

Risk-attitude scale: *Methodology and sample characteristics*

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On behalf of
Defence R&D Canada

PWGCS Contract Number: W7711-027824/001/TOR

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Contract Report
DRDC Toronto CR 2003 - 123
September 2003

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Abstract

This report summarizes the work completed in contract # W771-027824/001/TOR. The purpose of this contract was to conduct two initial studies towards the goal of applying current theory about risk-taking to military contexts and, in particular, to validate an existing domain-specific risk-taking (DOSPERT) scale (Weber, Blais, & Betz, 2002) for use with American and Canadian adult populations. Respondents were contacted by advertisements on web bulletin boards and list servers and agreed to complete seven surveys, including the risk-taking and risk-perception responses of an expanded (48-item) version of the DOSPERT Scale, with some items modified for more general applicability in adult populations. For convergent and discriminant validity evaluation, we also included five other scales, the Sensation-Seeking Scale version V (SSS-V; Zuckerman, 1994), the Risk-Taking scale of the Jackson Personality Inventory (JPI-RT; Jackson, 1994), the Personal Need for Structure Scale and Personal Fear of Invalidity Scale (Thompson, Naccarato, Parker, & Moskowitz, 2001), and the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1993, 1995). Surveys were placed on-line, allowing respondents to complete them via a variety of web browsers. The sample consisted of 401 respondents, of whom 296 indicated residing in the US and 105 in Canada. There were 188 female and 213 male respondents. Highest achieved educational level ranged from less than high school to a Ph.D. degree. Four respondents were less than 18 years old, 90 were between the ages of 18 and 21, 234 between the ages of 22 and 25, 72 between the ages of 36 and 60, and one was older than 61. While the largest group of 135 respondents indicated that they were students, there was a broad representation of 28 other occupations.

Résumé

Ce rapport résume les travaux effectués dans le cadre du contrat n° W771-027824/001/TOR. L'objet de ce projet consistait à mener deux études initiales afin d'appliquer aux contextes militaires la théorie actuelle au sujet de la prise de risque. En particulier, les études ont été conçues pour valider une échelle existante de prise de risque dans des domaines spécifiques (DOSPERT) (Weber, Blais, & Betz, 2002) qui a été conçue pour être utilisée chez les populations adultes tant américaines que canadiennes. Les répondants ont été recrutés au moyen d'une publicité affichée sur des babillards électroniques et des serveurs de listes; ceux-ci ont accepté de répondre à sept enquêtes comportant, entre autres, des questions sur la prise de risque et la perception du risque tirées d'une version élargie (48 questions) de l'échelle DOSPERT (Weber, Blais, Betz, 2002), dont on avait modifié certains éléments afin de les rendre plus généralement applicables aux populations adultes. Pour être en mesure d'évaluer la validité concurrente et discriminante, on a également inclus cinq autres échelles, la version V de l'échelle de recherche de sensation (Sensation – Seeking Scales) (SSS-V; Zuckerman, 1994), l'échelle de prise de risque de l'inventaire de la personnalité de Jackson (JPI-RT; Jackson, 1977), l'échelle du besoin personnel de structure (Personal Need for Structure Scale), l'échelle de la crainte personnelle de l'invalidité (Personal Fear of Invalidity Scale) (Thompson, Naccarato, Parker, & Moskowitz, 2001) et l'échelle d'auto-efficacité générale (General Self-Efficacy Scale) (Schwarzer et Jerusalem, 1993, 1995). Les enquêtes ont été affichées en ligne avec un logiciel appelé PHPESP, lequel permettait aux répondants de répondre au moyen de toute une gamme de navigateurs. L'échantillon était composé de 401 répondants dont 296 ont indiqué vivre aux États-Unis et 105 au Canada. Cent quatre-vingt-huit répondants étaient des femmes et 213, des hommes. Le niveau de scolarité le plus élevé allait d'un niveau inférieur au diplôme secondaire au doctorat. Quatre répondants étaient âgés de moins de 18 ans, 90 avaient entre 18 et 21 ans, 234, entre 22 et 25 ans, 72 entre 26 et 60 ans et un avait plus de 61 ans. Alors que le groupe le plus nombreux (135) était composé d'étudiants, les autres répondants étaient issus d'un large éventail de 28 métiers et professions.

Executive summary

Purpose:

The purpose of this project was to conduct two initial studies towards the goal of applying current theory about risk-taking to military contexts. In particular, the studies were designed to validate an existing Domain-Specific Risk-Taking (DOSPERT) Scale (Weber, Blais, & Betz, 2002) which had been developed and tested using American undergraduate students, for use with American and Canadian adult populations.

Methodology:

Respondents were contacted by advertisements on web bulletin boards and list servers and agreed to complete seven surveys, including the risk-taking and risk-perception responses of an expanded (48-item) version of the Domain-Specific Risk-Taking (DOSPERT) Scale (Weber et al., 2002), with some items modified for more general applicability in adult populations. For convergent and discriminant validity evaluation, we also included five other scales, the Sensation-Seeking Scale version V (SSS-V; Zuckerman, 1994), the Risk-Taking scale of the Jackson Personality Inventory (JPI-RT; Jackson, 1994), the Personal Need for Structure Scale and Personal Fear of Invalidity Scale (Thompson, Naccarato, Parker, & Moskowitz, 2001), and the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1993, 1995). Surveys were placed on-line with a software package called PHPESP that allowed respondents to complete them via a variety of web browsers.

Sample Composition:

The sample consisted of 401 respondents, of whom 296 indicated residing in the US and 105 in Canada. There were 188 female and 213 male respondents. Highest achieved educational level ranged from less than high school (7), to high school diploma (12), vocational training (7), a certificate (3), professional training (12), some college (92), an Associate degree (13), a Bachelor's degree (183), a Master's degree (61), and a Ph.D. (11). Four respondents were less than 18 years old, 90 were between the ages of 18 and 21, 234 between the ages of 22 and 25, 72 between the ages of 36 and 60, and one was older than 61. While the largest group of respondents (135) indicated that they were students, there was a broad representation of occupations, ranging from arts/entertainment/publishing (45), to accounting/finance (26), education/training (23), clerical/administration (22), technology (20), engineering/architecture (11), health care (9), retail (9), legal (8), marketing (8), banking (6), sales (6), government (5), not-for-profit (5), human resources (5), construction (5), and twelve other job categories.

Directions for Future Research:

Future studies should compare domain-specific risk perceptions and risk taking among anglophone versus francophone Canadian respondents. They should also compare the responses provided by members of the general population to those provided by members of the military, controlling for age and gender composition.

Sommaire

Objet :

L'objet de ce projet consistait à mener deux études initiales afin d'appliquer aux contextes militaires la théorie actuelle au sujet de la prise de risque. En particulier, les études ont été conçues pour valider une échelle existante de prise de risque dans des domaines spécifiques (DOSPERT) (Weber, Blais, & Betz, 2002), qui a été établie et mise à l'essai auprès d'étudiants américains de premier cycle, en vue d'être utilisée chez les populations adultes tant américaines que canadiennes.

Méthode :

Les répondants ont été recrutés au moyen d'une publicité affichée sur des babillards électroniques et des serveurs de listes; ceux-ci ont accepté de répondre à sept enquêtes comportant, entre autres, des questions sur la prise de risque et la perception du risque tirées d'une version élargie (48 questions) de l'échelle DOSPERT (Weber, *et al.*, 2002), dont on avait modifié certains éléments afin de les rendre plus généralement applicables aux populations adultes. Pour être en mesure d'évaluer la validité concourante et discriminante, on a également inclus cinq autres échelles, la version V de l'échelle de recherche de sensation (Sensation – Seeking Scales) (SSS-V; Zuckerman, 1994), l'échelle de prise de risque de l'inventaire de la personnalité de Jackson (JPI-RT; Jackson, 1977), l'échelle du besoin personnel de structure (Personal Need for Structure Scale), l'échelle de la crainte personnelle de l'invalidité (Personal Fear of Invalidity Scale) (Thompson, Naccarato, Parker, & Moskowitz, 2001) et l'échelle d'auto-efficacité générale (General Self-Efficacy Scale) (Schwarzer et Jerusalem, 1993, 1995). Les enquêtes ont été affichées en ligne avec un logiciel appelé PHPESP, lequel permettait aux répondants de répondre au moyen de toute une gamme de navigateurs.

Composition de l'échantillon :

L'échantillon était composé de 401 répondants dont 296 ont indiqué vivre aux États-Unis et 105 au Canada. Cent quatre-vingt-huit répondants étaient des femmes et 213, des hommes. Le niveau de scolarité le plus élevé allait d'un niveau inférieur au diplôme secondaire (7), à un diplôme de secondaire (12), une formation pour l'apprentissage d'un métier (7), un certificat (3), une formation professionnelle (12), une formation collégiale partielle (92), un grade d'associé (13), un baccalauréat (183), une maîtrise (61) et un doctorat (11). Quatre répondants étaient âgés de moins de 18 ans, 90 avaient entre 18 et 21 ans, 234, entre 22 et 25 ans, 72 entre 26 et 60 ans et un avait plus de 61 ans. Alors que le groupe le plus nombreux (135) était composé d'étudiants, les autres répondants étaient issus d'un large éventail de métiers et de professions appartenant aux domaines suivants : arts, divertissement et édition (45), comptabilité et finances (26), enseignement et formation (23), travail de bureau et administration (22), technologie (20), génie et architecture (11), soins de santé (9), commerce de détail (9), professions juridiques (8), marketing (8), banques (6), ventes (6), gouvernement (5), organismes sans but lucratif (5), ressources humaines (5), construction (5) et 12 autres catégories professionnelles.

Orientation de la recherche future :

Dans l'avenir, les études devraient comparer les perceptions du risque et la prise de risque dans divers domaines chez les répondants Canadiens anglophones et par rapport aux répondants francophones. Il faudrait toujours comparer les réponses fournies par les membres de la population générale à celles des membres des forces armées, en tenant compte de la composition selon l'âge et le sexe.

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Introduction

Risk Attitude Within an Expected Utility Framework

It is obvious that people differ in the way they resolve work-related or personal decisions that involve risk and uncertainty. Such differences are often described or explained by differences in risk attitude. In the expected utility (EU) framework and its variants, including prospect theory (Kahneman & Tversky, 1979), a person's risk attitude describes the shape of his or her utility function for the outcomes in question (derived from a series of risky choices) and is commonly considered to be a personality trait. For example, anecdotal evidence from the management area assumes that greater risk taking is associated with personal and corporate success, a suggestion that has received some empirical support (MacCrimmon & Wehrung, 1990).

Two problems have marred the notion of risk attitudes in the EU-sense as a personality trait. First, different methods of measuring people's utility have been shown to result in different classifications (Slovic, 1964). Second, even with the same assessment method, individuals have not shown themselves as consistently risk seeking or risk averse across different domains and situations, both in laboratory studies (Schoemaker, 1990) and in managerial contexts. MacCrimmon and Wehrung (1986, 1990) show, for example, that managers have different risk attitudes when making decisions involving personal versus company money or when evaluating financial versus recreational risks. These problems limit the predictive validity of EU-based assessments of risk attitude.

Given the volatility of EU-based assessments, it is not surprising that such measures and scales have not had much success in predicting people's choices or behavior in situations or domains outside of those assessed by the instrument (Bromiley & Curley, 1992). The observed content-specificity of responses suggests that they should not be combined across content domains. The Choice Dilemma Questionnaire by Kogan and Wallach (1964), for example, asks people for probability equivalents in twelve choice dilemmas from different domains of life, which are then combined into a single score that purports to report a person's risk attitude. Despite its obvious problems, the scale is still in use, primarily for lack of better alternatives.

Risk Attitude within a Risk-Return Framework

More recently, some researchers have argued that risk attitude is more naturally conceptualized in the risk-return framework of risky choice used in finance (Sarin & Weber, 1993). In this framework, people's preference for risky options is assumed to reflect a tradeoff between an option's expected return, usually equated to expected value, and its riskiness. Psychological risk-return models treat perceived riskiness as a variable that can differ between individuals and as a function of content and context (Weber, 1997, 1998). This decomposition of preference provides for different ways in which the outcome domain can affect people's choices under risk (Weber & Milliman, 1997). Preferences and thus choices might differ because the decision maker perceives the risks and returns to be of similar magnitude in two domains, but likes risk in one domain (e.g., recreational risks) and dislikes it in the other domain (e.g., financial risks). Alternatively, choices might differ because the

decision maker perceives the risks and benefits to differ in magnitude in the two domains, while attitude towards perceived risk is the same for both domains.

The management literature illustrates the utility of distinguishing between differences in risk perception and attitude towards perceived risk to better understand risky decision-making. Contrary to managerial folklore, the characteristic that differentiates entrepreneurs from other managers is not a greater preference for risk but instead an overly optimistic perception of the risks involved. For an outside observer who perceives risks more realistically, entrepreneurs will thus appear to take great risks. However, when differences in risk perception are factored out, entrepreneurs – just as other managers – demonstrate a preference for tasks that are only moderate in risk (Brockhaus, 1982). Empirical investigations have shown systematic individual, group, and cultural differences in perceptions of the riskiness of risky choice options (Bontempo, Bottom, & Weber, 1997; Weber, 1988; Slovic, 1997) and greater agreement on expected returns (Siebenmorgen, Weber, & Weber, 2001). However, after accounting for differences in the perception of the riskiness of choice alternatives, perceived-risk attitude (the willingness of people to select an alternative with a particular level of risk) has shown considerable cross-group and cross-situational consistency (Weber, 1998). The domain specificity of risk-taking thus seems to arise from differences in the perception of the riskiness of choice alternatives in different content domains. It stems from differences in the definition of what constitutes or contributes to risk in different types of situations rather than from differences in attitude towards risk.

A New Scale to Assess Risk Perceptions and Attitudes

Assuming that risk-taking is influenced jointly by the situation and by characteristics of the decision-maker (Bromiley & Curley, 1992), situational differences need to be considered before stable individual differences can be seen. Decision domains in which respondents have shown different degrees of risk-taking include gambling, financial investing, business decisions, and personal decisions (MacCrimmon & Wehrung, 1986, 1990). Personal decisions can be further broken down into categories that differ in content and might score differently on variables known to affect risk perception and risk taking (e.g., familiarity, controllability; Slovic, Fischhoff, & Lichtenstein, 1986): health/safety decisions (seatbelt usage, smoking), recreational decisions (sky diving), social decisions (confronting coworkers or family members), and ethics decisions (cheating on exams, terminating a comatose family member's life support).

Based on these premises, Weber, Blais, and Betz (2002) developed a new risk-attitude scale that allows researchers and practitioners to assess both conventional risk attitudes and perceived-risk attitudes in six commonly encountered content domains. They found that individual, gender, and content domain differences in apparent risk-taking were associated primarily with differences in the perception of the activities' benefits and risks, rather than with differences in attitude towards perceived risk. They also reported that perceived-risk attitudes, which factors domain differences in risk perception out of risk behavior, were significantly more consistent across domains for a particular respondent than conventional risk attitudes. Most respondents were significantly or mildly perceived-risk averse in all risk domains. What differed between individuals (partly as a function of gender) and between domains were perceptions of the benefits and riskiness of risky activities.

Objectives of Present and Future Research

The present research program represents the first step towards applying current theory about risk-taking to military contexts. For instance, many military personnel make decisions varying in risk and uncertainty during the course of their daily activities. Although such situations are integral to particular military duties, to date little attention has been devoted to understanding the factors that affect risky behavior in the military and its link to decision-making, coping, and cooperative behaviors.

An important area of decision-making research for the CEB Section is the influence of individual and situational differences upon risky decision-making processes. The present research program ultimately aims to delineate specific individual and situational differences that influence risky behaviors in a military setting and their impact on the nature and quality of military decisions, and the impact of these decisions on the people who make these decisions. In particular, a series of studies will examine the role of risk attitudes in decision-making, coping, and cooperative behaviors, with one promising instrument, Weber et al.'s (2002) Domain-Specific Risk-Taking (DOSPERT) Scale as its focus. Although preliminary psychometric information concerning this scale has been gathered, the first step in this program of research will involve collecting additional evidence regarding the reliability and validity of the scale's scores within a general English-speaking population before moving towards the military populations. In particular, this study modified the wording and content of some of the original 40 DOSPERT items to make them more applicable and interpretable across a broad age range (the original scale was developed for and tested with college students). This study also examined possible cultural differences between American and Canadian respondents by aiming at a sample of respondents from both countries (with about $\frac{3}{4}$ from the US and $\frac{1}{4}$ from Canada), though we did not expect major cultural differences between those two groups, given a very similar pattern of responses to both risk-taking and risk-perception on the DOSPERT scale observed for American and German college students (Johnson, Wilke, & Weber, 2003).

Given that the communality levels associated with the DOSPERT Scale items were, on average, below .50 in previous studies (i.e., on average, the common factors explained less than 25% of the variance in the manifest variables), and that the ratio of variables to factors is 20:3, we aimed for a sample size of at least 200 participants, based on the recommendations made by MacCallum, Widaman, Zhang, & Hong (1999), and ideally a sample of 400 participants, with 200 men and 200 women, to investigate measurement invariance across groups. By advertising and posting the study on the world-wide-web, we gained access to a sample of respondents in Canada and the US that is far more representative of the general population in age, educational level and occupations than most lab-based studies that tend to attract mostly college students.

Methodology

Respondents were contacted by advertisements on web bulletin boards and list servers and agreed to complete seven surveys for a payment of US \$9. The surveys included the risk-taking and risk-perception responses of an expanded (48-item) version of the Domain-Specific Risk-Taking (DOSPERT) Scale (Weber et al., 2002), with some items modified for more general applicability in adult populations. For convergent and discriminant validity evaluation, we also included the Sensation-Seeking Scale version V (SSS-V; Zuckerman, 1994), the Risk-Taking scale of the Jackson Personality Inventory (JPI-RT; Jackson, 1994), the Personal Need for Structure Scale and Personal Fear of Invalidity Scale (Thompson, Naccarato, Parker, & Moskowitz, 2001), and the General Self-Efficacy Scale (Schwarzer & Jerusalem, 1993, 1995).

The surveys were placed on-line with a software package called PHPESP that allowed respondents to complete them via a variety of web browsers. The package collected both responses and response times. Respondents were first presented with two informed consent forms (one supplied by the Canadian contractor and its Institutional Review Board, the other required by the Columbia University Institutional Review Board. Both forms provided e-mail and phone contacts to the Center for the Decision Sciences at Columbia University, in case respondents had questions or concerns. Respondents clicked a button at the end the Informed Consent Forms to indicate understanding of the purpose of the study, anonymity of responses (all identifying respondent information, including contact information was being stored on a secure server and in a separate file from their responses to the surveys), and their ability to exit the study at any point in time. After consent to participate was given, respondents provided demographic background information, their answers to the seven surveys in two different orders. Half of the respondents rated their risk-taking on the 48-item expanded DOSPERT scale first, and their risk-perceptions for the same 48 items (presented in a different random order) as the sixth survey, with the 20-item Jackson Personality Risk-Taking scale in second position, the 12-item Need for Structure Scale in third position, the 40-item Zuckerman Sensation-Seeking Scale in fourth position, the 14-item Personal Fear of Invalidity Scale in fifth position, and the 10-item General Self-Efficacy Scale in seventh position. The other half of the respondents rated their risk perceptions of the 48-item expanded DOSPERT scale first, and their risk-taking for the same 48 items (presented in a different random order) as the sixth survey, with the other five surveys appearing in the same order as for the other half.

Respondents took between 16 minutes and 116 minutes to complete the study, with a mean of 56 minutes.

At the end of the study, respondents received information about the payment process. Payment was delivered by Paypal, an internet service company that provides payments internationally in the form of checks or transfers to bank or credit card accounts in respondents' preferred currency.

Sample Composition

From a total of 467 respondents who finished the task, 66 were eliminated from the sample for meeting one or more of the following exclusion criteria, which indicated non-honest or careless responding: providing an invalid postal address, attempting to take the experiment multiple times with different identities, spending less than 1200 seconds (20 minutes) on the task, having an IP address or providing an e-mail address that did not match the country provided in their postal address.

Of the remaining sample of 401 legitimate and careful respondents, 296 indicated residing in the US and 105 in Canada. Canadian respondents came from Alberta (63), Ontario (20), Quebec (9), British Columbia (8), Nova Scotia (1), and the Northwest Territories (1). US respondents came from New York (153), New Jersey (34), Ohio (16), California (12), Illinois (10), Massachusetts (7), Florida (7), and Texas (7), and from 26 other states. Only 20 of the 401 respondents were not native-born Canadians or Americans and came from a variety of countries (China, India, Israel, Jamaica, Japan, and Tanzania). Perhaps not surprisingly, given that the advertisements for the study were in English, all but 11 of the 401 respondents indicated English as their primary language, and only two of the 105 Canadian respondents were francophone.

There were 188 female and 213 male respondents. Highest achieved educational level ranged from less than high school (7), to high school diploma (12), vocational training (7), a certificate (3), professional training (12), some college (92), an Associate degree (13), a Bachelor's degree (183), a Master's degree (61), and a Ph.D. (11). Four respondents were less than 18 years old, 90 were between the ages of 18 and 21, 234 between the ages of 22 and 25, 72 between the ages of 36 and 60, and one was older than 61. While the largest group of respondents (135) indicated that they were students, there was a broad representation of occupations, ranging from arts/entertainment/publishing (45), to accounting/finance (26), education/training (23), clerical/administration (22), technology (20), engineering/architecture (11), health care (9), retail (9), legal (8), marketing (8), banking (6), sales (6), government (5), not-for-profit (5), human resources (5), construction (5), and twelve other job categories.

Directions for Future Research

Future studies should compare domain-specific risk perceptions and risk taking among anglophone versus francophone Canadian respondents. They should also compare the responses provided by members of the general population to those provided by members of the military, controlling for age and gender composition.

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