Research Article

Domain Specificity in Experimental Measures and Participant Recruitment

An Application to Risk-Taking Behavior

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ABSTRACT—*We challenge the prevailing notion that risk taking is a stable trait, such that individuals show consistent risk-taking/aversive behavior across domains. We subscribe to an alternative approach that appreciates the domain-specific nature of risk taking. More important, we recognize heterogeneity of risk profiles among experimental samples and introduce a new methodology that takes this heterogeneity into account. Rather than using a convenient subject pool (i.e., university students), as is typically done, we specifically targeted relevant subsamples to provide further validation of the domain-specific nature of risk taking. Our research shows that individuals who exhibit high levels of risk-taking behavior in one content area (e.g., bungee jumpers taking recreational risks) can exhibit moderate levels in other risky domains (e.g., financial). Furthermore, our results indicate that risk taking among targeted subsamples can be explained within a cost-benefit framework and is largely mediated by the perceived benefit of the activity, and to a lesser extent by the perceived risk.*

How should researchers study a psychological construct such as risk-taking propensity? Answering this question might not be as easy as it seems at first glance. First, an individual might exhibit risk-taking tendencies in one domain (e.g., financial) but display more conservative behavior in another (e.g., recreational). Second, different methodological designs—for example, the pool of subjects used or the type of analysis conducted—can yield contradicting results (e.g., Huber, Wider, & Huber, 1997). In the present study, our methodological focus on the ecological validity of the experimental design (e.g., Huber, 1997), domain-specific risk-taking measures, and recruitment of participants in targeted groups yielded results that allow us to challenge the tendency to cluster individuals globally as either risk takers or risk avoiders—thus offering a richer perspective on the psychology of risk taking.

The psychological literature has been largely dominated by the assumption that risk taking is a stable personality trait, and thus individuals can be clustered into groups having risk-taking or risk-aversive styles (e.g., Eysenck & Eysenck, 1977; Lejuez et al., 2002; for a review, see Bromiley & Curley, 1992). This simplistic, though appealing, conceptualization has proven to be inadequate. Researchers have responded by examining subtraits and, therefore, the relation between risk taking and constructs such as self monitoring (Bell, Schoenrock, & O'Neal, 2000) and sensation seeking (Hansen & Breivik, 2001; Himelstein & Thorne, 1985). In recent years, however, a flourishing corpus of ideas and empirical findings has come to challenge the notion that individuals fit nicely into one of the two categories. Zaleskiewicz (2001) suggested his findings "confirmed the adequacy of going beyond a simple distinction between risk seeking and risk aversion" (p. 113). Indeed, the current zeitgeist among decision researchers seems to include a domain-specific approach to risk.

In line with these arguments, Weber and her colleagues have argued that risk taking can be better understood in a risk-return framework, in which risk taking is a function of the perceived risk of the action or choice option, its expected benefits, and the decision maker's attitude toward perceived risk (Weber, 2001;

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Weber & Milliman, 1997). Perceptions of risk have been shown to vary by content domain as a function of such factors as familiarity or framing (Blais & Weber, 2001; Mellers, Schwartz, & Weber, 1997), and Weber and Hsee (1998, 1999) have shown that apparent cultural differences in risk taking are mediated by cultural differences in the perception of risks, rather than true attitudinal differences toward risk. The theoretical risk-return trade-off framework and the large body of supporting empirical results served as Weber, Blais, and Betz's (2002) motivation for developing their *do*main-*spe*cific *r*isk-*t*aking (DOSPERT) scale. This scale allows for an assessment of the relative contributions of individual, group, and domain differences in risk perception, perception of benefits or returns, and attitude toward perceived risk, and the resulting differences in risk taking. In the present study, we used the German version of the DOSPERT scale (DOSPERT-G; see Johnson, Wilke, & Weber, 2004) to provide further support of the notion that risk taking is domain-specific.

Our methodology diverged in an important way from the methods in previous research. A growing literature has questioned the use of aggregate analyses to study individual behaviors, showing how such procedures can provide misleading results (Maddox, 1999). However, individual analyses often sacrifice power or introduce unwanted statistical dependencies. As a compromise of sorts, instead of using a heterogeneous group (i.e., university students) and exploring how their scores on a risk scale cluster into categories, we studied distinct but internally homogeneous groups, most of which were chosen precisely because of their extreme risk-taking behavior. Furthermore, we wanted to include a group that would be less likely to engage in domain-specific risky behaviors. To our knowledge, this is the first study to employ a domain-specific approach to investigate populations specifically for their behavioral tendencies. This is an important methodological advance with respect to the selection of experimental participants (who are typically drawn from the same underlying population).

We recruited individuals who were known to be risk takers (e.g., sky divers, smokers, and gamblers) or risk avoiders (i.e., gym members) in one domain. Although our study might seem to resemble previous research, such as investigations of stockbrokers', bankers', and laypeople's risk attitudes in the financial domain (MacCrimmon & Wehrung, 1990), ours is the only study to look simultaneously at multiple subpopulations and multiple risk-taking domains. That is, not only did we examine domain-specific behaviors, but we employed "domain-specific" participants, who provided another, novel way to test the validity of the DOSPERT scale (Weber et al., 2002).

METHOD

Participants

Participants (N = 146; mean age = 28.1, SD = 8.86) were recruited from the recreational domain (e.g., sky divers, bungee jumpers, hang gliders, scuba divers; n = 39), the health-seeking domain (i.e., gym members; n = 24), the health-risk domain (i.e., smokers; n = 50), the gambling domain (i.e., casino gamblers; n = 19), and the investment domain (i.e., members of stock-trading clubs; n = 14).

Materials and Procedure

The full version of the DOSPERT-G, containing 40 items, was administered using each of three response scales. The DOSPERT-G contains 8 items each for recreational, health, social, and ethical risks and 4 items each for the gambling and investment domains. For the *risk-behavior* scale, participants indicated their likelihood of engaging in each of the risky activities; the *risk-perception* scale assessed how risky participants perceived these activities to be; and the *expected-benefit* scale asked participants to indicate how much benefit they would expect to obtain from engaging in each activity. All judgments were made on 5-point Likert scales, whose endpoints and midpoint were labeled: Higher values indicated greater likelihood of engaging in the behavior, greater perceived risk associated with the activity, and greater expected benefit for engaging in the activity. After initial telephone contact with relevant clubs and institutions, paper questionnaires were given personally to participants. The instructions were general, indicating only that a survey about various risky behaviors and perceptions of those behaviors would be given and that individuals who participated (anonymously) would be paid (€8; about $9 at the time) upon completion of the questionnaire.

RESULTS AND DISCUSSION

The present research had two primary goals, namely, to demonstrate further the utility of a domain-specific approach to studying risk and to illustrate the benefit of focusing analyses on homogeneous subsamples in experimental studies. We hypothesized that, as in previous studies, we would observe domain-specific differences in behaviors and perceptions of risky activities. Furthermore, we hypothesized that these trends would be best elucidated by clustering our sample a priori into homogeneous subsamples. These hypotheses predicted that within each domain, the target subsample of risk takers (e.g., gamblers for the gambling domain) would show greater propensity for engaging in risky behaviors compared with the other subsamples, but that each subsample would not necessarily exhibit strong risk-seeking tendencies outside its domain. Finally, because gym members are likely to be health-conscious, we hypothesized that they would show a lower degree of risky behavior (compared with the other subsamples) in the health domain.

Mean DOSPERT-G scores for each risk domain (excluding the social and ethical domains) are given in Table 1, separately for each subsample. The table is organized such that domain specificity can be viewed across columns, whereas differences dependent on subsample membership can be viewed across

TABLE 1
Mean Scores on the German DOSPERT Subscales, by Subsample

Subsample	Recreation	Gambling	Investment	Health
	Subscale (risk-taking domain)			
	Behavior subscale			
Males	3.04	1.91	2.69	2.88
Females	2.57	1.65	2.47	2.64
Athletes	3.25[a]	1.54	2.69	2.82
Gamblers	2.66	2.99[a]	2.51	2.57
Investors	2.92	1.70	3.20[a]	2.54
Smokers	2.90	1.74	2.47	3.04[a]
Gym members	2.33	1.56	2.52	2.54[b]
All	2.87	1.82	2.61	2.79
	Risk-perception subscale			
Males	2.97	3.61	2.60	3.22
Females	3.27	3.86	2.73	3.64
Athletes	3.07	3.85	2.70	3.54
Gamblers	2.78	3.12[b]	2.61	2.86
Investors	3.16	4.21	2.61	3.42
Smokers	2.98	3.67	2.44	3.35
Gym members	3.47	3.70	3.04	3.51
All	3.08	3.70	2.65	3.37
	Expected-benefits subscale			
Males	2.75	1.77	2.77	1.97
Females	2.53	1.54	2.74	1.71
Athletes	3.02[a]	1.38	2.73	1.81
Gamblers	2.36	2.54[a]	2.26	1.89
Investors	2.65	1.86	3.27[a]	1.71
Smokers	2.75	1.57	2.94	2.04[a]
Gym members	2.21	1.67	2.52	1.74
All	2.67	1.72	2.68	1.84

Note. $N = 146$. The *n*s for the subsamples were as follows: males, 94; females, 52; athletes, 39; gamblers, 19; investors, 14; smokers, 50; gym members, 24. [a]Value is significantly higher than the mean across the remaining four subsamples (comparison does not include male and female subsamples). [b]Value is significantly lower than the mean across the remaining four subsamples (comparison does not include male and female subsamples).

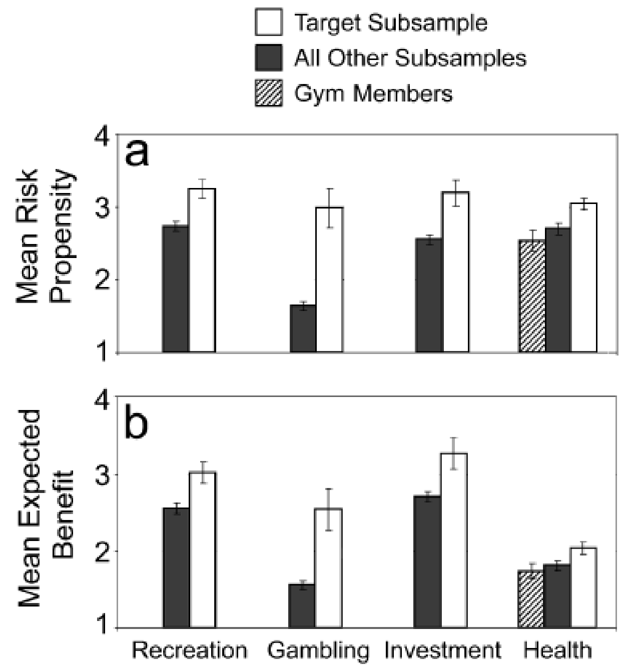

Fig. 1. Mean risk propensity (a) and mean expected benefit (b) by domain and subsample. The target subsample in the recreation domain included bungee jumpers, hang gliders, and scuba divers; the target subsample in the gambling domain was casino gamblers; the target subsample in the investment domain was members of stock-trading clubs; and the target subsample in the health domain was smokers. Additionally, for the health domain, a subsample of non-risk takers (gym members) was included. The members of these subsamples were pooled outside of their target domain (dark bars). Error bars represent standard errors.

rows—variance across both columns and rows indicates the combined dependency on domains and subsamples. We propose that the subsample is a useful level of analysis, especially when subsample clustering can be theoretically, empirically, or intuitively performed prior to analyses (see Lee & Webb, in press, for another method). Here, we report several indicators of this advantage.

First, we examined differences in the mean behavioral risk-taking propensity in each domain. A repeated measures analysis of variance (ANOVA) indicated that there was a main effect of domain, $F(3, 423) = 45.9$, $p_{rep} > .999$, $\eta_p^2 = .25$, as well as an interaction between domain and subsample, $F(12, 423) = 8.74$, $p_{rep} > .999$, $\eta_p^2 = .199$. According to our hypotheses, the interaction would occur because in each domain, the target subsample of risk takers (aside from gym members) would exhibit a greater risk-taking propensity than other subsamples, and the gym members would exhibit lower risk taking in the health domain. This is indeed the pattern evident in Table 1 and Figure 1. Furthermore, in the recreation, gambling, and investment domains, *t* tests showed that the mean score of the associated subsample was significantly higher than the mean across all remaining subsamples (all $ps < .01$). In the health domain, *t* tests indicated that the subsample of smokers had a higher mean score ($p < .01$), and the subsample of gym members a lower mean score ($p = .05$), than the mean across the remaining subsamples. These results support the validity of the DOSPERT scale in revealing tendencies to engage in risky behaviors within specific domains.

Next, we performed similar analyses on the mean expected benefit of risk taking in each domain (Fig. 1b). The results indicated that the differences in behavioral tendency may be in part explained by differences in the perception of expected benefit. A repeated measures ANOVA indicated a main effect of domain on expected benefits, $F(3, 423) = 75.4$, $p_{rep} > .999$, $\eta_p^2 = .35$, and an interaction between domain and subsample, $F(12, 423) = 8.15$, $p_{rep} > .999$, $\eta_p^2 = .19$. Figure 1b shows that within each domain, the target subsample of risk takers expected to receive greater benefits from risky behaviors than the other subsamples did, thus mirroring the differences in behavioral tendencies. Again, *t* tests showed a significant difference between the target subsample and all remaining samples in the recreation, gambling, and investment domains ($ps \leq .01$), and between the smokers and remaining subsamples in the health domain ($p = .01$).

For perceived riskiness, a repeated measures ANOVA again suggested a main effect of domain, $F(3, 423) = 52.98$, $p_{\text{rep}} > .999$, $\eta_p^2 = .27$, and a domain-subsample interaction, $F(12, 423) = 2.11$, $p_{\text{rep}} = .99$, $\eta_p^2 = .06$. However, planned contrasts examining differences between the target subsample of risk takers (excluding gym members) and the remaining subsamples (including gym members) were significant only in the gambling domain, where gamblers had lower perceptions of risk than the other subsamples did. Thus, it seems the benefits of engaging in risky activities are better than the costs in explaining patterned subsample differences in behavioral propensities.

We performed several regression analyses to explore this claim further, as well as to identify the contribution of subsample membership in predicting behavioral propensities. Specifically, for each domain, we predicted behavioral scores first with a linear model including the perceived-risk and expected-benefit scores as predictors, and second with a linear model that included these predictors plus variables reflecting subsample membership.[1] In the first set of models, the standardized coefficients for perceived risk were negative in all domains except investment, and those for expected benefits were all positive, consistent with the intuitive impact of these variables on risk-taking propensity (see also Weber et al., 2002). The magnitude (absolute value) of the coefficients was much larger for expected benefits (.64, .63, .72, and .47 for the recreation, gambling, investment, and health domains, respectively; mean $\beta = .62$) than for perceived risk (−.26, −.13, .03, and −.20 for the four domains, respectively; mean $\beta = -.14$), suggesting that expected benefits, indeed, were more important in determining risk propensity than perceived risk was. Finally, including subsample as a predictor increased the adjusted R^2 value in each domain, by an average of .026.

A final indicator of the utility of focusing on subsamples is the variance that can be explained. Specifically, if we predict an individual's behavioral score by using the overall mean across all subsamples and domains (2.63), we obtain a sum of squared errors (*SSE*) of 473.66. Using the mean of all respondents across all scale items ignores the context (risk domain) and individual differences (subsample membership). If the subsample means from Table 1 are used to predict individual scores in each domain, the explained variance increases, $SSE = 307.55$, $R^2 = .34$, adjusted $R^2 = .24$. Note that gender, a ubiquitous subsample variable in other work, does not produce the same level of improvement, $SSE = 349.54$, $R^2 = .25$, adjusted $R^2 = .21$.

The data of the current study are best summarized in two ways—across subsamples within a domain (differences across rows within each column of Table 1) and across domains within a subsample (differences across columns within each row of Table 1). Although these results indicate main effects of subsample and domain (domain specificity), respectively, the interaction between domain and subsample can be observed in Figure 1 because the highest values for risk propensity and expected benefit (the white bars) were obtained for a different subsample in each domain. Specifically, it was the target subsample of risk takers in each domain (e.g., extreme athletes in the recreation domain) that received the highest scores for these variables. Theoretically, these results support a domain-specific approach to studying risk within a cost–benefit framework. Methodologically, the results demonstrate the advantage of domain-specific measurements, and of using subsamples as a compromise between aggregate and individual levels of analysis. Admittedly, these analyses provide only a first glimpse of the utility of this approach in one area (risk taking); more stringent tests in other kinds of tasks are imperative.

Although employing new methodology can be risky, our study does have several broad and exciting ramifications. It illustrates the utility of investigating homogeneous clusters of risk takers, instead of a single heterogeneous sample of college students, to gain further understanding about the psychological processes that determine and motivate risky behavior, as well as their effects on experimental results. The level of analysis we utilized also avoids the pitfalls associated with aggregating data across participants from different underlying populations and simultaneously avoids the dependencies and low power that plague analyses at the individual level.

The current results suggest that the propensity to take risks is largely mediated by the perceived benefit of the activity, and to a lesser extent by the perceived risk. They indicate that sky divers, for example, view skydiving as far more beneficial (and somewhat less dangerous) than do individuals from other subsamples. Needless to say, our data do not allow one to explain risk-taking behavior solely on the basis of perceived benefit, riskiness, or both, because people might have many other motivations to participate in various activities (e.g., monetary reward, belonging to a group). There also seem to be differences in the perception of risk and expected benefit across domains, as evidenced by the variability in beta coefficients. For example, it seems that perceived risk becomes more important when the stakes include one's life or physical well-being (recreation and health domains) than when they involve money (investment domain).

Other studies using the DOSPERT scale have found that perception of risk is better than expected benefits as a predictor of risky behaviors among university students (Weber et al., 2002). Yet Shapira (1994) demonstrated that another targeted subsample (managers) was more concerned with benefits (monetary gains) than with risk magnitude (probabilities); Shapira's results may be supported by the positive coefficient we obtained for the contribution of expected benefit toward risk

[1]Binary variables were used for contrast-coding membership in each subsample, except for the health subsample, for which a ternary variable represented gym members (−1), smokers (1), and all others (0).

propensity in the investment domain. Furthermore, expected benefit can serve as an important component in explaining some risk-taking behaviors, such as willingness to smoke (Sloan, Smith, & Taylor, 2003) or engage in unprotected sex (Kershaw, Ethier, Niccolai, Lewis, & Ickovics, 2003). Additional work is necessary to determine the relative impact of costs and benefits on risk-taking behavior. The current study has shown how such work can—and should—take a domain-specific approach, targeting the subsamples of interest.

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