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The Role of Risk Avoidance in Anxiety

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Various forms of disinhibitory psychopathology (e.g., substance use disorder) are characterized by a tendency to make overly risky decisions. The current paper reports on data suggesting that, in contrast, anxiety is associated with an exaggerated tendency to engage in risk-avoidant decision making. In a nonclinical sample of university students, trait anxiety was associated with relatively low willingness to take risks, across a range of behavioral contexts. Trait anxiety was also associated with pessimistic risk appraisals (e.g., heightened perceptions of the likelihood and severity of negative outcomes). Furthermore, these associations were apparent while controlling for depression. Additional findings suggest that heightened perceptions of the severity of negative outcomes might mediate the link between trait anxiety and risk avoidance. This research has implications for understanding the role basic risk decision-making processes may play in the nature and treatment of anxiety.

FROM PROFESSIONAL MEETINGS to rides on a public bus, people face potentially risky situations that can elicit anxiety and distress. For example, although engaging in a novel social situation may result in a positive interaction or even a new friendship, such interactions can also result in rejection, embarrassment, and distress. People consistently make choices about whether they will engage in or avoid such situations. Such choices reflect the process of risk decision-making, whereby people make decisions that can result in either positive or negative outcomes.

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Most current perspectives presume that normal functioning is characterized by a balanced level of risk taking (e.g., Lejuez et al., 2002, 2003). At one extreme, exaggerated risk taking (e.g., substance abuse, unsafe sexual behavior) can lead to negative physical, psychological, and interpersonal consequences (e.g., Abikoff & Klein, 1992; Wulfert, Safren, Brown, & Wan, 1999; Wulfert, Wan, & Backus, 1996; see also Campbell, Stout, & Finn, 2004). At the other extreme, exaggerated risk avoidance may be associated with various forms of psychological and interpersonal dysfunction (e.g., Allen & Badcock, 2003; Barlow, 2002).

There are reasons to suspect that basic risk-avoidant decision making may play an important role in anxiety. Although several researchers have noted avoidance of specific threats in anxious individuals (e.g., avoidance of social situations among social phobics; Barlow, 2002; avoidance of disgusting stimuli in those with contamination fears; Tsao & McKay, 2004), the possibility that anxiety involves a more fundamental and pervasive tendency to avoid risks remains relatively unexplored. The current paper reports on a preliminary investigation into the link between risk-avoidant decision making and anxiety.

Anxiety and risk-avoidant decision making

There are strong reasons for hypothesizing a link between anxiety and risk-avoidant decision making. First, several theories imply that emotion plays a critical role in guiding basic risk decision-making processes (Fessler, Pillsworth, & Flamson, 2004; Lerner & Keltner, 2001; Loewenstein, Weber, Hsee, & Welch, 2001). In particular, the experience of anxiety can serve as a salient form of information, signaling the presence of threat in the environment (e.g., Barlow, 2002; Maner, Kenrick, et al., 2005; Schwarz & Clore, 1983, 1996). Anxiety, in turn, may potentiate risk-avoidant decision making as a

means toward avoiding perceived threats. Second, individuals with clinically significant anxiety tend to engage in chronic and pervasive forms of avoidant behavior (e.g., Barlow, 2002), suggesting the presence of a basic decision-making bias. Third, situational anxiety leads people to engage in basic forms of risk avoidance. Anxious individuals, for example, tend to avoid risks in responding to hypothetical risky scenarios and gambling-related tasks (Lerner & Keltner, 2001; Raghunathan & Pham, 1999). Thus, while few studies have directly examined the possibility that anxiety is associated with a pervasive tendency to engage in risk-avoidant decision making, there is indirect evidence to hypothesize this association.

The role of risk appraisals

Clinical studies of anxiety suggest that appraisal processes may play a key role in mediating the hypothesized link between anxiety and risk avoidance. Cognitive theories of anxiety propose that risk-related appraisal processes play an important role in the production and maintenance of anxiety pathology (McNally, 2001; Rachman, 1988; Trower & Gilbert, 1989). For example, negative expectancies have been directly implicated in both social anxiety disorder and phobic avoidance (e.g., Barlow, 2002; Butler & Mathews, 1983; Sloan & Telch, 2002; Telch, Brouillard, Telch, Agras, & Taylor, 1989). Individuals with social anxiety tend to overestimate the likelihood that social events will be distressing, as well as how intense their distress will be (Foa, Franklin, Perry, & Herbert, 1996; Gilboa-Schechtman, Franklin, & Foa, 2000; Lucock & Salkovskis, 1988). Similar biases have been found in persons with high levels of generalized anxiety, who also tend to overestimate the likelihood and intensity of distress associated with negative experiences (Butler & Mathews, 1987; see also Stöber, 1997). Anxiety may also be associated with a lack of perceived control-that is, the degree to which an individual judges events and consequences to be personally malleable (Chorpita & Barlow, 1998; Chorpita, Brown, & Barlow, 1998; Cloitre, Heimberg, Liebowitz, & Gitow, 1992; Sanderson, Rapee, & Barlow, 1989). Inasmuch as reduced control over an event decreases the probability of a favorable outcome (i.e., avoidance of a feared stimulus; Maier, 1970; Seligman & Maier, 1967), perceptions that an event is uncontrollable can increase apprehensive expectation of undesirable outcomes and, in turn, risk-avoidant behavior (Horswill & McKenna, 1999; Skinner, 1996).

Thus, clinically significant anxiety is associated with several appraisal biases, including heightened perceptions of the likelihood and intensity of possible negative outcomes and reduced perceptions of personal control. Although clinical researchers have documented biased appraisals of symptomatically relevant threats, the possibility that anxiety is associated with more global appraisal biases has received relatively less attention. Indeed, while there are reasons to suppose that basic risk appraisal and decision-making processes may play an important role in guiding the pronounced risk avoidance exhibited by those suffering from clinically significant anxiety, there has been very little direct empirical study of these processes.

The current study

In this paper, previous research on anxiety and risk is extended in three ways. First, data were collected to examine the potential relationships among levels of trait anxiety, negative risk appraisals, and risk decision-making. It was expected that high levels of trait anxiety would be associated with relatively negative appraisals of risk, and with relatively low willingness to engage in risky decision-making across a range of contexts. Second, it was expected that the relationship between anxiety and risk avoidance would be mediated by negative risk appraisals. Third, because risk avoidance may also be associated with depression (Allen & Badcock, 2003), analyses were conducted to rule out the possibility that any link between anxiety and risk-avoidant decision making is attributable simply to the presence of depressive symptoms in people with anxiety. That is, we examined whether any observed links between anxiety and risk avoidance were specific to anxiety or simply concomitant to the experience of depression.

Method

PARTICIPANTS

One hundred seventy-one undergraduate psychology students (59 men, 107 women, 5 failed to indicate gender) participated in exchange for partial course credit. Participants' average age was 18.8 years (*SD* = 1.1; range = 18–23 years). The sample was predominantly White (85%), with 6% African-American, 3% Asian-American, and 5% "other" ethnicities.

MEASURES

Trait anxiety. Trait anxiety was assessed with the trait anxiety portion of the State Trait Personality Inventory (STPI; Spielberger et al., 1979). This scale is comprised of 10 items selected from the 20-item STAI Parent Scale and is highly correlated with other commonly used measures of anxiety (the

correlation between the STPI Anxiety Scale and the STAI is approximately .95; Spielberger et al., 1979). The scale includes negatively worded items (e.g., "I worry too much over things that don't really matter") and positively worded items (e.g., "I feel secure"; reverse-scored). Responses were recorded using a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*), such that higher scores indicated higher degrees of anxiety. Scores were calculated by averaging responses to all items. Anxiety scores in the current sample were comparable with those typically found in a college sample (Spielberger et al., 1979). The Trait Anxiety Scale exhibited good reliability in the current sample (α = .84).

Trait depression. Trait depression was assessed with the trait depression portion of the STPI (Spielberger et al., 1979). This scale was constructed by adapting cognitive-affective items from the Beck Depression Inventory (Beck et al., 1996), Zung Depression Scale (Zung, 1965), Multiple Affect Adjective Checklist (Zuckerman & Lubin, 1985), and Center for Epidemiological Studies Depression Scale (Radloff, 1977). The STPI depression scale correlates highly with each of these parent scales (*r*s range from .76 to .85; Spielberger, Ritterband, Reheiser, & Brunner, 2003). Items include negatively worded items (e.g., "I feel hopeless") and positively worded items (e.g., "I feel content"; reverse-scored). Responses were recorded using a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*), such that higher scores indicated higher degrees of depression. Scores were calculated by averaging responses to all items. Depression scores in the current sample were comparable with those typically found in a college sample (Spielberger et al., 1979). The scale exhibited good reliability in the current sample (α = .87).

Risk-taking orientation. An abbreviated version of the Risk-Taking Behaviors Scale (RTBS; Weber, Blais, & Betz, 2002) assessed people's willingness to engage in risky decision-making. Responses to this scale predict the frequency with which people engage in risky decision-making in both naturalistic settings (e.g., drug use, risky sexual behavior, aggressive behavior, as well as safety risks such as not wearing a seatbelt or wearing a bicycle helmet) and in the laboratory (e.g., gambling tasks; Weber et al., 2002). Items assess risk-taking across several overlapping domains, including: health/safety (e.g., "Not wearing a seatbelt when being a passenger in the front seat"), recreation (e.g., "Going down a ski run that is a bit beyond your ability"), ethics (e.g., "Stealing an additional TV cable connection off the one you pay for"), social interaction (e.g., "Defending an unpopular issue that you believe in at a social occasion"), and gambling (e.g., "Betting a day's income on the outcome of a sporting event"). Participants responded by indicating the likelihood that they would engage in each behavior, provided the opportunity (1 = *very unlikely*; 5 = *very likely*); higher scores reflect greater risk-taking propensity. Scores were calculated by averaging responses to all items. The RTBS exhibited good reliability in the current sample (α = .87).[1]

Risk appraisals. Based on a review of the literature, (at least) six components of the risk appraisal process serve as critical inputs to decision making (e.g., Edwards, 1992; Lerner & Keltner, 2001; Mellers, 2000). As discussed above, these involve appraisals of the likelihood and intensity of positive and negative outcomes, as well as control over these outcomes. To allow for a full assessment of the relationships between anxiety and risk appraisals, we assessed each of these appraisal types. To obtain these evaluations, we used Weinstein's (1980) Optimism Scale. This scale has been widely used for the purpose of assessing global appraisals of risk (e.g., Lerner & Keltner, 2001; Weinstein, 1980). First, as in previous research (e.g., Weinstein, 1980), participants responded to both positive items (e.g., "I won some money while gambling") and negative items (e.g., "I tripped and broke a bone") by indicating how likely they thought it was that the outcome would happen to them, relative to other same-sexed students at their university (1 = *much less likely*, 5 = *much more likely*). Separate indices were calculated for perceived likelihood of positive and negative outcomes. Second, perceived intensity of positive and negative outcomes was assessed. For each of the positive outcomes, participants indicated how "desirable the emotional, social, or physical consequences" were perceived to be (1 = *not at all desirable*, 5 = *extremely desirable*). For each of the negative items, participants indicated how "severe

[1] A number of items were omitted from the original Weber et al. (2002) scale prior to conducting the current study. Items comprising the "investment risks" subscale (e.g., "Investing 10% of your annual income in a moderate growth mutual fund") were omitted because pretesting indicated that they were not perceived as relevant by college students. A number of other items were omitted because extensive pretesting indicated that they exhibited unacceptably low item-total correlations (below .30). It should be noted that the abbreviated version of the RTBS correlates very highly with the original (average correlation across three samples = .91). Original factor analytic work suggested that this scale might break down into distinct subscales, each associated with a distinct domain of risk-taking behavior (Weber et al., 2002). However, factor analyses with the current data indicated that these subscales failed to emerge. Hence, using these subscale scores as separate dependent variables was not statistically justified. Instead, full scale scores served as the dependent variable.

or disruptive the emotional, social, or physical consequences" were perceived to be (1 = *not at all severe*, 5 = *extremely severe*). Separate indices for perceived intensity of positive and negative outcomes were calculated by averaging responses to items on these two scales. Third, perceptions of personal control were assessed. Participants rated the extent to which they felt they would have control over the occurrence of each of the positive and negative outcomes (1 = *very little*, 5 = *a lot*). Separate indices were calculated for perceptions of personal control over positive and negative outcomes.

Results

Descriptive statistics and bivariate correlations among all variables are provided in Table 1. Further statistical analyses focused on the resilience of the relationships among measures of trait anxiety, trait depression, risk-taking orientation, and risk appraisal tendencies.

RISK-TAKING ORIENTATION

As predicted, trait anxiety was significantly related to risk-taking orientation, such that relatively more anxious individuals were less inclined to engage in risky decision-making. An additional analysis assessed whether this apparent relationship was specific to anxiety, or whether it may have been merely concomitant to the experience of depression. Participants' risk-taking orientation was regressed on trait anxiety, while controlling for trait depression: the magnitude of the link between anxiety and risk-avoidant orientation was only slightly reduced (partial $r = -.16$, $p < .05$). In contrast, while controlling for anxiety, any relationship between depression and risk-avoidant orientation was eliminated (partial $r = .06$, $p = .45$). Results therefore suggest that anxiety is uniquely associated with a risk-avoidant orientation.

RISK APPRAISALS

Trait anxiety was also associated with negative risk appraisals (see Table 1). Individuals with relatively high levels of anxiety viewed negative outcomes as particularly severe and likely to occur (both ps < .01). Notably, the relationship between anxiety and appraisals of positive outcomes was not significant. No significant correlations were observed with perceptions of the likelihood or intensity of positive outcomes or with perceived control over positive or negative outcomes.

As with the link between anxiety and risk-avoidant orientation, additional analyses confirmed that the apparent relationship between anxiety and negative risk appraisals was not merely concomitant to the experience of depression. Controlling for trait depression did not eliminate the relationship between anxiety and negative perceptions of likelihood (partial $r = .18$, $p < .05$) and only slightly reduced the relationship between anxiety and perceived severity (partial $r = .13$, $p < .10$). In contrast, controlling for trait anxiety reduced apparent relationships between trait depression and perceived likelihood (partial $r = .03$, $p = .66$) and perceived severity (partial $r = .02$, $p = .75$).

MEDIATIONAL ANALYSES

Once it had been determined that trait anxiety was reliably linked to both risk avoidance and to negative appraisals of risk, analyses were conducted to examine the possibility that negative risk appraisals might mediate the link between anxiety and risk avoidance. These analyses were conducted within a structural equation modeling framework.

Table 1
Bivariate correlations and descriptive statistics for all study variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1. Trait anxiety	–								
2. Trait depression	.72*	–							
3. Risk-taking score	−.20*	−.14	–						
4. Perceived likelihood (positive outcomes)	−.12	−.09	.19	–					
5. Perceived likelihood (negative outcomes)	.28*	.23	.10	−.16	–				
6. Perceived intensity (positive outcomes)	.15	.09	−.03	.19	−.10	–			
7. Perceived intensity (negative outcomes)	.20*	.16	−.28*	−.12	.00	.31*	–		
8. Perceived control (positive outcomes)	−.14	−.11	.18	.38*	−.13	.25*	−.05	–	
9. Perceived control (negative outcomes)	−.18	−.14	−.01	.31*	−.15	.26*	.05	.58	–
N	170	170	168	171	170	171	171	170	170
M	2.38	2.02	2.71	3.26	2.37	4.10	3.45	2.77	3.59
SD	.66	.57	.57	.45	.46	.62	.54	.52	.57
SEM	.05	.04	.04	.03	.04	.05	.04	.04	.04

Note. An alpha level of .01 was used to assess significance.
* Correlation is significant at the .01 level (2-tailed).

Trait anxiety was included as an exogenous variable. We included as putative mediators, negative risk appraisals that were associated with both trait anxiety and a risk-avoidant orientation. Perceptions of the likelihood and severity of negative outcomes both satisfied these criteria (see Table 1) and were therefore included as endogenous variables. Participants' risk-taking orientation served as the outcome variable. Maximum likelihood estimation was used to assess model fit.

This model provided adequate fit to the data, $\chi^2(2, n = 171) = 4.65$, $p = .09$, CFI = .91, RMSEA = .088, SRMR = .048. Note that a nonsignificant χ^2, CFI greater than .90, RMSEA less than .08, and SRMR less than .05 each indicate a good-fitting model (Hu & Bentler, 1998). Consistent with the earlier correlational analysis, results indicated that trait anxiety predicted both perceived severity and perceived likelihood of negative outcomes (both βs > .22, ps < .01). Moreover, perceptions of severity uniquely predicted participants' risk-avoidant orientation, $\beta = -.26$, $p < .001$. However, perceptions of likelihood did not predict risk-avoidance, $\beta = .02$, *ns*. Removing the path from perceived likelihood to risk-taking orientation did not significantly reduce the fit of the model, $\chi^2\Delta\ (1) = .08$, *ns*, and instead appeared to enhance overall model fit, $\chi^2(3, n = 171) = 7.73$, $p = .19$, CFI = .94, RMSEA = .058, SRMR = .047. Therefore, this path was omitted from the final structural equation model (see Figure 1).

These results suggest that perceptions of severity may mediate the link between trait anxiety and risk avoidance. We therefore followed up with a Sobel test, designed to more directly test this possibility (Baron & Kenny, 1986). The Sobel statistic was calculated as a joint function of (a) the magnitude of the relationship between anxiety and risk appraisal and (b) the magnitude of the relationship between risk appraisal and risk-taking orientation, controlling for variance in trait anxiety. Results suggest that perceptions of the severity of negative outcomes may indeed mediate the link between anxiety and risk avoidance, $z = 2.01$, $p = .04$.

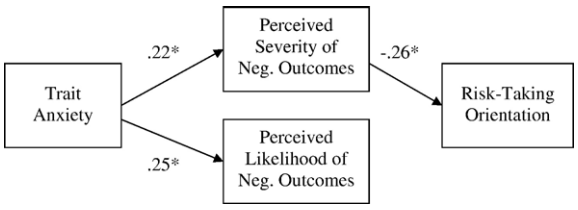

FIGURE 1 A structural equation model depicting the relationships among trait anxiety, negative risk appraisals, and participants' risk-taking orientation. Overall model fit was good. Perceptions of the severity of negative outcomes appeared to mediate the relationship between trait anxiety and risk-avoidance. Standardized path coefficients are provided. * $p < .01$.

Discussion

The current findings suggest that anxiety may be linked to relatively pervasive forms of risk-avoidant decision making. Findings indicate that individuals with relatively high levels of trait anxiety reported appreciably less willingness to engage in risky decision-making across a range of behavioral contexts. The current study is consistent with other recent evidence that various forms of anxiety pathology (e.g., generalized anxiety disorder, panic disorder, social anxiety disorder) are associated with a global orientation toward making risk-avoidant decisions (Maner, Richey, submitted for publication).

Evidence from the current study suggests further that the link between anxiety and risk-avoidant decision making cannot be explained simply by the relationship between anxiety and depression. The observed relationships among anxiety, negative risk appraisals, and risk avoidance remained even after controlling for levels of depression. This is noteworthy because previous studies have suggested that depression may also be related to patterns of risk avoidance (e.g., Allen & Badcock, 2003). The current findings suggest that, instead, controlling for levels of anxiety may eliminate apparent relationships between depression and risk avoidance. Thus, risk avoidance appears to be unique to anxiety and could potentially explain the apparent relationship between risk avoidance and depressive symptoms.

This research could suggest novel implications for understanding the nature, development, and maintenance of anxiety pathology. Although many theories of anxiety presume the presence of cognitive biases at basic stages of information processing, research inspired by such theories has at times fallen short of directly examining these mechanisms and specifying the levels of cognition at which they occur (see McNally, 2001). Such research has tended to focus more on explicit anxiety symptoms, overt patterns of avoidant behavior, and biased appraisals of symptomatically relevant threats, and have left relatively unexplored the more basic-level cognitive mechanisms presumed to underlie these more complex outcomes. The current research provides preliminary evidence that anxiety may be characterized by a basic decision-making bias, one that likely has implications for the maintenance of anxiety.

The current evidence also suggests that heightened perceptions of severity may mediate the relationship between anxiety and risk avoidance.

The current data are therefore consistent with a mediational chain in which anxious people view potential negative consequences as particularly severe and disruptive which, in turn, elicits a tendency to avoid making risky decisions. This is also consistent with previous evidence that individuals with anxiety psychopathology tend to form especially negative expectations about potentially anxiety provoking situations and events (e.g., Gilboa-Schechtman et al., 2000; Telch et al., 1989). The current study extends this literature by providing evidence that such appraisals are relatively pervasive and may mediate patterns of risk-avoidant decision-making across contexts.

Although anxiety was related to heightened perceptions of the likelihood of negative outcomes, perceptions of likelihood did not mediate the link between anxiety and risk avoidance. This could suggest that anxious people generally avoid risky decisions not so much because they overestimate the likelihood that bad will come of their choices, but rather because of the intensity of the anticipated distress and anxiety. In addition, whereas anxiety was related to appraisals of negative outcomes, we found little evidence that it was related to perceptions of positive outcomes. This is consistent with theories of selective cognition, which imply that anxiety might lead people to selectively process those aspects of a decision that are perceived to be most relevant to the avoidance of harm-that is, potentially threatening stimuli (see Maner, Kenrick, et al., 2005). Indeed, some evidence suggests that although fear leads to heightened perceptions of threat, it does not lessen perceptions of potential opportunities (Maner & Gerend, submitted for publication).

What role might risk-avoidant decision-making processes play in the development of anxiety pathology? We suspect that risk-avoidant decision making can be both a cause and a consequence of anxiety. On one hand, negative perceptions of what might happen if a certain risky course of action is taken can elicit anxiety. This is consistent with cognitive theories of anxiety, which suggest that appraisal and expectancy processes play an important role in the production and maintenance of anxiety pathology (e.g., Barlow, 2002; Beck et al., 1985).

Anxiety, in turn, can exert a profound influence on cognition (e.g., Shepperd, Grace, Cole, & Klein, 2005), potentially heightening perceptions of threat. This could suggest the presence of a self-perpetuating cycle in which (a) biased appraisals of risk evoke anxiety; (b) the experience of anxiety perpetuates the formation of negative risk appraisals; (c) negative risk appraisals and anxiety act as inputs into the decision-making process; (d) risk-avoidant decision-making potentiates pervasive patterns of risk-avoidant behavior. The current study provides only modest and indirect evidence for this cycle; further research is clearly needed to more directly describe the possible presence of this cycle, which could potentially have implications for understanding the genesis and maintenance of anxiety pathology.

In addition to these potential implications, the current work may also have implications for the treatment of anxiety. Despite the advent of reasonably efficacious psychological treatments for many of the anxiety disorders, additional challenges remain. One important challenge involves increasing the efficacy of psychosocial treatments, because a substantial percentage of patients fail to respond to these treatments or only experience partial relief. There are a variety of methods that could be used to enhance existing treatment protocols. For example, there has been interest in increasing the "dose" or duration of CBT, although this does not appear to be an effective solution for all anxiety conditions (Newman, 2000). This suggests that new approaches to treatment or new adjuncts to extant treatments will be needed if we wish to help partial or nonresponders. To that end, Westin and Morrison (2001) suggested that supplemental forms of treatment, which target durable diatheses for the disorder, may be needed to improve the sustained efficacy of extant treatments and the percentage of patients who return to relatively asymptomatic functioning subsequent to treatment. One such diathesis worth considering may be global decision-making processes regarding risk.

Indeed, recent studies suggest that intervening directly at the level of basic cognition has clinically significant effects on attenuation of anxiety pathology (Matthews & MacLeod, 2002). The current work suggests that basic biases in risk appraisal and decision making could serve as one worthwhile target for interventions designed to attenuate the presence of anxiety. That is, intervening directly at the level of basic decision making could prove an effective addition to current CBT protocols. For example, one novel implication is that reducing risk-avoidant decision-making biases in apparently nonsymptomatic domains could reduce the presence of basic risk-avoidance and, in turn, could facilitate reductions in anxiety. Further research is certainly needed to assess these potential treatment implications.

The current study may also be relevant to the assessment of anxiety psychopathology as it suggests the utility of methods designed to examine

global decision-making and appraisal processes. For example, the measures used in this study (e.g., RTBS, Optimism Scale) could serve as useful assessment instruments designed to identify the presence of basic biases in risk-avoidant decision-making in anxiety disorders.

As with any preliminary investigation, the current work should be considered in the context of limitations that also provide avenues for future work. First, the current study did not include a clinical sample. In addition, the sample was primarily college-aged, a period during which risk-taking may be higher than it is later in life (Spear, 2000). Thus, more research is needed to examine the extent to which the results reported here generalize to clinical and more demographically diverse populations. Second, although this report suggests factors that mediate the link between anxiety and risk-avoidant decision-making, the current study fell short of fully exploring all possible mediating processes. One possible mediator not examined in the current study is lack of self-efficacy, which has been shown to be related to both anxious responding (Schmidt, Trakowski, & Staab, 1997; Williams, Kinney, Harap, & Liebmann, 1997) and risk avoidance (Slanger & Rudestam, 1997). Third, although the current studies provided some evidence for relationships between anxiety and risk-avoidant decision-making, this research did not exhaust the possible methods with which to assess risk decision-making processes. Further studies are needed to evaluate the extent to which the current results generalize to other forms of risk taking. Indeed, while the risk avoidance exhibited by people with generally high levels of trait anxiety appears to be fairly pervasive, different forms of anxiety may be associated with distinct and perhaps domain-specific forms of risk-avoidant decision-making (e.g., the link between social anxiety and risk-avoidant decision-making could be particularly pronounced in the domain of social interaction). Future research on basic decision-making biases in anxiety should be sensitive to potential for such domain specificity. Fourth, although the current results suggest the presence of mediation, the correlational nature of these data precludes a definitive test (MacKinnon et al., 2002). Fifth, although the current findings suggest that risk-avoidance is characteristic of anxiety rather than depression, further research is needed to clarify more directly the link between risk avoidance and anxiety versus depression. Sixth, the magnitude of the relationships between anxiety and risk-related processes observed in the current study were generally small. It therefore remains for future studies to evaluate the extent to which these processes have truly substantive clinical implications.

Finally, risk-avoidant decision-making needs to be evaluated in relation to other risk factors that are potentially relevant to anxiety pathology. Intolerance to uncertainty, for example, describes processes relevant to GAD and OCD wherein people perceive ambiguous situations as threatening and, consequently, uncertainty is a source of fear or discomfort that contributes to the development of generalized anxiety and worry (Dugas, Gagnon, Ladouceur, & Freeston, 1998). Discomfort intolerance, defined as an individual difference in the capacity to tolerate unpleasant bodily sensations, is a construct recently posited as a risk factor for panic and anxiety pathology (Schmidt, Richey, & Fitzpatrick, 2006). According to conceptual models of anxiety, both intolerance of uncertainty and discomfort intolerance may contribute to the acquisition of worry and threat-related appraisals. Presumably, these cognitive risk factors could contribute to or interact with basic risk-avoidant decision-making to potentiate the development of anxiety pathology.

Beyond its application to anxiety, this research suggests potential benefits of applying basic behavioral theories of risk perception and decision making to psychopathology more generally. These theories explain how underlying cognitive and emotional experiences ultimately translate into choice and action. This translation may be central to a wide variety of psychological disorders. Indeed, biases in risk decision-making have been implicated-though not extensively studied-in many forms psychopathology, including major depressive disorder, panic disorder, specific phobias, and antisocial personality disorder. Further research might therefore profit from applying basic models of decision making toward better understanding the nature and treatment of psychological disorder.

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