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Predicting Domain-Specific Risk Taking With the HEXACO Personality Structure

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ABSTRACT

Although risk taking traditionally has been viewed as a unitary, stable individual difference variable, emerging evidence in behavioral decision-making research suggests that risk taking is a domain-specific construct. Utilizing a psychological risk-return framework that regresses risk taking on the perceived benefits and perceived riskiness of an activity (Weber & Milliman, 1997), this study examined the relations between risk attitude and broad personality dimensions using the new HEXACO personality framework (Lee & Ashton, 2004) across four risk domains. This personality framework, which has been replicated in lexical studies in over 12 natural languages, assess personality over six broad personality dimensions, as opposed to the traditional Five-Factor Model, or ''Big Five.'' Through path analysis, we regressed risk taking in four separate domains on risk perceptions, perceived benefits, and the six HEXACO dimensions. Across all risk domains, we found that the emotionality dimension was associated with heightened risk perceptions and high conscientiousness was associated with less perceived benefits. We also report several unique patterns of domain-specific relations between the HEXACO dimensions and risk attitude. Specifically, openness was associated with risk taking and perceived benefits for social and recreational risks, whereas lower honesty/humility was associated with greater health/safety and ethical risk taking. These findings extend our understanding of how individuals approach risk across a variety of contexts, and further highlight the utility of honesty/humility, a dimension not recovered in Big Five models, in individual differences research.

KEY WORDS risk taking; risk perception; risk-return framework; personality; HEXACO; honesty/humility

Risk taking has traditionally been viewed as an enduring, stable, and domain-invariant construct in both behavioral decision making and personality research (e.g., Eysenck & Eysenck, 1977; Kahneman & Tversky, 1979; Paunonen & Jackson, 1996; Tellegen, 1985). However, recent advances suggest that risk taking is content, or domain, specific (Blais & Weber, 2006; Hanoch, Johnson, & Wilke, 2006; Soane & Chmiel, 2005; Weber, Blais, & Betz, 2002). In light of this knowledge, psychologists would benefit from a deeper

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understanding of the antecedents of domain-specific risks. For instance, it would be helpful to understand whether certain personality characteristics influence risk behaviors invariant of domain, or if certain traits are more predictive of specific domains. Further, it would be valuable to know if dispositional variables influence specific risky behaviors by selectively influencing perceptions of risk, perceived benefits, or a combination of both. These insights could help shape prevention and intervention efforts aimed at individuals in populations that are particularly prone to engage in risky behaviors. The current study directly addresses these issues by examining the associations between personality and risk across a variety of domains, not only in terms of risk behaviors, but also in terms of the perceived risk and perceived benefits associated with these behaviors.

Domain-specificity of Risk

Accumulating evidence suggests that risk taking is a domain-specific construct. Individuals have often been found to show inconsistent response to risks across domains and situations (MacCrimmon & Wehrung, 1986; Schoemaker, 1990). To better understand the dynamic interplay between behavior and dispositional characteristics, researchers have generally conducted research in a few broad domains of risky decision making (see Bromiley & Curley, 1992). For example, early work yielded the Choice Dilemma Scale (Kogan & Wallach, 1964), which assessed the likelihood of taking a risk in 12 different scenarios across a variety of domains. However, this scale was originally intended to measure risk taking as a unidimensional measure of risk propensity, and subsequently, displayed weak convergent validity with other measures of risk taking (Slovic, 1962, 1964). Taking a more psychometric approach toward studying domain-specific risk taking, Weber et al. (2002) developed a domain-specific risk taking scale (DOSPERT) that assessed risk taking across commonly assessed risk domains: social, recreational, investment, gambling, health/safety, and ethical (for a revised, abbreviated version of the DOSPERT, see Blais & Weber, 2006). Using the DOSPERT, Hanoch et al. (2006) found that extreme sports enthusiasts were more likely to take recreational risks (i.e., skydiving, whitewater rafting, etc.) than others, but were not especially prone to take health risks (i.e., smoking, binge drinking, failing to wear seatbelt, etc.) or financial risks (i.e., gambling, speculative investing, etc.). Similarly, smokers were more likely to take health-related risks, but were indistinguishable from non-smokers in their propensity to take risks in other domains. These findings all suggest that risk taking is a complex construct that is manifest as a function of both dispositional and contextual factors.

A psychological risk-return framework

Based on early financial models of risk (e.g., Markowitz, 1959), psychological risk-return models suggest that the propensity to engage in a risky activity can be conceptualized in terms of (a) the perceived risk involved with the activity, (b) the benefits that are expected from engaging in an activity, and (c) an individual's willingness to trade-off risk for reward (Weber, 1997; Weber & Hsee, 1999). Whereas the latter remains relatively constant across domains for individuals, domain-specific differences emerge in how individuals viewed perceived benefits and perceived riskiness of a given activity (Weber et al., 2002). Thus, risk preference will vary between domains if there are differences in the magnitude of perceived risks and/or expected benefits (Mellers, Schwartz, & Weber, 1997; Weber & Milliman, 1997). Research suggests that increases in the perceived riskiness of an activity will be associated with less risk taking, whereas greater perceived benefits should result in a greater propensity to take a risk (e.g., Finucane, Alhakami, Slovic, & Johnson, 2000; Hanoch et al., 2006; Weber et al., 2002). Notably, this pattern may be due in part to the psychological representations of risk perception, as research frequently reports inverse associations between perceived benefits and perceived riskiness of an endeavor (e.g., Alhakami & Slovic, 1994; Finucane et al., 2000; Slovic, Fischhoff, & Lichtenstein, 1986).

The current study examines how underlying dispositional variables may be important predictors of an individual's propensity to perceive risks and benefits, and ultimately risk behaviors. While several studies

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have tested the link between risk taking and personality within a single domain, few studies have been conducted to directly test the role that individual differences in personality play in domain-specific risk taking. In laboratory tasks, different personality traits have been associated with decision-making among healthy individuals, both in children and adults (Lauriola & Levin, 2001; Lauriola, Levin, & Hart, 2007; Levin, Gaeth, Schreiber, & Lauriola, 2002; Levin & Hart, 2003). Within the context of everyday risk taking, Weber et al. (2002) reported that the Thrill and Adventure-seeking subscale of Zuckerman's (1994) Sensation Seeking Scale was most strongly correlated with recreational risks while the Disinhibition subscale was most strongly correlated with ethical risks (e.g., cheating on exams/taxes, having affairs, etc.). This might indicate that individual differences in traits related to antisocial behavior and psychopathy may strongly predict certain risks, whereas other traits may be more associated with risk taking to achieve social or material rewards, such as taking career risks (e.g., moving for a job, switching professions) or social risks (e.g., joining new groups, asserting one's opinions in a group, etc.). Finally, Nicholson, Soane, Fenton-O'Creevy, and Willman (2005) found that specific constellations of personality traits, as measured by the NEO-PI-R (McCrae & Costa, 1992), predict risk taking across domain. Although these findings provide valuable preliminary insights, they do not speak to how broad personality traits are associated with domain-specific risk taking within the context of a psychological risk-return framework.

To investigate these associations, we adopted the HEXACO model of personality structure (Lee & Ashton, 2004), which has been offered as an alternative to ''Big Five'' models of personality. In contrast to five-factor models (i.e., the personality dimensions of neuroticism, extraversion, openness, agreeableness, and conscientiousness) that traditionally have been reported (e.g., McCrae & Costa, 1992; Saucier & Goldberg, 1998), the HEXACO model reflects recent advances in personality psychology that suggest that a six-factor structure emerges in lexical studies of the phenotypic structure of personality. The HEXACO structure has been replicated in at least 12 languages (Ashton et al., 2004; Ashton, Lee, & Goldberg, 2004; Lee, Ashton, & de Vries, 2005; Watsi, Lee, Ashton, & Somer, 2008), and appears to be more widely replicable than the Big Five (Ashton & Lee, 2007). Three of the dimensions, extraversion, openness, and conscientiousness, correspond very closely to dimensions obtained within a Big Five model. However, the three other dimensions in the HEXACO structure (i.e., honesty/humility, emotionality, and agreeableness) bear a more complex association to the Big Five traits of Neuroticism and Agreeableness. The largest difference between the HEXACO and the Big Five, though, is the recovery of a sixth factor, *honesty/humility*, which had not emerged in early English-language studies of personality structure. This trait dimension can be defined by terms such as *sincere, fair, modest, and unassuming*, versus *sly, deceitful, greedy*, and *pretentious* (Lee & Ashton, 2004). A second difference between the HEXACO and Big Five structures is the dimension on which trait anger loads. In the HEXACO structure, anger is a marker of low agreeableness. However, for Big Five models, anger is a facet of neuroticism (McCrae & Costa, 1992). Thus, this dimension is believed to be associated with negative, rather than positive, emotional states. In HEXACO space, emotionality reflects low emotional stability without anger, whereas agreeableness encompasses trait hostility. Also related to the emotionality dimension, the third prominent difference between these two structural models is that the HEXACO emotionality dimension includes components of both physical and psychological harm avoidance (Ashton, Lee, Visser, & Pozzebon, 2008).

The HEXACO model's inclusion of an honesty/humility dimension offers some practical advantages over using a Big Five structure. First, the honesty/humility dimension has been shown to more strongly predict outcomes that may be associated with disinhibited behavior than Big Five dimensions. For instance, Lee, Ashton, and de Vries (2005) demonstrated that the HEXACO model was better able to predict workplace delinquency compared to Big Five models in samples obtained in three different countries. Additionally, recent evidence suggests a positive association between honesty/humility and risky sexual behaviors (Ashton & Lee, 2008; Bourdage, Lee, Ashton, & Perry, 2007). Second, compared to Big Five conceptualizations of agreeableness, the honesty/humility dimension appears to be more strongly associated with traits that comprise the ''Dark Triad'' of personality, namely primary psychopathy, Machiavellianism, and narcissism

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Table 1. Summary of hypothesized associations between risk domain and HEXACO personality dimensions

	Risk domain			
HEXACO dimension	Social	Recreational	Health/safety	Ethical
Honesty/humility	(−)	(−)	(− − −)	(− − −)
Emotionality	(− −)	(− −)	(− −)	(− −)
Extraversion	(+)	(+)		
Agreeableness	(−)		(− −)	(− −)
Conscientiousness	(−)	(−)	(− −)	(−)
Openness	(+ +)	(+ +)		

Note: A (−) sign signifies a predicted negative association between personality and domain, whereas a (+) indicates a predicted positive association. Multiple + or − signs reflect predicted strength of association.

(Ashton, Lee, & Son, 2000; Lee & Ashton, 2005; Paulhus & Williams, 2002). To varying degrees, these traits represent the propensity to engage in self-promoting, deceitful, and aggressive behaviors, with minimal empathy felt towards victims. Psychopathy, in particular, has been associated with impulsivity, committing moral transgressions, poor decision making, and risk taking (e.g., Blair, 2007; Hare, 1985), but a relationship between risk taking and narcissism has also been reported (Campbell, Goodie, & Foster, 2004).

We propose that domain-specific risk propensity is associated with both common and domain-specific influences of underlying dispositional tendencies. Whereas certain personality dimensions may be associated with a general propensity to engage in risky behaviors, others may only be associated with risk behaviors within specific domains. In Table 1, we make several a priori hypotheses regarding how personality is associated with the risk-return framework as a function of domain.

Honesty/humility

Individuals who report low honesty/humility tend not to feel bound by traditional rules and restrictions, which make them more inclined to violate societal conventions, laws, and norms. In many ways, individuals reporting low honesty/humility may be characterized as those who use any advantage that they can get to obtain a reward (e.g., cheating, disobeying the law). Lee, Ogunfowora, and Ashton (2005) found that low honesty/humility was modestly correlated with Paunonen's Risk Taking scale of the Supernumeracy Personality Inventory (SPI), which measures risk taking as ''behaviors involving some element of danger, or chance of loss, in combination with a positive emotional excitement or stimulation'' (Paunonen, 2002, p. 8). However, the SPI Risk Taking scale approaches risk taking as a unitary construct that may serve to attenuate such associations. Accordingly, we predict that low self-reported honesty/humility will be broadly associated with increased risk taking. However, these associations will be strongest for risk taking within the ethical and health/safety domains.

Emotionality

Research suggests that constructs associated with the HEXACO Emotionality dimension, such as neuroticism and trait anxiety, are associated with heightened risk perceptions. Lee, Ogunfowora, et al. (2005) found that HEXACO Emotionality was associated with less risk taking. Further, Peters and Slovic (1996) found that anxiety and fear led to risk-averse judgments of perceived risk. Moreover, Butler and Matthews (1987) found evidence to suggest that anxious individuals possessed a generalized tendency to over-estimate risk. Additionally, Stöber (1997) found that trait anxiety influenced individuals' assessment of subjective probabilities and utilities for both positive and negative events. Gasper and Clore (1998) argued that these specific biases are generated by means of a more general heightened attentional bias.

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Taken together, these findings suggest that emotionality influences risk taking by modulating perceived risk, but not necessarily the potential benefits, of a given activity. We propose that this heightened risk bias will be domain invariant. Evolutionarily speaking, it would make adaptive sense for humans to develop a general harm-avoidance system that monitors the environment for threats. In this sense, emotionality and its associated constructs may be a behavioral manifestation of an underlying Behavioral Inhibition System (BIS) that reacts to environmental uncertainty and potential danger (Gray, 1970; Tellegen, 1985).

Extraversion

It is generally agreed that extraverted individuals are sociable, optimistic, assertive, and energetic (Eysenck & Eysenck, 1977; McCrae & Costa, 1992; Tellegen, 1985). Though some research suggests that extraversion is based on biological systems that facilitate forward locomotion to obtain pleasurable rewards (Depue & Collins, 1999), results have been mixed regarding the link between extraversion and risk taking. Some studies have found positive associations between risk taking and extraversion (e.g., Cook, Young, Taylor, & Bedford, 1998; Terracciano, Löckenhoff, Crum, Beinvenu, & Costa, 2008; Vollrath & Torgersen, 2002); some have found negative associations (e.g., Kendler, Neale, Sullivan, Corey, Gardner, & Prescott, 1999; Vollrath, Knoch, & Cassano, 1999); and still others have found no associations at all (e.g., Lee, Ogunfowora, et al., 2005; Watson & Clark, 1993). Thus, the association between extraversion and risk taking within the risk-return framework remains somewhat of an open research question. However, if we consider that social and recreational risks (as opposed to health/safety and ethical risks) may entail socially acceptable means to obtain the benefits associated with these activities, we might expect that extraversion should be positively associated with perceived benefits of activities within the former two domains.

Agreeableness (vs. anger)

The agreeableness dimension is defined by one's tendency to cooperate and get along with others. Agreeable people are patient, tolerant, cooperative, and forgiving, while individuals low in agreeableness are generally ill-tempered, harsh in their criticisms of others, stubborn, and quarrelsome. Research has suggested that low self-reported agreeableness, as measured by Big Five models, has been found to be associated with greater risk taking in a variety of domains, such as marijuana use (Terracciano et al., 2008), health risks (e.g., Vollrath et al., 1999), delinquency (e.g., Heaven, 1996; van Dam, Janssens, & De Bruyn, 2005), and sexual risk taking (e.g., Miller, Lynam, Zimmerman, Logan, Leukefeld, & Clayton, 2004; Schmitt, 2004; Trobst, Wiggins, Costa, Herbst, McCrae, & Masters, 2000). In contrast, measures of agreeableness in HEXACO space have yielded only modest associations (Lee, Ashton, et al., 2005). This is not surprising due to the fact that agreeableness, measured by Big Five models – especially the NEO-PI-R, includes part of the variance accounted for in honesty/humility (Ashton & Lee, 2008). Thus, Big Five agreeableness tends to show moderately strong correlations with the criteria that are strongly predicted by honesty/humility. As such, we predict that disagreeable people, as compared to more agreeable people, would be more apt to engage in risky behaviors that involve deviations from cooperative rules and norms of society, such as ethical, health/safety, and social risks, but would be no more likely to take recreational risks. However, we predict that agreeableness will be more weakly associated to risk taking than the honesty/humility dimension in HEXACO space.

Conscientiousness

Conscientiousness represents engagement in task-based activities. Individuals who are conscientious are generally regarded as organized, disciplined, careful, and precise. Therefore, conscientious individuals are more likely to thoughtfully consider the tradeoffs associated with a given risk, whereas individuals who are more reckless (i.e., low conscientiousness) are more prone to engage in risky behaviors. For instance, low

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conscientiousness has been found to be associated with a host of risky health/safety behaviors, including risky sexual behavior (Trobst et al., 2000), smoking (Terracciano & Costa, 2004), and substance abuse (Terracciano et al., 2008). Thus, we predict that conscientiousness will be most strongly associated with risks within the health/safety domain. We also predict that because conscientious individuals are more likely to be more deliberate in their approach to decisions, high conscientiousness will be associated with greater perceived risks and lower perceived benefits. Further, the relation between conscientiousness and risk taking will be partially mediated by these perceptions.

Openness

Individuals who are open to experience are generally considered to be intellectual, creative, unconventional, and innovative, while individuals low in openness tend to be more conventional, less imaginative, and are less inquisitive. This trait represents engagement in tasks that may promote new experiences. Ashton and Lee (2007) posit that individuals who are high in openness will be prone to acquire social and material rewards through means of discovery. Through this charting of unexplored realms, individuals may take risks in order to achieve such experiences. Research linking openness to risk taking, though, has been mixed. While some studies have found openness to be positively associated with risk taking (e.g., Diehm & Armatas, 2000; Lauriola & Levin, 2001; Lee, Ogunfowora, et al., 2005; Markey, Markey, & Tinsley, 2004; Nicholson et al., 2005; Terracciano et al., 2008), other studies have found no relationship (e.g., Gullone & Moore, 2000; Terracciano & Costa, 2004; Trobst et al., 2000). Given the theoretical basis of openness (i.e., discovery), we would predict that individuals who are more open to experiences will be likely to see more benefits in social and recreational risks, and as a result should be more risk taking in this domains. In contrast, these individuals will likely not be especially prone to risks that lack the element of discovery, such as cheating on an exam (ethical) or failing to wear a safety belt (health/safety).

METHODS

Participants

Participants were 233 undergraduate students at a large Midwestern university in the United States. The responses from two subjects were removed from analysis due to significant missing data (over 10% of total responses), leaving a sample, $N = 231$ (159 women). Participants were recruited through the general experimental subject pool for an introductory psychology course; they participated in partial fulfillment of a course research exposure requirement. The mean age for this sample was 19.0 years (range = 18–32).

Procedure

This study was conducted in small-group sessions, with no more than four individuals participating in the study at any time. Participants were asked to complete a battery of self-report questionnaires. The study took approximately1 hour to complete.

Measures

Domain-specific risk taking (DOSPERT-R)

Participants completed the revised version of the domain-specific risk taking scale (Blais & Weber, 2006). The DOSPERT-R was adapted from the original DOSPERT scale (Weber et al., 2002) to assess components of risk taking across four primary domains: social (e.g., Moving to a city far away from your extended

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Table 2. Descriptive statistics and intercorrelations for the DOSPERT-R scales

	M (*SD*)	Social	Recreational	Health/safety	Ethical
Risk taking					
Social	4.67 (.82)	(.56)			
Recreational	4.47 (1.12)	.41**	(.76)		
Health/safety	3.49 (1.11)	.21**	.37**	(.62)	
Ethical	2.29 (.75)	.07	.14*	.48**	(.56)
Risk perceptions					
Social	2.91 (.88)	(.67)			
Recreational	4.44 (.95)	.23**	(.69)		
Health/safety	5.13 (.93)	.26**	.51**	(.68)	
Ethical	4.94 (.90)	.25**	.29**	.56**	(.65)
Perceived benefits					
Social	3.20 (.56)	(.56)			
Recreational	2.85 (.82)	.38**	(.80)		
Health/safety	1.63 (.49)	.03	.22**	(.58)	
Ethical	1.88 (.57)	−.01	.12	.48**	(.66)

Note: $n = 231$. Cronbach's alpha in parentheses.
*$p < .05$; **$p < .01$.

family), recreational (e.g., Taking a skydiving class), health/safety (e.g., Driving a car without wearing a seat belt), and ethical (e.g., Not returning a wallet you found that contains $200).[1]

The instructions for the DOSPERT-R were modified to assess risk taking, risk perceptions, and perceived benefits of engaging in a risky behavior. *Risk taking*, in this study, represents behavioral intentions towards engaging in risk. Participants were asked to respond on a 7-point Likert scale for 1 (Extremely unlikely) to 7 (Extremely likely) how likely they would be to engage in behaviors originating from the four specific risk domains. *Risk perceptions* were also assessed by asking participants how risky they perceived each of these behaviors to be on a 7-point scale, ranging from 1 (Not at all) to 7 (Extremely). Finally, we assessed *perceived benefits* of engaging in a certain behavior (i.e., ''What are the benefits that you would obtain from engaging in X behavior?'') on a 5-point scale, ranging from 1 (No benefits at all) to 5 (Great benefits). Each risk component in each domain consisted of six items. Scores for domain specific risk taking, risk perceptions, and perceived benefits were created by averaging participants' scores on the items in each domain, respectively.

The order of presentation for the perceived risks and benefits were counterbalanced. Due to the similarity of item content, these questionnaires were interspersed within the large packet of self-report questionnaires unrelated to the current study. Table 2 shows the descriptive statistics, intercorrelations, and Cronbach's alphas for the DOSPERT-R scales.

HEXACO-PI

Individual differences in personality variables were assessed using the HEXACO-PI (Lee & Ashton, 2004). The HEXACO-PI consists of 192 items that measure six broad personality dimensions: honesty/humility,

[1]We chose to omit the financial domain and focus on the social, recreational, health/safety, and ethical domains for the present study. First, given the present sample and their general lack of experience in this domain, we felt that analysis may yield unreliable results. For instance, in the investment domain, one item reads ''Investing 10% of your annual income in a moderate growth mutual fund,'' while another reads, ''Investing 10% of your annual income in a new business venture.'' While these domains are clearly important, we feel that the items that assess these domains do not provide an adequate assessment in the present sample.

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Table 3. Descriptive statistics and intercorrelations for HEXACO-PI Scales.

	M	*SD*	1	2	3	4	5	6
1. Honesty/humility	3.31	.50	(.88)					
2. Emotionality	3.22	.49	.19	(.87)				
3. Extraversion	3.75	.46	−.03	.04	(.90)			
4. Agreeableness	3.20	.48	.41**	.03	.25**	(.89)		
5. Conscientiousness	3.30	.53	.23**	.20**	.07	.13*	(.90)	
6. Openness	3.01	.57	−.07	−.17	.03	02	−.15*	(.90)

Note: $n = 231$. Cronbach's alpha in parentheses.
*$p < .05$; **$p < .01$.

emotionality, extraversion, agreeableness, conscientiousness, and openness (e.g., Ashton, Lee, & Goldberg, 2004). This six-factor model has been well-validated both using the HEXACO-PI, as well as using an alternative public-domain scale (IPIP-HEXACO; Ashton, Lee, & Goldberg, 2007). Cronbach's alphas for the six dimensions ranged from .87 to .90 in the current study. Table 3 shows descriptive statistics and intercorrelations for the HEXACO variables.

Data analytic strategy

To test if perceived benefits and perceived risks mediated the effects of the HEXACO dimensions on risk taking, we conducted path analysis models with AMOS 16 for each risk domain with direct and indirect paths. To obtain *p*-values and reliable confidence intervals of the indirect effects, we conducted 2000 bootstraps as previously recommended (Edwards & Lambert, 2007; Shrout & Bolger, 2002).

We started with a full, saturated path model that included all possible relations and reduced it stepwise until we reached a model with only significant effects. Figure 1 shows our starting path model for each of the risk domains. Second, to test if the conditions for mediation formulated by Baron and Kenny (1986) were fulfilled, we conducted several regression analyses and path analyses as recommended by Holmbeck (1997)

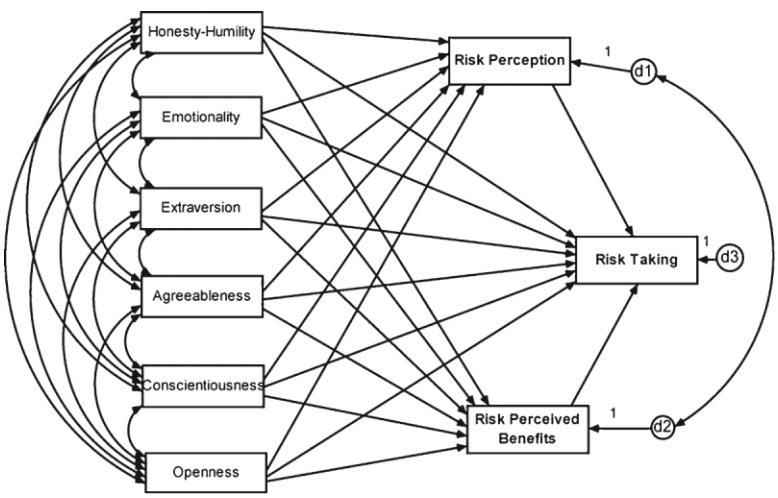

Figure 1. Starting path model for all domains

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who adjusted the Baron and Kenny (1986) approach for path analysis and structural equation modeling. Therefore, we compared the non-mediated multiple regression models, that is, (a) X (personality variables) $\rightarrow M$ (mediators: Risk Perception/Benefits), (b) $M \rightarrow Y$ (Risk Taking), (c) $X \rightarrow Y$, and (d) $X \rightarrow Y$ and $M \rightarrow Y$ (personality variables and mediators treated equally as independent variables) with each other, as suggested by Baron and Kenny to test the conditions for mediation. We also compared the full-mediated path model (i.e., no direct paths from $X \rightarrow Y$; $X \rightarrow M \rightarrow Y$) to the partial mediated path model (i.e., a direct path from $X \rightarrow Y$ in addition to the indirect path $X \rightarrow M \rightarrow Y$ in the same model; our final model) to test for full or partial mediation in each domain.

RESULTS

Associations between risk taking, risk perception, and perceived benefits

According to a psychological risk-return framework, we made three within-domain predictions: (1) risk perceptions would be inversely associated with risk taking, (2) perceived benefits of risky activities would be positively correlated with risk taking, and (3) risk perceptions would be inversely correlated with perceived benefits of engaging in risky activities. The top half of Table 4 shows support for these predictions. For all domains, both risk perceptions and perceived benefits were moderately strong predictors of risk taking. The perceived riskiness of behaviors in a domain was negatively correlated with risk taking within that domain. In contrast, individuals were more likely to engage in the behavior if they perceived more benefits associated with it. Consistent with past research (Finucane et al., 2000; Hanoch et al., 2006; Weber et al., 2002), we found that the more an individual perceived the behavior as risky, the less benefits they thought were associated with these behaviors (see Table 4).

Table 4. Correlations between risk perceptions, perceived benefits, and risk taking

Scale	Social	Recreational	Health/safety	Ethical
Risk taking scales				
Risk perceptions				
Social	−**.21****	−.01	−.06	−.07
Recreational	−.06	−**.30****	−.23**	−.09
Health/safety	−.05	−.15*	−**.46****	−.38**
Ethical	.03	−.09	−.26**	−**.49****
Perceived benefits				
Social	**.32****	.16*	−.01	.02
Recreational	.11	**.57****	.19**	.07
Health/safety	.05	.16*	**.45****	.32**
Ethical	−.01	.15*	.33**	**.56****
Perceived benefit scales				
Risk perceptions				
Social	−.07	.11	.06	−.03
Recreational	.04	−**.21****	−.23**	−.06
Health/safety	.08	−.06	−**.35****	−.29**
Ethical	.11	.05	−.30**	−**.47****

$N = 231$. Within-domain correlations are in bold.
$^{*}p < .05$; $^{**}p < .01$.

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Associations between risk taking and HEXACO-PI scales

Table 5 shows the correlations between DOSPERT-R risk taking, risk perception, and perceived benefit scales and the HEXACO-PI scales. Inspection of this table reveals several important trends. First, we observed that associations between personality and risk taking were largely a function of risk domain. For instance, whereas openness was significantly associated with social and recreational risks, it did not correlate with the health/safety or ethical risk scales. Conversely, honesty/humility and agreeableness were only associated with health/safety and ethical risks. In fact, the honesty/humility dimension showed strongest associations to risk taking behaviors in the health/safety and ethical domains, compared to other personality dimensions. Second, only two dimensions (emotionality and conscientiousness) had broad associations with perceived risk attitudes across the four domains. Conversely, extraversion was not significantly associated with any of the risk domains.

Associations between risk perceptions and HEXACO scales

Consistent with our predictions, emotionality showed the strongest and most consistent correlations across domains. Specifically, individuals reporting high levels of emotionality were more likely to perceive these behaviors to be riskier than those who were low in emotionality. In comparison, extraversion, agreeableness, and openness were not associated with perceived risks in any of the domains.

Similar to that observed with the DOSPERT risk taking scales, the inverse associations between honesty/humility and risk perceptions were localized to the health/safety and ethical risk domains. Individuals low in honesty/humility were more likely to take these types of risks, possibly because they viewed them as being less risky. To a lesser extent, individuals who were low in conscientiousness were somewhat more likely to perceive activities within these domains as being risky.

Table 5. Correlations between HEXACO and DOSPERT-R scales

	DOSPERT-R scales			
Personality dimension	Social	Recreational	Health/safety	Ethical
Risk taking				
Honesty/humility	−.03 (.01)	−.09 (−.03)	**−.44 (−.39)**	**−.57 (−.53)**
Emotionality	**−.16 (−.13)**	**−.35 (−.31)**	**−.27 (−.18)**	**−.24 (−.13)**
Extraversion	.00 (.05)	.10 (**.14**)	.00 (.06)	−.07 (−.03)
Agreeableness	**−.14** (−.12)	−.05 (−.03)	**−.20 (−.18)**	**−.26 (−.24)**
Conscientiousness	**−.16 (−.17)**	**−.19 (−.18)**	**−.34 (−.32)**	**−.32 (−.29)**
Openness to experience	**.37 (.33)**	**.23 (.23)**	.06 (.03)	.10 (.06)
Risk perception				
Honesty/humility	−.01 (−.02)	.11 (.04)	**.33 (.23)**	**.31 (.28)**
Emotionality	**.21 (.24)**	**.30 (.25)**	**.44 (.33)**	**.29 (.25)**
Extraversion	.04 (.03)	−.01 (−.04)	.07 (.02)	.09 (.05)
Agreeableness	.10 (.10)	.06 (.04)	.12 (.09)	.08 (.06)
Conscientiousness	.05 (.05)	.04 (.02)	**.20 (.17)**	**.17 (.15)**
Openness to experience	−.07 (−.06)	.01 (.03)	−.12 (−.06)	−.03 (−.03)
Perceived benefits				
Honesty/humility	.00 (−.04)	−.03 (−.01)	**−.25 (−.19)**	**−.46 (−.39)**
Emotionality	.04 (.00)	**−.14 (−.13)**	**−.16** (−.07)	**−.13** (.03)
Extraversion	.05 (.04)	.11 (.12)	−.10 (−.05)	−.06 (.00)
Agreeableness	.00 (−.01)	.02 (.03)	−.10 (−.08)	**−.16 (−.14)**
Conscientiousness	**−.17 (−.20)**	**−.19 (−.19)**	**−.18 (−.16)**	**−.22 (−.19)**
Openness to experience	**.37 (.37)**	**.27 (.28)**	−.03 (−.06)	−.04 (−.08)

$N = 231$. Correlations in bold are significant at $p < .05$. Figures in parentheses reflect the partial correlation between the HEXACO and DOSPERT-R scales, controlling for participant gender.

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Associations between perceived benefits and HEXACO-PI scales

Similar to risk taking and risk perceptions, the honesty/humility dimension was only associated with perceived benefits within the health/safety and ethical domains. We also found that conscientiousness showed modest correlations with perceived benefits across all domains. Extraversion and agreeableness were not associated with any of the perceived benefit scales.

Interestingly, whereas emotionality was associated with risk perceptions, it was not strongly associated with perceived benefits. On the other hand, openness was positively associated with perceived benefits of social and recreational risks, but not for risk perceptions within these two domains. This result suggests that individuals who are more open to new experiences may engage in these behaviors because they see the potential benefits associated with these behaviors, and not due to attenuated risk perceptions.

Path modeling to test direct and indirect relations between personality and risk taking

Starting with our saturated models, we progressively eliminated the non-significant paths until a model with only significant effects remained. Goodness-of-fit was assessed via several recommended model fit indices (e.g., Hildebrandt, Rudinger, & Schmidt, 1992; Homburg & Baumgartner, 1998; Hu & Bentler, 1999; MacCallum & Austin, 2000; Marsh, Hau, & Wen, 2004). Figure 2 illustrates the best fitting path models for all risk domains. Table 6 shows the fit indices[2] for the final models of each risk domain (see Appendix B for results of all models used in mediation tests).

Consistent with the zero-order correlations in Table 4, we found that risk perceptions and perceived benefits significantly contributed to the variance for all domains. Greater risk perceptions were associated with a lower likelihood to engage in those behaviors. Conversely, perceived benefits were positively associated with risk taking. Further, our results revealed inverse relationships between risk perceptions and perceived benefits.

Effects of HEXACO dimensions on risk-return framework as a function of domain

Social risk domain

In the final path model for the social risk domain (Figure 2, Panel A), 20% of the variance was explained. One can see that from the six personality dimensions, only emotionality and openness significantly contributed to explaining the variance in social risk taking. Openness had a significant direct path to risk taking; however, this relationship was partially mediated via perceived benefits, since the coefficient of the direct path from openness to risk taking decreased from $B = .37$ in the multiple regression model without the mediators to $B = .29$ in the mediated model. Emotionality, on the other hand, had a significant negative direct effect on risk perception, but we did not find evidence for mediation in this domain, as there was no significant direct effect from emotionality to risk taking in the multiple regression model without mediators. Thus, emotionality had only an indirect effect on social risk taking.

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[2]We used several fit indices that are widely used in the literature. The χ^2 fit index tests the null hypothesis that the implied covariance matrix is not different from the observed covariance matrix and its related p-value should therefore be not significant for a good model fit ($>.05$). The relative χ^2 is less dependent on sample size compared to χ^2 itself and it accounts for model complexity by considering the degrees of freedom. RMSEA computes average lack of fit per degree of freedom. By convention, there is good model fit if RMSEA is less than or equal to .05. The CFI evaluates the existing model fit in comparison to a baseline model (null model or independence model). The covariance matrix predicted by the model is compared to the observed covariance matrix, and the null model (covariance matrix of 0's) with the observed covariance matrix, to gauge the percent of lack of fit that is accounted for by going from the null model to the researcher's model. CFI values should be equal to or greater than .90 to accept the final model. For a detailed description of fit indices, see Loehlin (2004).

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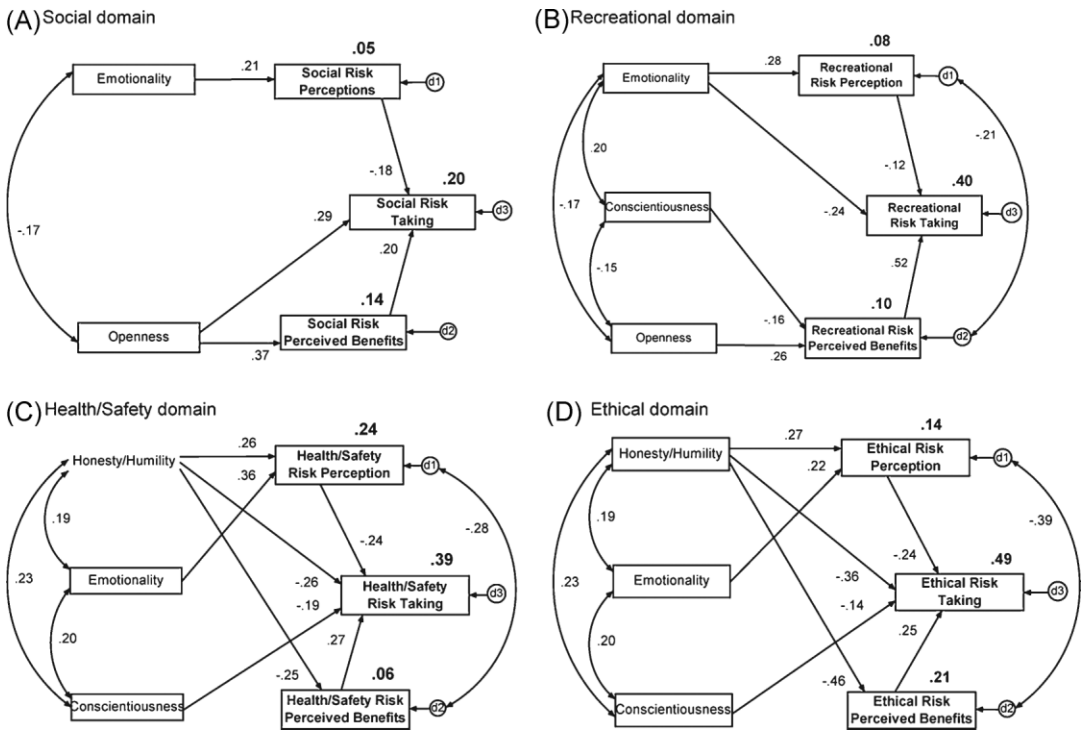

Figure 2. Path analysis results of all risk domains – standardized solutions. The values above one-headed arrows are standardized regression coefficients, while values at double-headed arrows are correlations, and bold numbers above the rectangles reflect the amount of explained variance (similar to R^2 in the regression analysis) of the associated variable. Path diagrams of the final models for the social (Panel A), recreational (Panel B), Health/Safety (Panel C), and Ethical (Panel D) risk domains. Refer to Appendix A for the unstandardized solutions including Beta weights, standard errors and *p*-values

Table 6. Fit measures for final path models

	DOSPERT scales			
Goodness of fit measures	Social	Recreational	Health/safety	Ethical
df	4	5	4	4
χ^2 ($p \geq .05$)	6.37 (.17)	4.17 (.52)	7.22 (.12)	5.75 (.22)
χ^2/df (≤ 2.5)	1.59	.83	1.8	1.44
RMSEA ($\leq .08$) ($p \geq .05$)	.05 (.41)	.00 (.78)	.06 (.34)	.04 (.47)
CFI ($\geq .95$)	.98	1.0	.99	.99

Note: The first column of the table contains the fit measures, along with recommended critical values. χ^2 = Chi-Square goodness of fit test. χ^2/df = relative χ^2.
RMSEA, root mean square error of approximation; CFI, comparative fit index.

Recreational risk domain

Within the recreational domain, the final model (Panel B) accounted for 40% of the variance in risk taking. Of the six personality dimensions, we observed only one direct effect, the relationship between emotionality and risk taking. However, we did observe several significant indirect effects of personality on risk taking: emotionality, conscientiousness and openness were all significant at least at the 5% level (see Table 7). Our mediation analyses revealed that risk perceptions partially mediated the emotionality-risk taking path, as the

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Table 7. Standardized effects (total and indirect), standardized confidence intervals of the indirect effects

	Total effects on			Indirect effects on RT via		Confidence intervals	
	Perceived benefits	Risk perception	Risk taking	Perceived benefits	Risk perception	Lower	Upper
Social risks							
Emotionality	—	.21	−.04	—	−.04**	−.08	−.01
Openness	.37	—	.36	.07***	—	.03	.13
Recreational risks							
Emotionality	—	.28	−.27	—	−.04*	−.07	−.01
Conscientiousness	−.16	—	−.08	−.08*	—	−.14	−.03
Openness	.26	—	.13	.13***	—	.08	.20
Health/safety risks							
Honesty/humility	−.25	.26	−.39	−.13***		−.18	−.08
Emotionality	—	.36	−.09	—	−.09***	−.13	−.05
Conscientiousness	—	—	−.19	—	—	—	—
Ethical risks							
Honesty/humility	−.46	.27	−.54	−.18***		−.24	−.13
Emotionality	—	.22	−.05	—	−.05***	−.09	−.03
Conscientiousness	—	—	−.14	—	—	—	—

Note: Values between two indirect effect columns reflect significant combined mediation via perceived benefits and risk perceptions. $^{*}p < .05$; $^{**}p < .01$; $^{***}p < .001$.

direct effect of this path decreased compared to the multiple regression model, $B = -.31$ to $B = -.24$. Additionally, the openness-risk taking path that was significant in the multiple regression model without mediators, $B = .18$, was fully mediated via perceived benefits in the final model, $B = .00$. In contrast, conscientiousness also had a significant indirect effect; however, there was no mediation, as we observed no bivariate association between these variables.

Health/safety risk domain

The final path model for the health/safety risk domain explained 39% of the variance in risk taking (see Panel C). Honesty/humility and conscientiousness had significant direct effects on risk taking. Additionally, we observed significant indirect effects. Risk perceptions and perceived benefits partially mediated the relationship between honesty/humility and risk taking ($B = -.36$ in the multiple regression model without the mediators versus $B = -.26$ in the final model). In contrast, the effect of emotionality on risk taking in our final health/safety model was fully mediated through risk perceptions, as the direct effect in the regression model without mediators ($B = -.15$) disappeared in the final model.

Ethical risk domain

The final path model for the ethical risk domain accounted for 49% of the explained variance in risk taking (Panel D). Like the health/safety model, the final model in the ethical risk domain showed only three HEXACO dimensions (honesty/humility, conscientiousness, and emotionality) to influence risk taking. Notably, honesty/humility and conscientiousness showed significant direct effects on risk taking. Inspection of the indirect effects revealed that risk perceptions and perceived benefits mediated the relationship between the honesty/humility and emotionality dimensions and risk taking. First, the relationship between honesty/

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humility and risk taking was partially mediated, as the direct effect on risk taking decreased, but did not disappear, when controlling for risk perception and perceived benefits in a multiple regression model, $B = -.51$ and $B = -.36$, for the non-mediated and mediated model, respectively. In contrast, the effect of emotionality on risk taking was fully mediated through risk perceptions since the direct effect on risk taking disappeared in the mediated regression model, $B = -.11$ to $B = 0$.

DISCUSSION

The current study investigated whether the personality correlates of risk taking were invariant across several important domains. Broadly, our findings suggest that while certain personality dimensions have overarching influences on risk behavior, others were more associated with risk in specific domains, and yet others appeared to be unrelated to risk taking (see Table 8 for summary).

Across the four risk domains studied, we found strong support for the psychological risk-return framework (Hanoch et al., 2006; Weber et al., 2002; Weber & Milliman, 1997). We found that in all domains, risk perceptions and perceived benefits uniquely contributed to the variance in domain-specific risk taking. Specifically, a heightened sense of perceived risk was associated with a lower likelihood to engage in a particular activity. Conversely, the greater benefits that an individual felt were associated with a certain risk, the more likely they were to engage in that activity. Moreover, our results also revealed significant inverse associations between risk perception and perceived benefits. That is, the more a person viewed an activity as risky, the less they perceived they would reap benefits from engaging in that activity.

Personality and risk taking: common threads across risk domains

Comparing the path models of the four risk domains, a clear pattern emerges that the ethical and health/safety risk domains share similar patterns of associations with HEXACO variables. Notably, path models for the health/safety and ethical domains share an identical structural pattern. Indeed, in this and past studies using the DOSPERT, the zero-order correlations observed between ethical and health/safety risks were stronger than correlations between any other two risk domain variables (Blais & Weber, 2006; Weber et al., 2002). These findings suggest that ethical and health/safety risks may be influenced by similar behavioral propensities.

Additionally, the recreational and social domains showed some similarities in the relationships between personality traits and the risk variables. One explanation for this similarity is that these behaviors may be associated with experience seeking to achieve personal growth. Individuals who may take these types may be more willing to take chances to experience social and personal rewards. Our finding that openness predicts both types of risks would support this notion.

Table 8. Summary of observed associations between risk domain and HEXACO personality dimensions

	Risk domain			
HEXACO dimension	Social	Recreational	Health/safety	Ethical
Honesty/humility			(− −)	(− − −)
Emotionality	(− −)	(− −)	(− −)	(− −)
Extraversion				
Agreeableness	(−)		(−)	(−)
Conscientiousness	(− −)	(− −)	(− −)	(− −)
Openness	(+ +)	(+ +)		

Note: A (−) sign signifies a negative association between personality and domain, whereas a (+) indicates a positive association. Multiple + or − signs reflect strength of association.

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HEXACO dimensions and the risk-return framework

Honesty/humility

Honesty/humility emerged as an important personality dimension when predicting risk taking in the health/safety and ethical domains. We found that low honesty/humility was strongly associated with high risk taking, lower risk perceptions, and greater perceived benefits for engaging in a risky behavior. Examination of the indirect effects suggests that the link between honesty/humility and ethical and health/safety risks is partially mediated through risk perceptions and perceived benefits.

These data suggest that the honesty/humility dimension shows the strongest associations with behaviors that offer rewards that are generally considered to run contrary to moral and legal conventions, and is unrelated to social or recreational risk-taking behaviors that tend to be considered more socially acceptable. Previous work that suggest that low standing on the honesty/humility dimension may share behavioral characteristics with subclinical manifestations of primary psychopathy (Lee & Ashton, 2005), which has been cited widely as a predictor of maladaptive behaviors (e.g., Blair, Peschardt, Budhani, Mitchell, & Pine, 2006; Hunt, Hopko, Bare, Lejuez, & Robinson, 2005; Levenson, 1990). Conversely, Ashton and Lee (2007) suggested that high levels of honesty/humility might be associated with missed chances for potential gains that result primarily from the exploitation of others. Our findings suggest that such individuals may perceive fewer benefits associated with such activities, which may be, in part, why these individuals chose not to engage in such behaviors.

Emotionality

Across all models, only the emotionality dimension significantly accounted for variance in risk taking for each domain. Precisely, emotionality had a consistent direct effect on risk perception across all risk domains, consistent with past research investigating the link between neuroticism (and related traits) and risk perceptions (e.g., Butler & Matthews, 1987; Gasper & Clore, 1998; Peters & Slovic, 1996; Stöber, 1997). In addition, within the recreational domain, emotionality showed a significant negative direct effect on risk taking, and this effect was partially mediated through risk perceptions. In contrast, for the health/safety and ethical risk domains, the relationship between emotionality and risk taking was fully mediated through risk perceptions. For the social risk domain, we only observed an indirect, non-mediating effect on risk taking, although notably we did observe a modest zero-order correlation between emotionality and risk taking.

These findings can be interpreted within the context of Gray's (1970) Behavioral Inhibition System (BIS), a biological system that is believed to underlie individual differences in negative emotionality. This system is believed to be primarily a reactive system, and generally is not activated. However, such a system offers individuals a ''quick switch'' to orient and react to perceived dangers. Gray argued that the biological system is responsible for sensitivity to punishment cues. The BIS is believed to be related to avoidance and cautious behaviors, keeping organisms out of trouble and away from doing something harmful. Tellegen (1985) suggests that this system also involves a strong attentional component, coupled with vigilant scanning of the environment. As a result, the BIS is said to provide increased sensitivity to novel stimuli. In Gray's (1970) words, the BIS is the ''stop, look, listen'' system of the mind. Because the HEXACO Emotionality dimension includes some aspects of harm-avoidance (Ashton et al., 2008), higher levels of emotionality may reflect a hyper-sensitivity to potential dangers, and as a result, may be associated with greater perceived risks of certain activities. In turn, this may ultimately translate into less risk taking.

Conscientiousness

In HEXACO space, conscientiousness reflects lower-order traits marked by organization, perfectionism, prudence and diligence, which all correspond to engagement in task-related endeavors. Thus, conscientious individuals are generally more careful, more likely to maintain task focus, and as such, may be more likely to consider the risks and benefits of certain activities that may ultimately lead to less engagement in unnecessary

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risks. We observed significant negative correlations with risk taking and perceived benefits for all risk domains, and with risk perceptions for the health/safety and ethical domains, extending previous research (e.g., Chauvin, Hermand, & Mullet, 2007; Lauriola & Levin, 2001; Vollrath & Torgersen, 2002). However, we found that this dimension uniquely accounted for the variance in risk taking in two distinct patterns of impact: in the ethical and health/safety domains conscientiousness had a direct effect on risk taking. In the recreational domain, we found indirect, but non-mediated effects on risk taking. Since conscientiousness and honesty/humility were found to be modestly correlated in the current sample, it is not surprising that we observed such a pattern. We speculate that this pattern may indicate that these two dimensions may tap different parts of a higher-order factor, akin to results observed in other personality structures (Digman, 1997; Markon, Krueger, & Watson, 2005).

Openness

We found that openness influenced risk taking only in the social and recreational risk domains. Individuals high in openness were more likely to see more benefits associated with activities within these domains, and as a result, were more likely to engage in these types of risks. Interestingly, whereas openness was associated with perceived benefits, it was not associated with risk perceptions. These findings reinforce that openness is associated with engaging in activities that offer the potential for discovery, and the rewards, material and social, which are associated with them (Ashton & Lee, 2007; Digman, 1997).

Extraversion and agreeableness

Notably, the best fitting models did not yield significant direct or indirect paths for two HEXACO dimensions: extraversion and agreeableness. In fact, extraversion was the only dimension that did not show any significant associations with any component of the risk-return model (i.e., risk taking, risk perception, or perceived benefits). Indeed, previous studies have been mixed with regards to the association between extraversion and risk taking (e.g., Lee, Ogunfowora, et al., 2005; Vollrath et al., 1999; Watson & Clark, 1993). In one study, for instance, extraversion, especially the NEO Excitement Seeking facet (E5; McCrae & Costa, 1992) was found to broadly predict risk taking (Nicholson et al., 2005). Further, Lee, Ogunfowora, et al. (2005) found that HEXACO Extraversion and IPIP Extraversion (Goldberg, 1992) was significantly correlated with risk taking. Construct breadth may be a partial explanation for the differences in findings. For instance, the content of the social risk domain does not include social risks such as taking on leadership positions or seeking out new friends, which could certainly attenuate the associations between risk taking and extraversion. However, a post-hoc examination of the HEXACO Extraversion facets (Social Self Esteem, Sociability, Social Boldness, & Liveliness) revealed that only HEXACO Social Boldness showed significant, albeit modest, associations with social ($r = .17$, $p < .05$), recreational ($r = .19$, $p < .01$), and health/safety risks, ($r = .18$, $p < .05$).[3] The Social Boldness subscale assesses one's comfort or confidence within a variety of social situations: high scorers are willing to approach strangers and are willing to speak up within group settings: Thus, this facet may represent an intrepid approach to situations/activities that may garner positive social attention, such as recreational risks or even a health risk like heavy drinking at a party. Nonetheless, further research is warranted to better understand in what context extraversion is associated with risk behaviors.

While the best-fitting models do not yield significant paths between agreeableness and the risk-return framework, inspection of the zero-order correlations revealed significant correlations between these variables. However, within each risk domain where honesty/humility was a significant predictor, the zero-order correlations are significantly higher than agreeableness for risk taking, perceived risks, and perceived benefits, supporting our predictions. Moreover, we observed a divergence between honesty/humility and agreeableness for risk

[3]Facet level data available from authors upon request.

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perceptions and risk benefits. Whereas honesty/humility is significantly associated with these two components, agreeableness was only weakly correlated with risk perception and was uncorrelated with perceived benefits.

This study is not without limitations. First, we acknowledge that the DOSPERT-R may not encompass all risks. While some risk taking domains such as the recreational domain are well defined by the DOSPERT-R, other scales, such as the social domain, are more heterogeneous in scope. The DOSPERT was created, however, not to be a comprehensive measure of all risk domains, but instead to illustrate the multi-dimensionality of risk taking as a psychological construct. Further refinements of the DOSPERT scales could help illuminate our understanding of risks that are not well characterized, or only broadly defined, by this measure. Second, the DOSPERT-R was validated in an adult population and was designed to be more broadly applicable to a wider range of individuals. This may have led to lower internal consistency estimates than previously reported in Blais and Weber (2006). However, the fact that we observed largely the same patterns predicted by psychological risk-return models for the risk domains should allay concerns regarding the appropriateness of the measure. Third, although not the scope of the current paper, a direct comparison between the HEXACO and Big Five models would be a fruitful avenue of future research to further explore in greater depth the potential advantages of assessing the HEXACO personality structure versus Big Five models. Finally, though we had a theoretical framework regarding both the phenotypic structure of personality and the psychological model of risk, there are no explicit theories about the interdependencies between these variables. Thus, as with any exploratory results, further research should aim to replicate these analyses with an independent sample to test the built hypotheses. Nevertheless, despite these limitations, we feel the present study illuminates the complex relationship between personality and risk behavior.

In summary, the results support that risk taking is a not a unitary construct, but is in fact dynamic and multidimensional in scope (Blais et al., 2006; Hanoch et al., 2006; Slovic, 1962, 1964; Weber et al., 2002). At the same time, some personality dimensions have broad implications for a general propensity to avoid or approach certain activities that may be deemed risky. Yet, other dimensions may be more focused in their sphere of influence. By understanding the antecedents that may contribute to not only risk taking, but also our perceptions of costs and benefits of certain behaviors, we may be able to identify vulnerability factors and find ways to best develop risk communications for populations who engage in maladaptive behaviors.

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APPENDIX A

Unstandardized regression weights (*B*), standard errors (*SE*), and *p*-values for significant paths.

Risk domains		*B*	*SE*	*p*
Social perceived benefits	Openness	.36	.06	***
Social risk perceptions	Emotionality	.39	.12	***
Social risk taking	Social risk perceptions	−.17	.05	**
Social risk taking	Openness	.41	.09	***
Social risk taking	Social risk perceived benefits	.29	.09	**
Recreational perceived benefits	Openness	.37	.09	***
Recreational perceived benefits	Conscientiousness	−.24	.10	**
Recreational risk perception	Emotionality	.54	.12	***
Recreational risk taking	Recreational risk perception	−.15	.07	*
Recreational risk taking	Emotionality	−.55	.12	***

(*Continues*)

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(Continued)

Risk domains		*B*	*SE*	*p*
Recreational risk taking	Recreational risk perceived benefits	.70	.07	***
Health/safety risk perception	Honesty/humility	.49	.11	***
Health/safety risk perception	Emotionality	.69	.11	***
Health/safety perceived benefits	Honesty/humility	−.24	.06	***
Health/safety risk taking	Conscientiousness	−.39	.11	***
Health/safety risk taking	Honesty/humility	−.57	.12	***
Health/safety risk taking	Health/safety risk perceived benefits	.61	.12	***
Health/safety risk taking	Health/safety risk perception	−.28	.07	***
Ethical perceived benefits	Honesty/humility	−.53	.07	***
Ethical risk perception	Honesty/humility	.49	.11	***
Ethical risk perception	Emotionality	.41	.11	***
Ethical risk taking	Conscientiousness	−.20	.07	**
Ethical risk taking	Honesty/humility	−.53	.08	***
Ethical risk taking	Ethical risk perception	−.20	.04	***
Ethical risk taking	Ethical risk perceived benefits	.33	.08	***

*$p < .05$; **$p < .01$; ***$p < .001$

APPENDIX B

Tested models with fit indices, explained variances (R^2) and χ^2 difference tests.

Domain	Models	df	χ^2	$p_{(\chi^2)}$	χ^2/df	RMSEA	$p_{(\text{RMSEA})}$	CFI	R^2 – risk taking (%)	χ^2 difference test
Social	F_{so}: final model	4	6.373	.173	1.59	.051	.411	.976	20	E–F**
	E_{so}: indirect	6	24.348	.000	4.05	.115	.011	.84	13	—
	D_e: $X \rightarrow Y$ and $M \rightarrow Y$	5	4.349	.500	.87	.000	.759	1.00	21	—
	C_e: $X \rightarrow Y$	1	.071	.789	.07	.000	.841	1.00	16	—
	B_e: $M \rightarrow Y$	1	1.099	.294	1.10	.021	.421	.997	13	—
	A_e: $X \rightarrow M$	3	1.479	.687	.49	.000	.834	1.00	—	—
Recreational	F_{rec}: final model	5	4.175	.525	.84	.000	.776	1.00	40	E–F**
	E_{rec}: indirect	6	23.092	.001	3.84	.111	.016	.908	36	—
	D_e: $X \rightarrow Y$ and $M \rightarrow Y$	0	—	—	—	—	—	—	41	—
	C_e: $X \rightarrow Y$	0	—	—	—	—	—	—	15	—
	B_e: $M \rightarrow Y$	0	—	—	—	—	—	—	36	—
	A_e: $X \rightarrow M$	3	2.164	.539	.72	.000	.734	1.0	—	—
Health/safety	F_{hs}: final model	4	7.219	.125	1.80	.059	.339	.99	39	E–F**
	E_{hs}: indirect	3	29.262	.000	9.75	.195	.000	.875	29	—
	D_e: $X \rightarrow Y$ and $M \rightarrow Y$	0	—	—	—	—	—	—	41	—
	C_e: $X \rightarrow Y$	0	—	—	—	—	—	—	28	—
	B_e: $M \rightarrow Y$	0	—	—	—	—	—	—	30	—
	A_e: $X \rightarrow M$	1	3.117	.077	3.12	.096	.163	.980	—	—
Ethical	F_e: final model	4	5.751	.219	1.44	.044	.470	.994	49	E–F**
	E_e: indirect	3	46.399	.000	15.5	.251	.000	.847	37	—
	D_e: $X \rightarrow Y$ and $M \rightarrow Y$	0	—	—	—	—	—	—	50	—
	C_e: $X \rightarrow Y$	0	—	—	—	—	—	—	38	—
	B_e: $M \rightarrow Y$	0	—	—	—	—	—	—	37	—
	A_e: $X \rightarrow M$	1	.558	.455	.56	.000	.571	1.00	—	—

Note: *X*, independent variables (personality traits); *M*, mediator variables (risk perception and risk benefits); *Y*, dependent variable (risk taking). Models A, B, C and D were calculated with respect to Baron and Kenny's (1986) approach to testing mediation using multiple regression. Additionally, models E (all indirect effects) and F (final model: direct + indirect effects) were compared, consistent with Holmbeck (1997) suggestions for testing mediation in SEM and path models. Besides the χ^2 difference test, we also calculated the significance of the indirect effects for testing mediation via bootstrapping (see Table 7 for the indirect effects).
**$p < .01$.

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