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MOOD STATE AND RISK TOLERANCE IN ORGANIZATIONAL DECISIONS

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Abstract

Objective of the study: This study aims to identify the relationship between an individual's mood and risk tolerance in organizational decisions.

Methodology/approach: It is an applied, quantitative, descriptive and survey research. For data collection, a questionnaire was applied to a sample of 90 academics from higher education courses in the area of management at a Higher Education Institution in the State of Santa Catarina. Data were categorized and analyzed quantitatively using descriptive statistics, correlation analysis and logistic regression analysis.

Originality/relevance: Researches relate positive mood and increased risk-taking, however, the results are fragmented and inconclusive as to the influence of negative mood on the tendency to take risks. Thus, this research focuses attention on the asymmetry of influence of both positive and negative mood on risk preferences.

Main results: We found that in decisions involving gains, respondents have less tolerance than when they involve losses. Although mood is not related to risk tolerance, when analyzed separately, a relationship was found between the dimensions of mood and the individuals' risk tolerance.

Theoretical/methodological contributions: This research adds to the literature, by exploring decision-making and the behavioral line simultaneously, as well as contributing to represent a more comprehensive description regarding the decision process regarding the Prospect Theory, by demonstrating which dimensions of mood have an influence on the risk tolerance of respondents.

Social/management contributions: The study contributes to the improvement of decision-making processes in the context of aspects related to risk tolerance. The practical implications refer to the construction of a decision-making process designed in a more assertive way and in line with the losses and gains arising from the inherent risk of this decision-making process.

Keywords: Mood State. Risk tolerance. Decision making.

ESTADO DE HUMOR E A TOLERÂNCIA AO RISCO EM DECISÕES ORGANIZACIONAIS

Resumo

Objetivo do estudo: Este estudo possui o objetivo de identificar a relação entre o estado de humor do indivíduo e sua tolerância ao risco em decisões organizacionais.

Metodologia/abordagem: Trata-se de uma pesquisa de natureza aplicada, quantitativa, descritiva e survey. Para a coleta de dados foi aplicado um questionário em uma amostra de 90 acadêmicos dos cursos superiores da área de gestão em uma Instituição de Ensino Superior no Estado de Santa Catarina. Os dados foram categorizados e analisados quantitativamente por meio de estatísticas descritivas, análise de correlação e análise de regressão logística.

Originalidade/relevância: Pesquisas relacionam o humor positivo e o aumento na propensão de correr riscos, entretanto, os resultados são fragmentados e não conclusivos quanto a influência do humor negativo na tendência a assumir riscos. Assim, esta pesquisa foca sua atenção a respeito da assimetria de influência tanto do humor positivo quanto negativo nas preferências por risco.

Principais resultados: Verificou-se que em decisões que envolvem ganhos, os respondentes apresentam menos tolerância do que quando estas envolviam perdas. Apesar de o humor não apresentar relação com a tolerância ao risco,

quando analisadas separadamente, encontrou-se relação das dimensões do humor com a tolerância ao risco dos indivíduos.

Contribuições teórico-metodológicas: Esta pesquisa agrega à literatura, ao explorar a tomada de decisões e a linha comportamental de forma simultânea, assim como contribui por representar uma descrição mais abrangente no tocante ao processo de decisão acerca da Teoria do Prospecto, por demonstrar que dimensões do humor apresentam influência sobre a tolerância ao risco dos respondentes.

Contribuições sociais/gerenciais: O estudo contribui para o aperfeiçoamento dos processos decisórios no âmbito de aspectos relacionados à tolerância ao risco. As implicações práticas remetem à construção de um processo decisório desenhado de forma mais assertiva e em consonância com as perdas e ganhos decorrentes do risco inerentes desse processo decisório.

Palavras-chave: Estado de humor. Tolerância ao risco. Processo decisório.

ESTADO DE ÁNIMO Y TOLERANCIA AL RIESGO EN LAS DECISIONES ORGANIZATIVAS

Resumen

Objetivo del estudio: Este estudio tiene como objetivo identificar la relación entre el estado de ánimo de un individuo y la tolerancia al riesgo en las decisiones organizacionales.

Metodología/enfoque: Es una investigación aplicada, cuantitativa, descriptiva y por encuestas. Para la recolección de datos, se aplicó un cuestionario a una muestra de 90 académicos de cursos de educación superior en el área de gestión en una Institución de Educación Superior del Estado de Santa Catarina. Los datos se categorizaron y analizaron cuantitativamente utilizando estadística descriptiva, análisis de correlación y análisis de regresión logística.

Originalidad/relevancia: Las investigaciones relacionan un estado de ánimo positivo y una mayor asunción de riesgos, sin embargo, los resultados son fragmentados y no concluyentes en cuanto a la influencia del estado de ánimo negativo en la tendencia a asumir riesgos. Por lo tanto, esta investigación centra la atención en la asimetría de la influencia del estado de ánimo tanto positivo como negativo en las preferencias de riesgo.

Resultados principales: Se encontró que en las decisiones que involucran ganancias, los encuestados tienen menos tolerancia que cuando estas involucran pérdidas. Aunque el estado de ánimo no está relacionado con la tolerancia al riesgo, cuando se analiza por separado, se encontró una relación entre las dimensiones del estado de ánimo y la tolerancia al riesgo de los individuos.

Contribuciones teóricas/metodológicas: Esta investigación se suma a la literatura, al explorar la toma de decisiones y la línea conductual simultáneamente, además de contribuir al representar una descripción más completa del proceso de decisión sobre la Teoría del Prospecto, al demostrar qué dimensiones del estado de ánimo influyen en la tolerancia al riesgo de encuestados.

Contribuciones sociales/de gestión: El estudio contribuye a la mejora de los procesos de toma de decisiones en el contexto de aspectos relacionados con la tolerancia al riesgo. Las implicaciones prácticas se refieren a la construcción de un proceso de toma de decisiones diseñado de manera más asertiva y acorde con las pérdidas y ganancias derivadas del riesgo inherente a este proceso de toma de decisiones.

Palabras clave: Estado de ánimo. Tolerancia al riesgo. Toma de decisiones.

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1 Introduction

In the dynamic, competitive and complex environment in which they operate, modern organisations depend directly on an assertive decision-making process for their success (Baykasoğlu & Gölcük, 2015; Cristofaro, 2016). Thus, decision-making processes are intrinsic to business management and have a direct impact on organisational performance (Fagundes, Lunkes & Schnorrenberger, 2018). Among the factors that consciously influence the results of decision-making processes are social, environmental and economic concerns (Courtney, 2001).

In addition to this set of available information, the results are also affected by psychological factors, such as the cognitive profile and particular attributes of the decision maker (Leonard, Scholl & Kowalski, 1999; Cools & Van den Broeck, 2007; Kelly, 2010; Allwood & Salo, 2012; Faraci, Lock & Wheeler, 2013; Luft, Shields & Thomas, 2016). Among the psychological factors of a personal nature, the mood can directly interfere with decisions (Antunes, 2017).

The effects of human behavior on business decision-making processes have been analyzed in different branches of applied social sciences. In accounting, these studies focus on behavioral accounting research lines (Lucena, Fernandes & Silva, 2011). From economics, thes seminal studies by Kahneman and Tversky (1979) created the field of Behavioural Economics by showing that cognitive biases make purely rational decisions difficult.

When considering risk exposure, for example, the level of risk accepted in decisions involving losses is higher than the level of risk in situations involving gains. Even if the expected value of gains and losses are the same, the difference in perspective leads to inconsistencies in decision-making preferences (Kahneman and Tversky, 1979). Accepted risk exposure levels are also influenced by contextual, emotional and hormonal factors (Kusev et al., 2017); by the affective state (Isen, 1993; Mittal & Ross Jr., 1998; Herman, Critchley & Duka, 2018); or even fear (Alempaki, Starmer & Tufano, 2019).

What is the relationship between mood state and risk tolerance of individuals in organizational decisions? There is evidence relating positive mood to increased propensity to take risks (Nygren *et al.,* 1996; Mittal & Ross Jr., 1998). However, the results are fragmented and inconclusive as to the influence of negative humour on the tendency to take risks (Pietromonaco & Rook, 1987; Leith & Baumeister, 1996; Hockey *et al.,* 2000). Thus, the aim of the study is to elucidate and discuss how mood state affects risk tolerance in organizational decisions.

It was observed that there are national studies on risk tolerance that replicate international instruments in experiments with students, such as the study by Soares, Simões and Jorge Neto (2018), in which they found a tendency of underestimation in the willingness of individuals to assume risk in hypothetical laboratory experiments, and the study by Kruger, Prestes, Mazzioni and Petri (2018), in which they applied experiment and found that variables such as experience and gender present

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statistically significant relationships with risk tolerance. However, no national studies about mood and risk tolerance were found in the literature searches when sought by themselves as key words.

In the present research, the investigation of the influence of mood states on risk tolerance was performed through the application of questionnaires that placed students in hypothetical situations of risk decision-making, elaborated by Fagundes (2019). The mood of the respondents was identified by means of Mcnair, Loor and Droppleman's (1971) six dimensions of mood state.

The study is justified by the originality and scarcity of research in the area. The literature is fragmented, especially in relation to understanding cognitive dissonance in decision-making (Shafir, Diamond & Tversky, 1997; Luppe & Angelo, 2010; Lima Filho & Bruni, 2013; Shepherd, Williams & Patzelt, 2015; Nobre et al., 2016; Souza, 2017; Fagundes, Schnorrenberger & Lunkes, 2018). It is worth highlighting the relevance of the theme of humour in any decision making process, with consequences on expenditure and investment of money, time, effort, or all these factors simultaneously (Hought & Ogilvie, 2005).

It contributes to the literature by exploring the themes of decision making and the behavioural thread simultaneously (Shields, 2015). Among the practical aspects, it presents alerts so that the decision making processes, critical to the success of organisations, are not affected by cognitive biases arising from the decision maker's mood. Thus, it is intended to contribute to the planning of more effective and rational decision-making processes from this new perspective.

2 Theoretical background

2.1 Prospectus theory

Studies on decision making based on bounded rationality were introduced by Herbert Simon (Kahneman, 2012). Starting from the assumption that the individual does not make purely rational decisions, Kahneman and Tversky (1979) counter the dominant normative model of rational choice accepted by the Expected Utility Theory (EUT). They introduce Prospect Theory, which discusses how people make their choices between alternatives that present risk and uncertainty.

For Kahneman (2012) one of the main flaws of EUT is the parity given for gains and losses. In essence, the Prospectus Theory holds that individuals have different tolerance to risk when faced with win or lose situations. In gains, individuals tend to be less risk tolerant than in losses (Kahneman & Tversky, 1979). It is often pointed out that the difference is approximately 2 to 1 (Kahneman & Tversky, 1979; Kahneman, Knetsch & Thaler, 1990; Tversky & Kahneman, 1991). With regard to gains and losses, another difference between EUT and Prospect Theory is in the value function. In perspectives of losses the function is convex and steeper, whereas for gains it is concave and not so steep

It should also be noted that the Prospect Theory uses a point of reference, that is, every individual, when performing cognitive operations for decision making, is inserted into a context. Thus, from his insertion in the decision context, the individual evaluates the consequences. In this way, gains

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and losses are generally defined on the basis of the reference point, which generally corresponds to the ao *status quo* of the decision maker, that is, his asset at the time of the decision (Kahneman & Tversky, 1979).

Hastie and Dawes (2010) treat the Prospectus Theory as the most comprehensive description of the decision-making process, given that it synthesizes several empirical observations and inferences about human behaviour when faced with decisions. It can even be emphasised that Prospect Theory has provided new perspectives, as well as fostered new methods concerning the assessment of human behaviour under risk.

2.2 Risk tolerance

It is difficult to conceptualise risk tolerance, as it is subjective and complex to measure (Geetha & Selvakumar, 2016). Thus, new studies are needed to seek to relate the factors that determine these subjectivities and individual differences in risk attitudes (Dohmen *et al.,* 2011).

Individual differences derive from different decision-making styles, which in turn influence the decision-making process (Allwood & Salo, 2012). Therefore, you have different choices, even if the same information is available (Hought & Ogilvie, 2005; Penolazzi, Leone & Russo, 2013; Pennino, 2002; McKenna, Hyllegard & Linder, 2003; Gary & Wood, 2011; Azadeh *et al.*, 2015; Cools & Van den Broeck, 2007). Therefore, in more complex decisions, these factors and cognitive styles should be known and evaluated, since they have different consequences for the organisation.

Choices in the decision-making process may be influenced by the personal characteristics of the decision maker (Ramiah *et al.,* 2016). Studies indicate that women are more risk averse than men (Coet & McDermott; 1979; Meier-Pesti & Goetze, 2005; Dohmen *et al*., 2011; Yao, Sharpe & Wang, 2011; Montinari & Rancan, 2013; Bliss, Potter, & Schwarz, 2012; Andersson, Holm, Tyran, & Wengström, 2014; Francis *et al*., 2015; Ramiah *et al*., 2016; Geetha & Selvakumar, 2016; and Brooks *et al*., 2018). They also point out that older people are more conservative (Yao, Sharpe & Wang, 2011; Dohmen *et al*., 2011; Brooks *et al*., 2018).

The literature points out that single people are more risk tolerant because they do not have as much family expenses as married ones (Hallahan, Faff & Mackenzie, 2004; Yao, Sharpe & Wang, 2011; Geetha & Selvakumar, 2016). In addition, Yao, Sharpe, and Wang (2011) show that people with dependents are less likely to take risks. According to the study, this chance is reduced by 11.6%.

Financial risk tolerance refers to the maximum amount of uncertainty an individual is willing to accept when making a given financial decision (Grable, 2000). In general, the higher the income, the greater the tolerance. A better financial condition allows the adverse effects of risk exposure to be mitigated, allowing the individual to be prepared to assume possible losses (Camerer, 2005; Sung & Hanna; 1996; 1996; Grable, 2000; Grable & Joo, 2004; Geetha & Selvakumar, 2016). The level of

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education presents a similar pattern, in which the propensity to risk is higher as the level of education is increased (Yao, Sharpe & Wang, 2011; Dohmen *et al*., 2011).

Thus, risk tolerance can be influenced by factors other than the cognitive characteristics of the decision maker, such as characteristics of the organization or the context in which decisions are made (Fagundes, Schnorrenberger, Gasparetto & Lunkes, 2021), or by the behavior of individuals, which also shows a statistically significant relationship with risk tolerance (Faria, Salim & Santos, 2020).

The next section introduces the psychological aspect of interest, i.e. how the mood of invididuals can influence the decision-making process.

2.3 Mood status

Humour is considered a personal and multidimensional phenomenon, that is, it refers to different spheres of basic human needs, serving as a means of communication and, when well applied, a relevant tool for work and socialization (Antunes, 2017). According to Cooper (2008), humour plays a relevant role in terms of working relationships. It is recognized as an important mechanism capable of acting in the creation, maintenance and even act in the destruction of relationships in the work environment. Langhorn (2004) indicates that the performance of senior managers is directly related to the ability to be aware of and understand one's own emotions, a set of skills also known as part of self-awareness or emotional intelligence.

Thus, the decision-making process in scenarios involving risks are shaped by different and complex interactions. In addition to cognitive factors such as the availability of mental resources, memory processing and decision-making strategies, research suggests that mood interferes with all of these factors. Thus, mood states influence loss and/or earnings choices (Nygren *et al.,* 1996; Yuen & Lee, 2003; Kusev *et al.,* 2017; Herman, Critchley & Duka, 2018). Li and Yan's research (2021) indicates that the individual's mood can interfere with their decision-making involving risks, so they used this measure to control their investigation. The study by Efimov *et al.* (2022), could not identify a significant relationship between mood and risks.

In this research, the measurement of mood states are made possible by the instrument of Mcnair, Loor and Droppleman (1971). The instrument for capturing the individual's mood status is subdivided into six dimensions: i) Tension-Anxiety; (ii) Depression-Melancholy; iii) Hostility-Anger; iv) Vigor-Activity; v) Fatigue-Inertia; and vi) Confusion-Disorientation.

Each dimension can be defined as follows: i) Tension-Anxiety corresponds to increases in musculoskeletal tension and concern of the individual; ii) Depression-Melancholy is represented by an emotional state of discouragement, sadness, unhappiness and loneliness; iii) Hostility-Anger refers to a state of anger mood and antipathy to others; iv) Fatigue-Inertia represents a state of tiredness, inertia and low energy; v) Vigor-activity is related to a state of energy and physical and psychological vigor, being inverse to the others; and vi) Confusion-Disorientation is characterized by a state of confusion

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and low lucidity (Mcnair, Loor & Droppleman, 1971; Viana, Almeida & Santos, 2001). The sum of these dimensions allow the construction of the Humour scale.

The following section details the methodological procedures used for the construction of questionnaires, research design and data collection and analysis procedures.

3 Methodology

In order to achieve the objective of identifying the relationship between the individual's mood state and their risk tolerance in organizational decisions, the research type of *survey* was conducted based on the application of questionnaires that sought to insert the participating students in organizational decision-making situations. The questionnaires presented hypothetical situations of risk decision making, also assessing the mood of each respondent.

The hypothetical risk decision-making situations were constructed by Fagundes (2019) based on Kahneman and Tversky's (1979) Prospect theory. The first block of questions addresses the perspectives of gains and losses in organisational decisions in six decision scenarios, with mirrored questions for six gains and six losses, so as to enable the confrontation of respondents. Faced with these decisions, respondents can choose between two alternatives, one being less and the other being more risky. Hence, depending on the alternative chosen, the respondent is classified as more or less risk tolerant in that decision. The table in Appendix I presents the scenarios that the respondents were entered into for decision making.

The research sample covers 90 academics from management courses linked to a Higher Education Institution in Santa Catarina, who were invited to participate voluntarily in the research. Through questionnaires administered in November 2019, respondents were guided to assume the role of managers in the light of organisational decisions. The data collected with the Google Forms tool shows an average response time of 15 minutes, with 90 valid responses. Table 1 presents the research constructs, their variables and references.

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Table 1

Research Constructs

Dependent variable			
Construct	**Variable**	**Theoretical basis**	
Risk Tolerance (RT)	Earnings Perspective Loss Perspective	(Kahneman & Tversky, 1979; Fagundes, 2019)	
Independent variables			
Construct	**Dimension**	**Adjective**	**Theoretical basis**
Mood Profile (POMS)	Stress-Anxiety (TEN)	Tense; Restless; Nervous; Anxious; Quiet and Impatient	(Mcnair, Loor & Droppleman, 1971; Viana, Almeida & Santos, 2001)
	Depression-Melancholy (DEPR)	Sad; Discouraged; Lonely; Depressed; Discouraged and Unhappy	
	Hostility-Anger (HOS)	Irritated; Bad-tempered; Annoyed; Furious; Angry	
	Vigor-Activity (VIG)	Lively; Active; Energetic; Full of Life; Full of Good Disposition and Cheerful	
	Fatigue-Inertia (FAD)	Exhausted; Fatigued; Exhaustion; Without Energy; Exhausted and Tired	
	Confusion-Disorientation (CONF)	Confused; Shuffled; Bewildered; Effective; Competent and Insecure	
Control variables			
Construct	**Variable**	**Theoretical basis**	
Demographic Characteristic	Age (IDA) Gender (GEN) Marital status (CIV) Course (CUR) Period (PHASE) Monthly income (REN) Dependents (DEP) Financial situation (SFI)	(Coet & McDermott; 1979; Viscusi, Magat & Huber, 1987; Johnson & Powell, 1994; Tan & Yates, 1995; Hallahan, Faff & McKenzie, 2004; Camerer, 2005; Dohmen *et al.*, 2011; Yao, Sharpe & Wang, 2011; Ross *et al.*, 2015; Ramiah *et al.*, 2016; Geetha & Selvakumar, 2016; Brooks *et al.*, 2018)	

Source: Prepared by the authors (2022).

The research questionnaire is based on instruments validated in the international literature for measuring mood states and risk tolerance, and is structured in three blocks. The first refers to the demographic characteristics of the research respondents: Age, Gender (0 = Female, 1 = Male), Marital Status (0 = Single, 1 = Stable Union, 2 = Married, 3 = Other), Course (0 = Technologist in management, 1 = Business Administration, 2 = Accounting), Period, Monthly Income (0 = No income, 1 = Up to R$998.00, 2 = More than R$998.01 up to R$1,996.00, 3 = More than R$1. 996.01 up to R$ 2,994.00, 4 = More than R$ 2,994.01 up to R$ 3,992.00, 5 = More than R$ 3,992.01), Dependents (0 = No, 1 = Yes) and Financial situation (0 = Very indebted, 1 = Little indebted, 2 = Financially balanced, 3 = Financially balanced with leftovers and/or applications/investments).

The second block refers to the mood profile based on the instrument by Viana, Almeida and Santos (2001), a reduced Portuguese version of the Profile of Mood States, adapted from the original version of the instrument *Profile of Mood States* (poms) (Mcnair, Loor & Droppleman, 1971). The POMS employed is composed of 42 adjectives selected from repeated factor analysis studies, establishing six mood states: Tension-Anxiety, Depression-Melancholy, Hostility-Anger, Vigour-

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Activity, Fatigue-Inertia and Confusion-Disorientation (Viana, Almeida & Santos, 2001). The dimension "Training maladjustment" is disregarded as it is not related to this research and the dimensions are referred to throughout the text only by their first term (for example, "Tension-Anxiety", "Tension" is written).

The mood state scales were collected according to the individuals' choices in identifying their mood, selecting the column that best represented their level in the last seven days. Viana, Almeida and Santos (2001) follow in the presentation of questions with scales of the type *Likert* of 5 points (0 = Not at all, 1 = A little, 2 = Moderately, 3 = A lot and 4 = A very much). The adjectives are added up in the same direction, except for the inversion in one item on the Tension scale (Tranquil) and two items on the Confusion scale (Effective and Competent). The individual's mood profile scales are calculated as follows:

$$Mood = 100 + Vigorousness - (Tension + Depression + Hostility + Fatigue + Confusion)$$

In order to verify the reliability of the questionnaire applied in the survey, Cronbach's alpha coefficient was calculated (Cronbach, 1951). The results of the Cronbach's Alpha calculation for each mood dimension scale are presented in Table 2.

Table 2

Cronbach's alpha of the scales of mood dimensions

Construct	Alpha of Cronbach
Humour	0,88
Tension	0,76
Depression	0,91
Hostility	0,83
Vigor	0,87
Fatigue	0,90
Confusion	0,72

Source: Survey data (2022).

Cronbach's alpha coefficients were all higher than 0.70, indicating that the variables measured are reliable to represent the concerned construct (Hair Jr. *et al.,* 2009).

Data were categorised and analysed quantitatively by means of descriptive statistics, correlation analysis and logistic regression analysis, using the *software* free R. The correlation analysis employs Spearman's rank correlation coefficient, which allows the identification of the relationship between the relative positions of the performance (Myers & Well, 2003).

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Spearman's correlation is suitable for investigating relationships between ordered qualitative levels of mood. Myers and Well (2003) define Spearman's rank correlation coefficient as:

$$\rho = 1 - \frac{6 \sum_i D_i{}^2}{N(N^2 - 1)}$$

Where D_i represents the difference between the positions of X and Y for the i-th case and N denotes the number of observations. Accordingly, the correlation coefficient varies between 1 and -1, and when the value is 0 the relationship is null, indicating that the two variables have no ordinal relationship. To interpret the magnitude of the correlations, the following classification of the coefficients was adopted, in module: weak correlation ($0 \leq r < 0.5$), moderate correlation ($0.5 \leq r < 0.8$) or a strong correlation ($0.8 < r \leq 1.0$) (Larson & Farber, 2016).

For the regression analysis, each of the 90 respondents was considered as different individuals in the gain perspective and in the loss perspective. Thereby, the sample size considered in the regression is doubled in order to isolate the effect of the binary variable of perspective attributed in gains and losses in questions of the same decision. In each case, six logistic regressions are considered, one for each decision, in which the perspective variable is included ($PERS$, 0 = Loss, 1 = Gain). The first model, in order to identify the relevance of mood for risk tolerance, in addition to the other socioeconomic variables, has the functional form:

$$TR = \beta_0 + \beta_1 HUMOR_i + \beta_2 PERS_i + \beta_3 IDA_i + \beta_4 GEN_i + \beta_5 CIV_i + \beta_6 SFI_i + \beta_7 REN_i + \beta_8 DEP_i$$

Where TR is the dependent variable of Risk Tolerance (assuming the values 0 = More tolerant and 1 = Less tolerant), with the independent variables of Mood ($HUMOR$), Perspective ($PERS$), Age (IDA), Gender (GEN), Marital Status (CIV), Financial Situation (SFI), Monthly Income (REN) and Dependents (DEP).

The second model adds the disaggregated dimensions that form the mood scale, aiming to detect individual relevance for risk tolerance, with the functional form:

$$TR = \beta_0 + \beta_1 TEN_i + \beta_2 DEPR_i + \beta_3 HOS_i + \beta_4 VIG_i + \beta_5 FAD_i + \beta_6 CONF_i$$
$$+\beta_7 IDA_i + \beta_8 GEN_i + \beta_9 CIV_i + \beta_{10} GIN_i + \beta_{11} REN_i + \beta_{12} DEP_i$$

Where TR is the dependent variable of Risk Tolerance (assuming the values 0 = More tolerant and 1 = Less tolerant), with the independent variables with the inclusion of the mood dimension scales: Stress-Anxiety (TEN), Depression-Melancholy ($DEPR$), Hostility-Ira (HOS), Vigor-Activity (VIG),

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Fatigue-Inertia (FAD) and Confusion-Disorientation ($CONF$). The next section presents the analysis and discussion of the results found in the study.

4 Results

The results section begins with a descriptive analysis of the questionnaire responses and socioeconomic characteristics of the participants. In the following subsection regression analyses are conducted in order to infer the effects of mood states on risk tolerance.

4.1 Descriptive results of the questionnaires applied

The current subsection performs the exploratory analysis of the data by presenting the descriptive statistics of the variables used in the study and their degree of association. Initially, descriptive statistics were calculated, of the demographic and mood state variables of the research participants, as presented in table 3.

Table 3

Descriptive statistics

Variables	Respondents	Average	Std Deviation	Min.	Pct. (25)	Pct. (75)	Max.
Age	90	24,97	7,37	17	20	28	52
Period	90	2,74	1,55	1	1,2	3,8	6
Dependents	90	0,23	0,43	0	0	0	1
Mood	90	72,38	24,80	5	57,2	92	118
Tension	90	10,86	4,80	0	8	13	23
Depression	90	5,54	5,70	0	1	10	23
Hostility	90	6,10	4,83	0	3	9	22
Vigor	90	12,84	5,04	0	10	16	24
Fatigue	90	10,53	6,52	0	5	15	24
Confusion	90	7,43	4,23	1	4	9,8	21

Source: Survey data (2022).

From table 3 it can be seen that the sample represents 90 students with an average age close to 25 years, a minimum of 17 and maximum of 52 years. In addition, 23% of respondents reported having dependents. Of the proportions of responses in the other qualitative variables, not summarised in the table, gender presented equally 50% between female and male. In relation to marital status, 72.2% declared themselves single, 12.2% in a stable union, 13.3% married and 2.2% answered "other".

The courses represented are 45.6% in Accounting, 31.1% in Administration and 23.3% in Management Technology. The collection covers students from both the early and final stages of the courses, with an average of 2.74, minimum of 1 and maximum of 6. The average is shifted downwards by the presence of technologists courses, consisting of a maximum of 4 semesters (periods).

In the declaration of the income range it was found: 3,3% in No income, 14,4% up to R$998,00, 41,1% with More than R$998,01 up to R$1.996,00, 25,6% with More than R$1.996,01 up to R$2.994,00, 3,3% with More than R$2.994,01 up to R$3.992,00, 12,2% Above R$3.992,01. As for the financial situation, 5.6% were declared to be very indebted, 17.8% as not very indebted, 58.9% as financially balanced, 17.8% as financially balanced with surpluses and/or investments.

Table 4 presents the percentages of answers in questions 1 to 6, classifying the respondents as more tolerant or less tolerant to risk, facing a Gain scenario and a Loss scenario.

Table 4

Risk tolerance proportions in win/loss scenarios for each decision

Decision	Gains		Losses	
	More tolerant	Less tolerant	More tolerant	Less tolerant
1	41,1%	58,9%	51,1%	48,9%
2	20,0%	80,0%	56,7%	43,3%
3	35,6%	64,4%	52,2%	47,8%
4	63,3%	36,7%	67,8%	32,2%
5	61,1%	38,9%	40,0%	60,0%
6	14,4%	85,6%	63,3%	36,7%
Average	39,3%	60,7%	55,2%	44,8%

Source: Survey data (2022).

From table 4, it is possible to identify that in decisions involving gains, respondents show less tolerance than when these involved losses. These results corroborate with the precepts of Prospect Theory, which highlights that individuals are less risk tolerant in gains than in losses (Kahneman & Tversky, 1979).

Table 5 presents the Spearman correlation coefficients between the dimensions that make up the Mood scale. Rank correlation was used since the variables are measured on ordinal scales, from the scale *Likert* of the questionnaire, in which case Pearson's linear correlation is not the most appropriate (Myers and Well, 2003).

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Table 5

Spearman correlation coefficients between mood dimensions

	Tension	Depression	Hostility	Vigor	Fatigue	Confusion
Depression	0,526					
Hostility	0,651	0,631				
Vigor	-0,342	-0,561	-0,535			
Fatigue	0,686	0,590	0,734	-0,398		
Confusion	0,573	0,653	0,533	-0,610	0,491	
Mood	-0,771	-0,816	-0,855	0,698	-0,836	-0,770

Source: Survey data (2022).

For the interpretation of the magnitude of the correlations, the following classification of the coefficients was adopted, in module: weak correlation ($0 \leq r < 0.5$), moderate correlation ($0.5 \leq r < 0.8$) or a strong correlation ($0.8 < r \leq 1.0$) (Larson & Farber, 2016). In general, the correlations between the POMS scales are high, but do not exceed 0.70, which indicates the fact that any of them assess independent constructs (Viana, Almeida & Santos, 2001).

In table 5 it can be seen that there is moderate positive correlation between Hostility and Fatigue (0.734), Tension and Fatigue (0.686), Depression and Confusion (0.653), Tension and Hostility (0.651), Depression and Hostility (0.631), Depression and Fatigue (0.590), Tension and Confusion (0.573), Hostility and Confusion (0.533) and Tension and Depression (0.526). There is a moderate negative correlation between Vigor and Confusion (-0.610), Vigor and Depression (-0.561) and Vigor and Hostility (-0.535). The correlation is weak and negative between Vigor and Fatigue (-0.398), Vigor and Tension (-0.342).

The dimensions represented in the columns of table 5 are integral to the calculation of the Mood scale, represented in the last row, and strong correlations between them are expected. Yet, one can still sort in terms of the relevance of the dimensions to the formation of Humour as: Hostility (-0.855), Fatigue (-0.836), Depression (-0.816), Tension (-0.771), Confusion (-0.770) and Vigor (0.698).

4.2 Regression analyses for mood states and risk tolerance

By means of a logistic regression analysis the first model is estimated, with the aim of identifying the relevance of mood for risk tolerance, in addition to the other socioeconomic variables. Table 6 presents the regression results for each of the six decisions. The dependent variable of the regressions is the result of the respondent's risk tolerance, assuming the values 0 = More tolerant and 1 = Less tolerant, including as independent variables his/her mood scale, perspective of the decision in a win/loss scenario and other socioeconomic variables. The method used was *stepwise* of eliminating non-significant variables, starting from a complete model in each decision, but omitting from the results table those that proved to be non-significant.

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Table 6

Results of the regressions of risk tolerance in each decision with the mood scale

Variables independent	Dependent variables					
	Decision 1 (1)	Decision 2 (2)	Decision 3 (3)	Decision 4 (4)	Decision 5 (5)	Decision 6 (6)
Humour	-0.003	-0.009	0.004	-0.002	0.0003	0.003
	(0.006)	(0.007)	(0.006)	(0.006)	(0.006)	(0.007)
Perspective	0.404	1.722***	0.700**	0.197	-0.879***	2.395***
	(0.301)	(0.348)	(0.309)	(0.314)	(0.309)	(0.382)
Age		0.058*				
		(0.031)				
Range income		-0.338**				
		(0.166)				
Gender			-0.645**			
			(0.316)			
Financial Status					-0.429**	
					(0.214)	
Marital Status						-0.453**
						(0.227)
Constant	0.151	-0.274	-0.025	-0.620	1.205**	-0.546
	(0.490)	(0.759)	(0.503)	(0.510)	(0.605)	(0.570)
Observations	180	180	180	180	180	180
Log Likelihood	-123.216	-103.208	-118.744	-115.676	-118.582	-94.248
Akaike Inf. Crit	252.433	216.417	245.489	237.352	245.165	196.495

Note: * significant at 10% level; ** significant at 5% level; *** significant at 1% level. There are 180 observations given that each participant responded to profit and loss scenarios.
Source: Survey data (2022).

From table 6 it can be seen that the mood scale variable did not show a statistically significant relationship with any of the six decisions with which the respondents were confronted. In other words, it cannot be said that the mood of the respondents influences the relationship with the choice for the alternative that characterized him as more or less tolerant to risk. This finding follows the results of Efimov et al. (2022), who also failed to observe significance between mood and risk.

Regarding the perspective (gains or losses), it is observed in decisions 2, 3 and 6 that respondents were less tolerant to risk in decisions involving gains than in decisions involving losses. These results corroborate the Prospect Theory, which highlights that individuals are less tolerant to risks in gains than in losses (Kahneman & Tversky, 1979; Kahneman, 2012). Only in Decision 5 was the opposite observed, that is, that the respondents presented greater tolerance to risk in decisions involving gains.

Regarding age, it was possible to observe a statistically significant relationship only in Decision 2. In this decision, older respondents are less tolerant of risk, while younger respondents tend to be more tolerant of risk, which corroborates Yao, Sharpe and Wang (2011), Dohmen *et al*. (2011) and Brooks *et al*. (2018). Regarding gender, the only decision that obtained a statistically significant result was Decision 3. Under this scenario, the male gender was more tolerant to risk, which reinforces the findings of Coet and McDermott; (1979); Francis *et al*., (2015); Ramiah *et al*., (2016); and Geetha and

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Selvakumar, (2016). Marital status was statistically significant only in Decision 6, indicating that non-single respondents are more tolerant to risk than single respondents. This finding is contrary to the literature, which points out singles as being more tolerant (Hallahan, Faff & Mackenzie, 2004; Yao, Sharpe & Wang, 2011; Geetha & Selvakumar, 2016).

Decision 2 also showed a statistically significant relationship between income range and risk tolerance. It can be observed that the higher the respondent's income, the higher the risk tolerance, consequently, respondents with lower income range are less tolerant. These findings confirm the results of Sung and Hanna (1996); Grable, (2000); Grable and Joo (2004); Geetha and Selvakumar (2016). When dealing with the *status quo*, the respondents' financial situation was statistically significant in Decision 4. This indicates that the better the respondent's financial situation, the more risk tolerant the individual is Camerer (2005).

In short, model 1 showed that mood was not related to risk tolerance in this study. However, factors that influence risk tolerance were observed, such as the perspective in which decisions are made (gains or losses), age, income, gender, marital status and financial situation.

The second estimated model adds the disaggregated dimensions that form the mood scale, aiming to detect the individual relevance for risk tolerance (dependent variable assuming the values 0 = More tolerant and 1 = Less tolerant). The six dimensions of the mood construct (Tense-Anxiety, Depression-Melancholy, Hostility-Anger, Vigor-Activity, Fatigue-Inertia, Confusion-Disorientation) were considered as independent variables. The results are presented in table 7.

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Table 7

Results of risk tolerance regressions on each decision by mood dimensions

Variables explanatory	Dependent Variables					
	Decision 1 (1)	Decision 2 (2)	Decision 3 (3)	Decision 4 (4)	Decision 5 (5)	Decision 6 (6)
Vigor		-0.095***				
		(0.037)				
Depression			0.109***			
			(0.038)			
Hostility					0.132**	
					(0.052)	
Fatigue			-0.105***		-0.110***	
			(0.033)		(0.039)	
Perspective	0.413	1.788***	0.750**	0.197	-0.925***	2.393***
	(0.304)	(0.359)	(0.321)	(0.314)	(0.319)	(0.382)
Number of dependents	-0.715**					
	(0.361)					
Age		0.063**				
		(0.030)				
Range income		-0.300*				
		(0.168)				
Gender			-0.686**			
			(0.327)			
Status financial					-0.475**	
					(0.221)	
Status marital						-0.442**
						(0.224)
Constant	0.118	0.107	0.746*	-0.744***	1.687***	-0.365
	(0.227)	(0.725)	(0.401)	(0.226)	(0.589)	(0.235)
Observations	180	180	180	180	180	180
Log Likelihood	-121.311	-100.354	-112.640	-115.712	-114.049	-94.308
Akaike Inf. Crit	248.622	210.709	235.281	235.424	238.098	194.617

Note: * significant at 10% level; ** significant at 5% level; *** significant at 1% level. There are 180 observations given that each participant responded for win and loss scenarios.
Source: Survey data (2022).

The Vigor-Activity, Depression-Melancholy, Hostility-Anger and Fatigue-Inertia dimensions showed relationships with risk tolerance. Regarding the Vigour dimension, in Decision 2 a negative and statistically significant coefficient was observed. That is, the results indicate that the higher the level of vigor of the respondent, the greater their tolerance to risk. These findings indicate and corroborate with the literature in presenting that the positive mood of the individual makes him/her more likely to take risks and seek better results (Nygren *et al.,* 1996; Mittal & Ross Jr., 1998).

As for Depression-Melancholy, the results in Decision 3 indicate that the higher the respondent's level of Depression, the lower will be their risk to tolerance. As depression brings negativity, future projections always result in negative results, so it is not advantageous for the individual to take risks (Pietromonaco & Rook, 1987). Also relevant is Hostility-Anger, at Decision 5, indicating that the higher the level of Hostility, the lower the individual's risk tolerance, as negativity interferes with decision-making (Yuen & Lee, 2003).

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On the other hand, the Fatigue-Inertia dimension presented statistical significance in Decisions 3 and 5, in which results indicate that the higher the respondents' Fatigue level, the higher their tolerance to risk. This situation can be dangerous for a manager, when high levels of fatigue and stress can lead him to make mistakes in exposing the company to unnecessary risks. It is noteworthy that the dimensions Tension-Anxiety and Confusion-Disorientation did not present a statistically significant relationship with risk tolerance in any of the decisions analyzed.

The perspective (gains or losses) in which the decision was made was statistically significant in Decisions 2, 5 and 6, indicating that there is influence on risk tolerance. In Decisions 2 and 6, when respondents were faced with a prospect of gains, they behaved less risk-tolerantly than when decisions involved losses. These results corroborate the Prospect Theory, which highlights that individuals are less risk-tolerant in gains than in losses (Kahneman & Tversky, 1979). In Decision 5 the opposite was observed, that is, in decisions involving gains, individuals showed greater tolerance to risk.

Besides the perspective, other control variables used in this research, such as age, income, gender, financial situation and marital status showed a significant relationship with risk tolerance, corroborating the literature (Ramiah *et al*., 2016; Geetha & Selvakumar, 2016; and Brooks *et al*., 2018). In relation to the number of dependents, only in Decision 1 was it observed that respondents who had dependents were more risk tolerant, contradicting the literature (Yao, Sharpe & Wang, 2011). In Decision 2 it was found that older respondents were less risk tolerant and younger respondents are more risk tolerant, as previous research has pointed out (Yao, Sharpe & Wang, 2011; Dohmen *et al*., 2011; Brooks *et al*., 2018). In this same decision, in relation to the income level, it was observed that the higher the income of the respondent, the more tolerant he behaved (Grable, 2000; Grable & Joo, 2004).

Gender presented a statistically significant result in Decision 3, in which it was observed that male respondents are more risk tolerant than female respondents (Meier-Pesti & Goetze, 2005; Dohmen *et al*., 2011; Yao, Sharpe & Wang, 2011; Montinari & Rancan, 2013; Bliss, Potter, & Schwarz, 2012; Andersson, Holm, Tyran, & Wengström, 2014; Francis *et al*., 2015). In Decision 5, it was also observed that the financial situation influences risk tolerance. The results indicate that the better the financial situation of the respondent, the more risk tolerant he/she will be (Camerer, 2005). Finally, marital status presented significance in Decision 6, indicating that non-single respondents have higher risk tolerance (Hallahan, Faff & Mackenzie, 2004; Yao, Sharpe & Wang, 2011; Geetha & Selvakumar, 2016).

5 Conclusions

The aim of this article was to identify the relationship between the individual's mood state and their risk tolerance in organizational decisions. To this purpose, we applied a questionnaire of the type *survey* which sought to insert students in decision-making situations of an organisational nature that involved risk.

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In line with Prospect Theory, it was shown that the prospect of gains or losses influences decision making. In situations that are faced with gains, individuals were less tolerant to risk than in situations of loss. It was also shown that individuals may be influenced by personal characteristics and other behavioral factors. The demographic characteristics of the respondents presented significant results in risk tolerance situations. Unlike the mood scale, in which no statistical significance was obtained in any of the scenarios investigated, the separate mood dimensions influenced risk tolerance.

Thus, the main results admit the possibility of cognitive biases when making decisions involving risks. For example, the Fatigue-Inertia effect indicates that managers who feel exhausted, burnout or depleted are likely to make riskier decisions, which may lead to higher returns or expose companies to potential losses when the decision proves to be incorrect.

On the other hand, the research provides evidence on conservative behaviours arising from negative feelings, as in the cases of Depression-Melancholy and Hostility-Anger. The data point out that managers with these psychological traits are less risk tolerant in decision-making situations. One can imagine situations where good earnings opportunities are missed by managers in these negative moods.

The study finds limitations in the fact that the scenarios are only hypothetical, not presenting real gains or losses. It was found that the mood dimension interfered little in the decision making process. This result may be specific to a sample of students who were placed in organisational decision scenarios. Lack of real experiences or incentives may bias their responses. Therefore, further research should be conducted to deepen and consolidate in the literature the relationship between an individual's mood state and their tolerance to risk.

The contributions of this study serve to improve decision-making processes with regard to the aspect of mitigating the negative effects of risk itself. It is suggested that future studies advance to contemplate other behavioural and psychological variables, as well as broader samples of experienced managers and the population in general. In this manner, it will be possible to design more assertive and rational decision-making processes to evaluate the potential losses and gains of modern companies.

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Appendix I

Scenarios presented to the research participants

Scenario (Perspective)	Presented situation
Scenario 1 (Gains)	With the same investment amount, your company can choose to invest in two innovative product ideas. However, even if you invest equal value in both ideas, they have different chances and return values. As the manager of the organisation, you should choose only one of the ideas. Which of the alternatives do you prefer? (A) Invest in idea A and have a 33% chance of gaining R$2,500.00 and a 67% chance of gaining nothing. (B) Invest in idea B and have a 34% chance of gaining R$ 2,400.00 and a 66% chance of gaining nothing.
Scenario 1 (Losses)	Your company has a certain amount of products that are nearing their expiry date. There are two of your distributors (A and B) who have offered to resell these products and both have proposed a risk contract. You have analysed the history of the two distributors and checked which one would be the best option to sell these products before their expiry date. So, which of the two alternatives do you prefer? (A) Passing on the products to distributor A has a 33% chance of losing R$2,500.00 and a 67% chance of losing nothing. (B) Pass the products on to distributor B and have a 34% chance of losing R$2,400.00 and a 66% chance of losing nothing.
Scenario 2 (Gains)	Suppose that an occasional supplier (who does not sell frequently to your company) has delayed the delivery of raw materials, jeopardising your production process. As a manager, you decide to sue him/her for damages. When the supplier becomes aware of the fact, he contacts you and proposes an out-of-court settlement. Therefore, you must decide between maintaining the legal action (Alternative A) or accepting the agreement proposed by the supplier (Alternative B). Which alternative do you prefer? (A) Accept the proposed deal and have a 100% chance of gaining R$3,000.00. (B) Take legal action against the supplier and have an 80% chance of gaining R$4,000.00 and a 20% chance of gaining nothing.
Scenario 2 (Losses)	A former employee is suing your company for labour issues. You can go to court (Alternative A) or accept an out-of-court settlement (Alternative B). Which one do you prefer? (A) Have 100% chance of losing R$ 3,000.00, accepting the agreement. (B) Have 80% chance of losing R$ 4,000.00 and 20% chance of not losing anything.
Scenario 3 (Gains)	Your company has leftover funds and decides to invest them. You, as the manager, have two investment options, with different chances and return values. Alternative A has a lower chance of winning, but in case of winning, the return is higher; Alternative B has a higher chance of winning, but in case of winning, the return is lower. Which of the two alternatives do you prefer? (A) 25% chance of winning R$ 3,000.00 75% chance of winning anything. (B) 20% chance of winning R$ 3,000.00 75% chance of winning anything.

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Scenario (Perspective)	Presented situation
Scenario 3 (Losses)	A former employee is suing your company for labour issues. You can choose between two lines of defence. In the first case (Alternative A), your company will have a lower risk of losing, but if it does occur, the loss will be greater. In the second line of defence (Alternative B), the risks of losing are greater, but the value of the loss, should it occur, will be lower. Which of the two alternatives do you prefer? (A) Choose the second line of defence and have a 25% risk of losing R$3,000.00 and a 75% chance of losing nothing. (B) Choose the first line of defence and have a 20% risk of losing $4,000.00 and an 80% chance of losing nothing.
Scenario 4 (Gains)	Your company is looking for new clients to expand its business and has three potential candidates. However, your time to attend to these possible clients is limited and only you can attend to them. So, you can divide the time and attend to all three clients (Alternative A) or you can use it to attend to one of them with more time to give you attention. Alternatives have different chances of success. Which one do you prefer? (A) Attend only one client and have a 10% chance of concluding a contract with this client and a 90% chance of not concluding any contract. (B) Attend to the three clients and have a 5% chance of concluding a contract with all of them and a 95% chance of not concluding any contract.
Scenario 4 (Losses)	Your company has had some serious problems in customer service. Thus, the company has adopted some strategies to retain these customers. There are three customers who are very important to your company and are at great risk if not buying your products anymore. However, your time to reverse the loss of these customers is limited and only you can do it. So, you can either divide the time and attend to all three customers (Option A) or use it to attend to one of them with more time to give your attention Alternatives have different chances of success. Which one do you prefer? (A) Attend only one client and have a 10% chance of keeping this client and a 90% chance of losing this client as well. (B) Serve all three customers and have a 5% chance of keeping all three customers and a 95% chance of losing all three customers.
Scenario 5 (Gains)	Your company's bank account manager called offering bank products. At the time, he offered product A and product B, and the investment in both was the same. The two products offered gave your company the right to participate in a draw, with different chances of being drawn and, in case of being drawn, different prizes. As your company wants to maintain a good relationship with the bank, it has decided to invest in one of the products. It was up to you as manager of the company to make the choice. Which of the two alternatives do you prefer? (A) Invest in product A and have 0.1% chance of gaining R$6,000.00 and 99.9% chance of gaining nothing. (B) Invest in product B and have a 0.2% chance of gaining R$3,000.00 and a 99.8% chance of gaining nothing.
Scenario 5 (Losses)	Your company must store a lot of perishable materials, and for this it has as alternatives warehouse A and warehouse B. The storage costs are the same. However, the storage conditions are different, so there are different probabilities of loss of materials, as well as in the value of the possible losses. As a manager, you must choose one of the warehouses. Disregard the total value of the batch of goods. Which of the two alternatives do you prefer? (A) 0.1% chance of losing R$6,000.00 and 99.9% chance of not losing anything. (B) 0.2% chance of losing R$3,000.00 and 99.8% chance of not losing anything.

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Scenario (Perspective)	Presented situation
Scenario 6 (Gains)	Your company delivered to a customer goods that were not in accordance with the requested specifications, so that he could cancel the payment according to the contract. You, as the manager, became aware of the situation and decided to send someone from your team to the customer to reverse the situation, in other words, to be able to receive the purchase made by the customer. Among your team, there were two employees who could reverse this problem. By sending employee A, the chances of reversing the problem were lower, but if successful, your company would receive more money than if you sent employee B. However, by sending employee B, the chances of reversing the situation were higher. Which of the two alternatives do you prefer? (A) Have a 90% chance of receiving R$3,000.00 and a 10% chance of receiving nothing. (B) Have a 45% chance of receiving R$6,000.00 55% chance of receiving nothing.
Scenario 6 (Losses)	Your company delivered to a customer, goods that were not in accordance with their needs, due to a communication failure. This is a one-off purchase and there is no chance of the customer becoming a regular. As a manager, you have learnt that the customer is taking legal action in order to receive compensation from your company. Consulting your lawyer, he informed you that there are two possible courses of action with different risks and probabilities involved. In one (Alternative A), the risks of losing the case are lower, but if it does occur, the amount of the loss will be greater. In the other (Alternative B) the risks of loss are greater, however, the value of the loss, if it happens, will be lower. Which of the two alternatives do you prefer? (A) Have a 90% chance of losing R$3,000.00 and a 10% chance of losing nothing. (B) Have a 45% chance of losing R$6,000.00 55% chance of not losing anything.