for the existence of subgroups of social anxious individuals (i.e., risk-taking and risk-averse) by integrating the social anxiety and risky decision-making literatures. Dominance theory suggests that socially anxious individuals should be risk-averse given that they are likely to view themselves as inferior to others (Ermer et al., 2008; Gilbert, 2001). In fact, this is how socially anxious individuals have been traditionally viewed. However, some research suggests that there is a group of socially anxious individuals for whom this description does not fit. These individuals may be more likely to engage in risky social behaviors such as unprotected sex and binge drinking (Kashdan et al., 2006; Kashdan et al., 2009). Dominance theory suggests that these individuals may be willing to take these risks because of the value of the potential rewards, and research suggests that this group does in fact believe that there is potential social gain for engaging in risky behavior (Kashdan et al., 2006). However, although previous research has not attended to the specifics of the social situation, certain social situations (i.e., public situations) more readily allow for the chance of social rank enhancement whereas the social gains in private social situations are less obvious. Therefore, public and private social decisions were expected to bring out differential risk-taking behavior in socially anxious approach oriented versus socially anxious avoidance oriented individuals. More specifically, it was hypothesized that socially anxious individuals would be differentially risk-taking when presented with a public decision rather than a private decision such that the approach-oriented group would be more risk-taking relative to avoidance-oriented group when

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making a public decision due to the activation of and differing responses to potential social evaluation.

Contrary to hypotheses, social anxiety and approach behavior were not found to moderate the relationship between condition and risk-taking. Moreover, social anxiety, regardless of approach-avoidance orientation, had no effect on risk-taking. This suggests it may be that the experimental manipulation of condition may not have been strong enough to provoke different expectations of social rewards or social costs. There is empirical evidence to suggest that risky word problems can successfully manipulate individuals' perceptions about social comparisons (Hill & Buss, 2010), and, in the current study, the private versus public decisions had some effect on risk-taking. However, the current study may call for a relatively stronger manipulation regarding the public versus private social information to activate social anxiety. For instance, socially anxious participants may be more manipulated by the presence or perceived presence of a real evaluation than a hypothetical written description, and past research indicates that perceived social evaluation can be manipulated effectively (Ermer et al., 2008). As this manipulation is particularly important in the current study, a more salient manipulation may be necessary to activate social evaluation concerns among the socially anxious individuals of interest.

Although the main hypotheses were not supported, results from the overall sample and female subsample indicated that social information is a significant predictor of risk-taking behavior. More specifically, individuals reacted differently when making public decisions relative to private decisions such that risk-taking increased when gains were made public. Moreover, individuals in the public and private conditions were both more

risk-taking relative to those who did not receive any social information. These findings are relatively consistent with previous findings in that social information has been found to increase risk-taking for loss and gain scenarios (Ermer et al., 2008; Hill & Buss, 2010). However, previous studies examined the public or private nature of a decision separately, as such, no direct comparisons could be made. The current findings extend this literature suggesting that making a potential social gain public knowledge may be viewed competitively and increases risk-taking behavior relative to making a social gain of a private nature. Given this increased risk-taking when making gains that are public knowledge, it appears that individuals are willing to engage in even more risk-taking when they are able to showcase their increased social status to others. These findings are consistent with evolutionary theory stating that relative fitness is important as well as absolute fitness (Hill & Buss, 2010).

Although the findings for social information effects on risk-taking are consistent with evolutionary theory, the fact that the overall model was able to predict risk-taking for the overall sample and females, but not males deviates from the theoretical assumption that males, in particular, should be effected by social information and social status concerns given their evolutionary tendencies to need resources in order to mate and further their genes. In fact, Ermer et al. (2008) found that males, in particular, are affected by social status concerns consistent with dominance theory. It is therefore, particularly surprising that social anxiety and approach behavior did not moderate the effects of condition on risk-taking behavior for males. The reasons behind this are unclear; however lack of results may be related to the need to use a relatively stronger manipulation as previously discussed or to the relatively small number of males in the

sample. A sufficient amount of power was found for the main effect; however, research indicates that examining multiple moderators within the context of multiple regression may significantly decrease power and increase the probability of type II error (Aguinis, 1995); therefore, more males may be needed to find the hypothesized moderation.

Despite non-significant results for the main analyses of interest, the current study has important implications for how researchers study females' decision-making from an evolutionary perspective. Ermer et al. (2008) found that males, in particular are affected by social status concerns, which is consistent with dominance theory; however, they also found that under some circumstances social status concerns affected women's risk-taking as well. It is unclear, however, whether this was a reliable finding, given that they failed to replicate it in a second study. When considered in conjunction with the positive findings from the current study, however, it appears that further examination of the effect of social information on women's risk-taking behavior is warranted.

Regarding social information and risk-taking from an evolutionary perspective, researchers have largely focused on the role of males with results for females remaining inconclusive. Research from nonhuman primates and human primates consistently demonstrates that access to resources and access to more resources relative to competitors, in particular, is important in obtaining access to mates and producing offspring. Given current changes in social structure for women (e.g., delayed age of marriage and pregnancy, increased number of single mothers) (Ventura, 2009), the results of this study imply that perhaps it is time to revisit the importance of resources for women in their ability to be socially successful. Given the way society has evolved, women may need to be more competitive for resources. While evolutionary theory may

play a role in this, it does not focus on current environmental circumstances that can also shape behavior. Following this argument, it could be hypothesized that access to resources is becoming increasingly important to women given the increased departure from men as sole providers for the family unit.

Although the effect of private versus public social information on risk-taking is notable, the potential limitations of the study are important to consider given the lack of support for three out of four of the hypotheses. The current study may be limited by the use of the CARE to measure approach behavior. More specifically, there is no known normative data for the CARE making it difficult to ascertain a normative range and variance for the data, which subsequently hinders interpretability. Moreover, the study may also be limited by the risky word problems used. The risky word problems used in the current study present social situations that vary in regards to the types of social competitors (e.g., strangers, significant others), which may have resulted in increased statistical noise. In addition, although the risky word problems used were modeled after traditional decision-making problems (i.e., Kahneman & Tversky, 1979), expected utility values were not equivalent across all answer choices. Therefore, future research should use more precise risky word problems in regards to the types of social situations, social competitors and expected values presented.

Future research should continue to refine the current methodology (e.g., stronger experimental manipulation, more precise measurement of approach behavior) in an effort to further examine the proposed model. In addition, it may be important to examine the effect of reducing ambiguity among the consequences of the decision (i.e., if you chose the riskier option, your co-worker would be jealous). Alternatively, qualitative data

regarding potential consequences of the decision may also be informative for future research efforts. Subgroups of socially anxious and non-anxious individuals may spontaneously generate very different consequences (e.g., fear of negative evaluation, increased social status, no change in social relationships). Moreover, the current findings suggest that it is important to examine gender differences in risk-taking behavior when presented with social information. Given the lack of significant findings for the main hypothesized effect, however, the examination of alternative theories for risk-taking behavior may also be warranted. More specifically, the theory of planned behavior that examines the relationship between attitudes, beliefs, social norms, and risk-taking behavior may be well suited to examination of risk-taking behavior among socially anxious individuals (Ajzen, 1991). Despite the limitations of the current study, the findings suggest that further examination is needed regarding the influence of social information on decision-making from an evolutionary perspective and can be used to inform future research endeavors.

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Appendix A
Tables

Table 1

Descriptive Statistics for Continuous Predictor Variables and Outcome Variables

Variable	Overall Sample		Males		Females	
	M	*SD*	*M*	*SD*	M	*SD*
LSAS	40.23	21.69	35.31	1.74	42.71	1.29
CARE	49.49	58.46	51.72	4.94	48.33	3.47
Risk-taking	1.60	1.38	1.89	1.48	1.46	1.30

Table 2

Descriptive Statistics for Continuous Predictor Variables and Outcome Variable by Condition

Variable	Public		Private		No Social Information	
	M	*SD*	*M*	*SD*	M	*SD*
LSAS	40.43	22.42	40.48	21.86	40.09	21.00
CARE	48.76	62.62	48.60	51.98	51.27	61.24
Risk-taking	2.03	1.36	1.53	1.33	1.23	1.33

Table 3

Primary Multiple Regression Analyses for the Overall Sample

Variable	Overall Sample			
	B	SE B	β	r
Condition				
Public versus Private	-.506	.159	-.177**	.15
Public versus Control	-.816	.166	-.273**	.24
Private versus Control[a]	-.310	.161	-.104*	.09
Social Anxiety	-.007	.006	-.116	.06
Approach Behavior	.071	.207	.028	.02
Social Anxiety x Approach Behavior	-.008	.008	-.081	.052
Condition x Social Anxiety				
Public versus Private x Social Anxiety	.011	.008	.103	.07
Public versus Control x Social Anxiety	.000	.008	-.001	.001
Private versus Control x Social Anxiety[a]	-.011	.008	-.092	.07
Condition x Approach Behavior				
Public versus Private x Approach Behavior	-.342	.294	-.078	.06
Public versus Control x Approach Behavior	.136	.300	.030	.02
Private versus Control x Approach Behavior[a]	.477	.302	.104	.08
Condition x Social Anxiety x Approach Behavior				
Public versus Private x Social Anxiety x Approach Behavior	-.003	.013	-.016	.01
Public versus Control x Social Anxiety x Approach Behavior	.010	.012	.057	.04
Private versus Control x Social Anxiety x Approach Behavior[1]	.014	.014	.076	.05
R^2			.074	

[a]These comparisons were not included in the original regression analysis. Dummy variables were recoded to reflect the comparison.
* $p < .05$. **$p < .01$.

Table 4

Primary Multiple Regression Analyses for Males

Variable	B	SE B	β	r
Condition				
Public versus Private	-.181	.323	-.057	.05
Public versus Control	-.661	.327	-.204	.18
Private versus Control[a]	-.481	.336	-.149	.13
Social Anxiety	.000	.011	.003	.002
Approach Behavior	-.00	.019	-.001	.06
Social Anxiety x Approach Behavior	.000	.019	-.001	.0004
Condition x Social Anxiety				
Public versus Private x Social Anxiety	.007	.017	.048	.04
Public versus Control x Social Anxiety	-.009	.016	-.075	.05
Private versus Control x Social Anxiety[a]	-.016	.017	-.130	.08
Condition x Approach Behavior				
Public versus Private x Approach Behavior	-1.022	.594	-.269	.15
Public versus Control x Approach Behavior	-.648	.645	-.134	.09
Private versus Control x Approach Behavior[a]	.374	.538	.077	.06
Condition x Social Anxiety x Approach Behavior				
Public versus Private x Social Anxiety x Approach Behavior	.002	.026	.012	.008
Public versus Control x Social Anxiety x Approach Behavior	.013	.023	.095	.05
Private versus Control x Social Anxiety x Approach Behavior[1]	.011	.022	.078	.05
R^2		.097		

[a]These comparisons were not included in the original regression analysis. Dummy variables were recoded to reflect the comparison.

* $p < .05$. ** $p < .01$.

Table 5

Primary Multiple Regression Analyses for Females

Variable	B	SE B	β	r
<u>Condition</u>				
Public versus Private	-.693	.187	-.258**	.21
Public versus Control	-.864	.193	.000**	.26
Private versus Control[a]	-.171	.185	-.061	.05
Social Anxiety	-.010	.007	-.171	.09
Approach Behavior	-.028	.243	-.011	.007
Social Anxiety x Approach Behavior	-.009	.009	-.086	-1.02
<u>Condition x Social Anxiety</u>				
Public versus Private x Social Anxiety	.013	.008	.141	.092
Public versus Control x Social Anxiety	.005	.009	.042	.03
Private versus Control x Social Anxiety[a]	-.008	.009	-.070	.06
<u>Condition x Approach Behavior</u>				
Public versus Private x Approach Behavior	.368	.382	.076	.06
Public versus Control x Approach Behavior	.464	.349	.107	.08
Private versus Control x Approach Behavior[a]	.096	.386	.022	.02
<u>Condition x Social Anxiety x Approach Behavior</u>				
Public versus Private x Social Anxiety x Approach Behavior	.005	.016	-.020	.02
Public versus Control x Social Anxiety x Approach Behavior	-.004	.016	-.017	.01
Private versus Control x Social Anxiety x Approach Behavior[1]	-.009	.019	-.037	.03
R^2			.104	

[a]These comparisons were not included in the original regression analysis. Dummy variables were recoded to reflect the comparison.

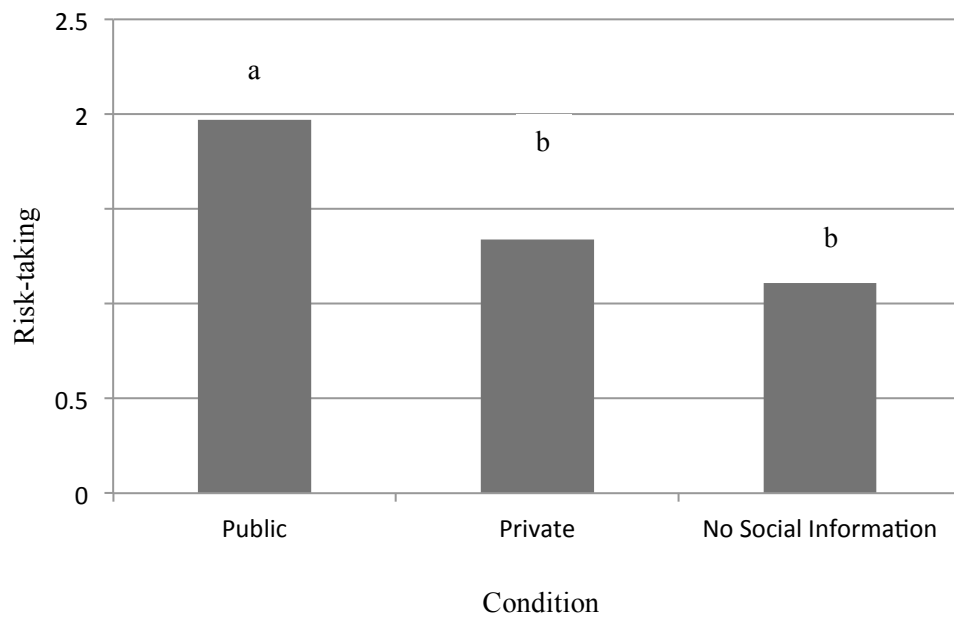* $p < .05$. ** $p < .01$.
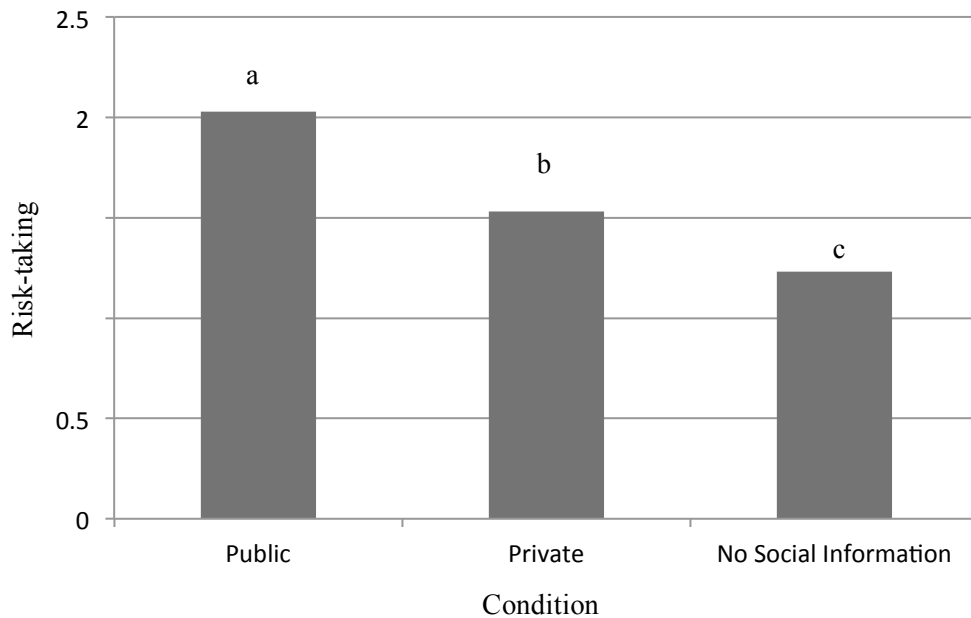
Figure 1. Risk-taking by condition for the overall sample. Individuals in the public condition (a) engaged in significantly more risk-taking than individuals in the private condition (b, $p < .01$) and no social information condition (c, $p < .01$). Individuals in the private condition (b) were significantly more risk-taking than individuals in the no social information condition (c, $p < .05$).

Figure 2. Risk-taking by condition for females. Individuals in the public condition (a) were significantly more risk-taking than individuals in the private (b, $p < .01$) and no social information conditions (b, $p < .01$); however, individuals in the private and no social information conditions did not differ significantly in risk-taking (b, $p > .05$).

Appendix C

Risky World Problems

In the questions below, there are two states of the world, State A and State B. You are asked to select the letter (A or B) corresponding to the world you would prefer to live in. Treat each question independently from the others (i.e., State A in question 1 is different from State A in questions 2, which is different from State A in questions 3, and so on). There are no "correct" answers, so please be completely honest when choosing which of the two states you would prefer to live in.

Gain Problems- Social Comparison/Private

1. You are allowed to choose one of the following schemes for your new job's salary. Which of the following incomes would you most prefer? (Hill & Buss, 2010).

A. You have a:
- o   66% chance of getting paid $2,400 a month
- o   33% chance of getting paid $2,500 a month
- o   1% chance of getting paid $1,000 a month

Your co-workers get paid:
- o $1,000 a month with certainty

B. You get paid:
- o $2,400 a month with certainty

Your co-workers get paid:
- o $3,000 a month with certainty

2. You and a number of others recently entered into a sweepstakes where prizes were awarded. Choose between the following prizes: (Hill & Buss, 2010).

A. You have a:
- o   50% chance to win a $3,000 shopping spree.
- o   50% chance of not winning any money towards a shopping spree.

Your rivals win nothing.

B. You win a:
- o $1,000 shopping spree with certainty

Your rivals win a $2,000 shopping spree with certainty.

3. Your company has had a relatively good year and decides to give some of its profits to its employees by offering games with monetary rewards. (Ermer et al., 2008)

A. You win:
- o $25 with certainty

Your co-workers win:
- o $50 with certainty

B. You have a:
- o   33% chance of winning $75
- o   67% chance of not winning any money ($0)

Your co-workers win:
- o $50 with certainty

4. Your neighborhood sponsors a home-improvement contest. Which of the following scenarios would you prefer?

A. You have a:
- o   70% chance of winning $3000 for home improvements
- o   30% chance of not winning money for home improvements ($0)

Your neighbors win:
- o $2500 for home improvements with certainty

B. You win:
- o $1500 with certainty

Your neighbors win:
- o $2000 with certainty

5. You and several members of your book club register to win several cars as part of a promotion from a local car dealer. Which of the following scenarios would you prefer?

A. You have a:
- o   40% chance of winning a $200,000 car.
- o   60% chance of not winning a car.

Your rivals win:
- o   a $100,000 car with certainty.

B. You win:

- a $50,000 car with certainty.

Your rivals win:
- a $75,000 car with certainty.

6. You recently found out that an old teacher from high school has passed away and has left you and other students from your class some money in their will. They let you choose between the following ways of dividing up their money. Choose the option that you would most prefer:

A. You have a:
- 33% chance of getting $2,500
- 67% chance of not getting anything ($0)

The rest of your class gets:
- $1500 with certainty

B. You have a:
- 90% chance of getting $2,000
- 10% chance of getting $0

The rest of your class gets:
- $3000 with certainty

Gain Problems- Social Evaluation/Public

1 You are allowed to choose one of the following schemes for your new job's salary. Your boss will present you as a new employee and announce your starting salary at the next department meeting. Which of the following incomes would you most prefer? (Hill & Buss, 2010)
A. You have a:
- o   66% chance of getting paid $2,400 a month
- o   33% chance of getting paid $2,500 a month
- o   1% chance of getting paid $1,000 a month

Your co-workers get paid:
- o $1,000 a month with certainty

B. You get paid:
- o $2,400 a month with certainty

Your co-workers get paid:
- o $3,000 a month with certainty

2. You and a number of others recently entered into a sweepstakes where prizes were awarded. The winner of the sweepstakes will be announced at a celebratory event with the winner's family and friends present. Choose between the following prizes: (Hill & Buss, 2010).
A. You have a:
- o   50% chance to win a $3,000 shopping spree.
- o   50% chance of not winning any money towards a shopping spree.

Your rivals win nothing.

B. You win a:
- o $1,000 shopping spree with certainty

Your rivals win a $2,000 shopping spree with certainty.

3. Your company has had a relatively good year and decides to give some of its profits to its employees by offering games with monetary rewards. Monetary rewards will be announced at the end-of-year party (Ermer et al., 2008)
A. You win:
- o $25 with certainty

Your co-workers win:
- o $50 with certainty

B. You have a:
- o 33% chance of winning $75
- o 67% chance of not winning any money ($0)

Your co-workers win:
- o $50 with certainty

4. Your neighborhood sponsors a home-improvement contest. Contest winners will be announced at the neighborhood block party. Which of the following scenarios would you prefer?

A. You have a:
- o 70% chance of winning $3000 for home improvements
- o 30% chance of not winning money for home improvements ($0)

Your neighbors win:
- o $2500 for home improvements with certainty

B. You win:
- o $1500 with certainty

Your neighbors win:
- o $2000 with certainty

5. You and a number of others register to win cars as part of a promotion from a local car dealer. Winners will be announced at the car dealership's grand opening. Which of the following scenarios would you prefer?
A. You have a:
- o 40% chance of winning a $200,000 car.
- o 60% chance of not winning a car.

Your rivals win:
- o a $100,000 car with certainty.

B. You win:
- o a $50,000 car with certainty.

Your rivals win:
- o a $75,000 car with certainty.

6. You recently found out that an old teacher from high school has passed away and has left you and other students from your class some money in their will. Beneficiaries will be announced at the upcoming reunion. They let you choose

between the following ways of dividing up their money. Choose the option that you would most prefer:

A. You have a:
- o 33% chance of getting $2,500
- o 67% chance of not getting anything ($0)

The rest of your class gets:
- o $1500 with certainty

B. You have a:
- o 90% chance of getting $2,000
- o 10% chance of getting $0

The rest of your class gets:
- o $3000 with certainty

Gain Problems- No Social Information

1 You are allowed to choose one of the following schemes for your new job's salary. Which of the following incomes would you most prefer? (Hill & Buss, 2010)
A. You have a:
- o 66% chance of getting paid $2,400 a month
- o 33% chance of getting paid $2,500 a month
- o 1% chance of getting paid $1,000 a month

B. You get paid:
- o $2,400 a month with certainty

2. You and a number of others recently entered into a sweepstakes where prizes were awarded. Choose between the following prizes: (Hill & Buss, 2010).
A. You have a:
- o 50% chance to win a $3,000 shopping spree.
- o 50% chance of not winning any money towards a shopping spree.

B. You win a:
- o $1,000 shopping spree with certainty

3. Your company has had a relatively good year and decides to give some of its profits to its employees by offering games with monetary rewards. (Ermer et al., 2008)
A. You win:
- o $25 with certainty

B. You have a:
- o 33% chance of winning $75
- o 67% chance of not winning any money ($0)

4. Your neighborhood sponsors a home-improvement contest. Which of the following scenarios would you prefer?

A. You have a:
- o 70% chance of winning $3000 for home improvements
- o 30% chance of not winning money for home improvements ($0)

B. You win:

o $1500 with certainty

5. You and several members of your book club register to win several cars as part of a promotion from a local car dealer. Which of the following scenarios would you prefer?

A. You have a:
- o 40% chance of winning a $200,000 car.
- o 60% chance of not winning a car.

B. You win:
- o a $50,000 car with certainty.

6. You recently found out that an old teacher from high school has passed away and has left you and other students from your class some money in their will. They let you choose between the following ways of dividing up their money. Choose the option that you would most prefer:

A. You have a:
- o 33% chance of getting $2,500
- o 67% chance of not getting anything ($0)

B. You have a:
- o 90% chance of getting $2,000
- o 10% chance of getting $0