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# RISK TOLERANCE IN ORGANIZATIONAL DECISIONS: WOMEN AND MEN IN GAIN AND LOSS SITUATIONS

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## ABSTRACT

The purpose of this study is to verify, enlightened by Prospect Theory, whether women have lower risk tolerance than men in organizational decisions. A field experiment was conducted with 236 managers (115 women and 121 men) divided into two groups (both with men and women): a control group (personal decisions) and an experimental group (organizational decisions) and, afterwards, the 115 women were evaluated separately. All data were analyzed by logistic regression using two models. The results indicate that the initial assumption regarding decisions in the personal field those women are less risk tolerant than men applies less often when decisions are made in the organizational field. Moreover, the influence of gender on risk tolerance is more evident in situations involving gains than in situations of losses. The findings of the study provide reflections on the theme by stating that assumptions accepted by the literature in the field of personal decisions may not be applicable or totally valid in decisions in the organizational field, nor are they the same for gain or losses situations.

**Keywords:** Prospect Theory. Risk tolerance. Decision Making. Gender.

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## **TOLERÂNCIA AO RISCO EM DECISÕES ORGANIZACIONAIS: MULHERES E HOMENS EM SITUAÇÕES DE GANHOS E PERDAS**

### **RESUMO**

O objetivo deste estudo é verificar, à luz da Teoria do Prospecto, se mulheres apresentam menor tolerância ao risco do que homens, em decisões organizacionais. Realizou-se experimento de campo com 236 gestores (115 mulheres e 121 homens) distribuídos em dois grupos, um de controle (decisões pessoais) e outro experimental (decisões organizacionais) e, após, avaliou-se isoladamente as 115 mulheres. Os dados foram analisados por meio de regressão logística, utilizando dois modelos. Os resultados indicam que a premissa inicial, referente decisões no campo pessoal, de que mulheres são menos tolerantes ao risco do que homens, se aplica com menor frequência quando as decisões são tomadas no campo organizacional. Além disso, a influência do gênero sobre a tolerância ao risco é mais evidente em situações envolvendo ganhos do que em situações de perdas. Os achados do estudo trazem reflexões sobre o tema ao constatar que premissas aceitas pela literatura no campo de decisões pessoais podem não ser aplicáveis ou totalmente válidas em decisões no campo organizacional e tampouco iguais para situações de ganhos ou de perdas.

**Palavras-Chave:** Teoria do Prospecto. Tolerância ao risco. Tomada de decisão. Gênero.

### **1 INTRODUCTION**

Decisions are present in the lives of individuals and involve social, environmental, and economic concerns, so supporting decision making requires the ability to deal with situations of unpredictability and pressure for time and results (Courtney; 2001; Nummela, Saarenketo, Jokela & Loane, 2014). In organizations, tolerance to risk in the face of decisions taken is associated with managers. That is, manager-related factors play an important role in organizational decision making (Buckley, Chen, Clegg & Voss, 2018).

Time pressures and results from uncertainties lead to risk exposure (Lefley, 1997). In this regard, Zhou, Liu, Zhang, Gu, and Wang (2014) state that individuals' attitude toward making decisions involving risk is uncertain, which makes it difficult to estimate the risks that will be taken by different individuals. These behaviors can be influenced by demographic factors such as gender, age, marital status, educational qualifications, income level, and experience, among others. They are also influenced by factors related to the characteristics of the organization in which the decision maker works, such as income, bond, time of existence, and number of employees, among others.

Regarding gender, Sarin and Wieland (2016) state that studies have indicated that women are less tolerant to risk than men. Maxfield, Shapiro, Gupta and Hass (2010) relate this finding to a cultural issue, in which women are not expected to take risks. However, Johnson and Powell (1994) claim that this stereotype may not apply when women play the role of managers, since in the managerial role they may show similar risk tolerance to men. Fisher and Yao (2017) corroborate when stating that there is an influence of gender on risk tolerance. However, the authors argue that individual characteristics, such as income

uncertainty and equity, lead to different risk tolerances for different genders. Thus, in an organizational environment, if there is homogeneity between the individual characteristics of women and men, there could be no difference in the tolerance to risk presented by both.

The international literature on risk tolerance focuses on personal decisions, with fewer studies on risk in the context of organizational decisions (Fagundes, Schnorrenberger & Lunkes, 2018). More recent national studies, on the other hand, have sought to analyze the risk tolerance presented by actuarial academics and professionals (Bilk, Barbosa, Silva & Nakamura, 2018) or have sought to determine factors related to risk tolerance, among them age, marital status, income, and gender (Nobre, Macedo, Nobre & Silva, 2017; Lobel, Klotzle, Silva & Pinto, 2018). More specifically about gender, Gava and Vieira (2008) found evidence that men are more risk tolerant than women, when applying a questionnaire with decisions in the personal field. It is noted that these studies did not consider the different fields of decision making, such as personal and organizational, since they adopted instruments with decisions only in the personal field.

Thus, in order to know if the field in which the decision is made influences risk tolerance, that is, if women present changes in risk tolerance depending on the field in which they are deciding, the guiding question of this research arises: in decisions in the organizational field, do women maintain lower risk tolerance than men, as in personal decisions?

This research is justified by the importance in understanding the decision-making process in organizations, as well as the factors that influence it (Fisher & Yao, 2017). Risk is intrinsically associated with economic activity, being an important variable in decision making (Melesse & Cecchi, 2017). The scenario of wide offer of financial products and different investment possibilities in search of extra returns further amplifies the need for studies about risk tolerance (Campara, Vieira, Bender Filho & Coronnel, 2017). Furthermore, with the increase in the number of women playing increasingly important roles in business management, knowing the differences in decisions made by women and men can have real implications for organizations (Francis, Hasan, Park & Wu, 2015).

## **2 2 THEORETICAL FOUNDATION AND HYPOTHESIS DEVELOPMENT**

### **2.1 Prospect Theory and Risk Tolerance**

Dohmen et al. (2011) point out that risk, uncertainty, and pressure for outcomes permeate most economic decisions. Tversky and Kahneman (1992) and Lefley (1997) highlight that many decisions in organizations are made under conditions of uncertainty. Every choice bears elements that involve uncertainty, which may imply changing the decision maker's own level of exposure to risk. When managers understand the characteristics of the risks involved in a decision, their implications can be appreciated and mitigated (Lefley, 1997).

Research about risk tolerance has sparked interest in recent years, since the topic consists of an input in decision-making models, and in this context it is relevant to identify the factors that have an influence on the risk tolerance of decision makers (Geetha & Selvakumar, 2016). In the field of social sciences, risk is treated from a broader perspective, in which it refers to a set of beliefs and feelings

that people have about the nature of dangerous events, their qualitative characteristics, outcomes, and acceptability (Aven, 2009).

Risk tolerance is a concept that describes what an individual performs when faced with safer and less safe alternatives (Hsee & Weber, 1997). Thus, decision making under risk can be seen as a choice between prospects or bets. You have choice  $x$  with possibility  $p$ , and choice  $y$  with probability  $1 - p$ . Thus, an individual is less risk tolerant if he always prefers the safe prospect to the risky one. It can be said that the prevalence of risk aversion is the best-known generalization regarding risky choices (Kahneman & Tversky, 1979). An individual's choice when faced with a situation is an important predictor of his or her risk tolerance behavior (Hsee & Weber, 1997).

Kahneman and Tversky (1979), based on the ideas of Simon (1955), developed the Prospect Theory (PT), which considers the difference between the terms utility and value, defining utility in terms of net wealth and value in terms of gains and losses, which in turn are defined as deviations (positive or negative) from a given reference point (Kahneman & Tversky, 1979). Risks taken are related to changes in wealth rather than states of wealth (Kahneman, 2003)

In PT the value function for losses is different from the value function for gains, since in loss perspective the function becomes convex and steeper, and in gain perspective the function is concave and not as steep. That is, in general, when losses are directly and proportionally compared to gains, the rejection of losses tends to be greater than the attraction to gains (Kahneman, 2012). This ratio, according to Kahneman and Tversky (1979), Kahneman, Knetsch and Thaler (1990), and Tversky and Kahneman (1991), in situations involving mainly decisions related to the personal field, is usually about 2 to 1.

Also back in the 1990s, Hsee and Weber (1997) stated that to succeed in ventures involving other people, each person must anticipate the preferences of others, including their risk tolerance. In this sense, considering that individuals make decisions that involve others, Reynolds, Joseph, and Sherwood (2009) identified that individuals are more tolerant to risk when making decisions for themselves and less tolerant in decisions that affect others, from an experiment conducted with students, not contemplating decisions in the organizational field.

Corroborating, Montinari and Rancan (2013) found that when deciding for others, even in identical contexts, individuals make different choices than if they decided for themselves. Pahlke, Strasser, and Vieider (2015) state that in the gains domain, when deciding for others decision makers tend to exhibit lower risk tolerance, which is due to a sense of caution. In loss situations, decision-makers who are deciding for others seek risk with greater intensity than when deciding for themselves, which cannot be explained by a social rule of caution when individuals decide for others.

As noted and, according to Andersson, Holm, Tyrann and Wengström (2014), research findings on third-party decision making are not convergent. While some studies have found greater risk-taking on behalf of others, Reynolds, Joseph and Sherwood (2009) and Eriksen and Kvaløy (2010) found that individuals take less risk with others' money than with their own. Chakravarty, Harrison, Haruvy, and Rutström (2011) also point out that there is a need for better understanding of the motivations of those who act on behalf of others.

Hence, it is possible to identify the need for risk tolerance studies in both personal and organizational fields. He and Villeval (2017) conclude that it is unclear whether differences in risk tolerance are stronger or weaker in the organizational field when compared to the personal. This vagueness may be related to the findings of Fisher and Yao (2017), who state that women and men who exhibit homogeneity of individual characteristics may not exhibit different risk tolerance behavior. According to the authors, the differences in individual characteristics of women and men is what leads to the different risk tolerance behaviors.

## **2.2 Differences in Risk Tolerance of Women and Men**

In addition to varying with respect to the prospects of gains and losses and with respect to the field in which one is deciding, risk tolerance can also vary from factors related to the decision maker and the environment, such as demographic, cultural, psychological, financial, and behavioral factors (Geetha & Selvakumar, 2016).

Demographic factors are characteristics of individuals (gender, age, marital status, educational qualification, income, and perception of own financial condition) and characteristics of organizations (revenue, respondent's bond, length of existence, number of employees, individual's experience, and perception of organization financial condition), which can influence decision-making behavior (Geetha & Selvakumar, 2016; Ramiah, Zhao, Moosa, & Graham, 2016; Nobre et al., 2017).

With regard to gender, studies state that women are less risk tolerant than men (Grable, 2000; Dohmen et al., 2011; Montinari & Rancan, 2013; Geetha & Selvakumar, 2016; Sarin & Wieland, 2016), finding that gender influences risk tolerance. For Sarin and Wieland (2016), from surveys it has become accepted that women are less risk tolerant than men. Thus, the first research hypothesis is:

**H1a:** On the personal front, women are less tolerant of risk than men.

However, Johnson and Powell (1994) state that the stereotype that women are less risk tolerant may not apply to managers making organizational decisions. They argue that women and men who hold management positions undergo managerial training that leads them to make decisions of equal quality, and this qualification can affect an individual's tolerance to risk, mitigating it.

Corroborating, Maxfield et al. (2010) state that, in fact, women are seen as less risk tolerant. However, they relate this finding to an American cultural issue. They claim that the risk-taking behavior of female and male managers does not differ. They argue that women take risks in managerial settings and found little evidence to support results that women are less risk tolerant than men in decisions in the organizational field.

In this regard, Francis et al. (2015) point out that with the increase of women in management positions has also increased research about the influence of gender on organizational decisions. Although much of the literature points out that there is a significant difference in the decisions made by women and men, it has limited and not definitive results. Thus, the following research hypothesis arises:

**H1b:** In the organizational field, women are less risk tolerant than men.

When individuals make decisions for other people, such as the manager in an organization, they may have a different risk tolerance than when making personal decisions. Reynolds, Joseph and Sherwood (2009) found that individuals are more risk tolerant in making decisions for themselves than in decisions for others. In this same regard, Eriksen and Kvaløy (2010) concluded that individuals take more risks with their own money than with the money of others. Thus, the following research hypothesis arises:

**H2:** Women are more risk tolerant in the personal field than in the organizational field.

Hypotheses H1a, H1b, and H2 are aligned with studies regarding differences in the risk tolerance of women and men in the organizational environment, by checking whether the results of previous research, predominantly in the personal field, also apply to decisions in the organizational field.

### 3 METHODOLOGICAL PROCEDURES

In this study a field experiment with a questionnaire was conducted. Although there is less control in such type of experiment, if compared to the one performed in the laboratory, the field experiment allows to verify the influence of independent variables on a dependent variable (Prodanov & Freitas, 2013). Field experiments are indicated in organizational contexts when you can only use pre-existing groups and cannot randomly select them (Gray, 2012). Experiments have been used in recent studies of risk tolerance such as that of Moosavian, Hammond, and Goodwin (2020), who researched risk tolerance from an experiment using lottery options. Brocas, Carrillo, Giga, and Zapatero (2019), on the other hand, studied risk tolerance from a laboratory experiment.

As experimental research, this study uses three conditions pointed out in the literature: manipulation of variables, control of variables, and random distribution of participants, so that they have the same chance of participating in the different groups belonging to the experiment (control and experimental group) (Baptista & Campos, 2016).

The research populations are women and men who work as managers in organizations linked to commercial and industrial associations in the municipalities of Santa Catarina State, randomly assigned to the control and experimental groups. It is not possible to determine the total population, since some of the associations do not disclose the number of members. The choice for managers of these associations was made by accessibility. From the contact with the associations, it was possible to send the questionnaires to the managers of associated organizations, which have different sizes and operate in different activity sectors, diversifying the research sample.

After telephone contact with the associations, an e-mail was sent with the link for each of the questionnaires (personal or organizational decisions), assuring the associations that the managers would randomly receive only one of the two questionnaires, so that they had the same chance to belong to the control (decisions in the personal field) or experimental (decisions in the organizational field) group. They were informed about the academic nature of the study and that the data would not be disclosed individually, as well as that there were no right or wrong answers. A letter introducing the research was sent to the participants, in

which they were informed that they could choose not to participate or to withdraw from the research at any time, and they only needed to disregard the research instrument.

A total of 243 managers participated in this experiment, but 7 answers were eliminated because they were incomplete. Responses from 236 managers remained, of which 120 made up the control group (personal decisions) and 116 participated in the experimental group (organizational decisions). Of the total, 115 declared themselves women and 121 men. The control group had an equal number of women and men, while the experimental group was composed of 47% women and 53% men. The confidence level of the survey is 95%, which, according to Fávero and Belfiore (2014), is the standard confidence level. The margin of error is 6.4% as calculated by Wooldridge (2006). Data was collected between September and November 2018.

In attention to internal validity, the control took place through control variables, allowing the influence of the independent variable on the dependent one to be identified (Baptista & Campos, 2016). These control variables consist of surveyed characteristics of the managers and the organizations, to which they were linked, such as age, marital status, level of education, monthly income level, relationship to the organization, manager's experience, number of employees, and the organization's revenues.

In this study, the dependent variable corresponds to risk tolerance, analyzed according to independent variables. Firstly, gender is the independent (explanatory) variable, from which we seek to verify its influence on managers' risk tolerance. Subsequently, only the women's answers are selected and the decision field takes on the role of independent variable (explanatory), from which we seek to verify the influence of the decision field on the risk tolerance of the women who participated in the survey.

A design was chosen in which no observation is made prior to the manipulation of the independent variable in the experimental group, since this could have an interactive effect on the intervention. Conducting an observation prior to manipulating the independent variable can reduce its efficiency (Baptista & Campos, 2016).

The research instrument was divided into two blocks. Block I includes questions about the demographic characteristics of the respondents, which represent control variables, from which we try to increase the internal validity, so that we can attribute possible effects occurring in the dependent variable to the independent one. Control variables are measured in both groups (control and experimental) so that it becomes possible to compare the groups and identify relationships. These variables were defined from the literature, in which research has been found that highlights the influence of these variables on risk tolerance when making decisions. Block I is identical for both groups of managers.

The choice options in Block II were adapted from Kahneman and Tversky (1979), following the same odds ratios in the answers to the twenty questions that make up this Block. However, the situations were adapted, creating situations that involved decisions present in the personal and organizational fields. Some examples of situations in the personal sphere are personal investment options, cash or installment sales of personal items, labor actions against organizations where you have worked, participation in a raffle, property rental, traffic fines, litigation

with neighbors, and acquisition of real estate. As for decisions in the organizational field, some examples are corporate sales, bank investments, investments in product development, product and raw material purchases, regulatory agency fines, negotiations with customers and suppliers, and labor claims by former employees. Table 1 presents the structure of Block II of the research instrument used in both groups.

**Table 1**  
Structure of Block II of the Research Instrument

<b>Block II</b>				
<b>Group</b>	<b>Field</b>	<b>Decisões</b>	<b>Perspectiva</b>	<b>Autores</b>
Control	Personal Field	Decisions 01 to 10	Gains	Kahneman and Tversky (1979); Hsee and Weber (1997); Reynolds, Joseph and Sherwood (2009); Chakravarty et al. (2011); Montinari and Rancan (2013).
		Decisions 11 to 20	Losses	Kahneman and Tversky (1979); Kahneman et al. (1990); Hsee and Weber (1997).
Experimental	Organizational Field	Decisions 01 to 10	Gains	Kahneman and Tversky (1979); Kahneman et al. (1990); Hsee and Weber (1997); Reynolds, Joseph and Sherwood (2009); Montinari and Rancan (2013).
		Decisions 11 to 20	Losses	Kahneman and Tversky (1979); Kahneman et al. (1990); Hsee and Weber (1997).

Source: Prepared by the authors.

Table 2 presents the dependent variable, the independent (explanatory) variables, and the control variables of the research, presenting the acronyms and descriptions, with the classifications and authors, and also the metrics used. It is worth mentioning the pre-test application of the questionnaire with managers who are not linked to commercial and industrial associations in Santa Catarina, which, therefore, do not make up the research population. After the pre-test, adjustments were made to the research instrument, making the text clearer and more objective, mitigating the risk of a distorted effect of the decisions. In the end, the average response time was 25 minutes.

In order to avoid possible differences in the attention of managers at the time of data collection, the last questions were presented randomly to the participants.



**Table 2**

Background of dependent, independent and control variables

<b>Abbreviation</b>	<b>Variable</b>	<b>Category</b>	<b>Authors</b>	<b>Metrics</b>
TR	Tolerance for Risk	Dependent (Dichotomous)	Kahneman and Tversky (1979); Hsee and Weber (1997); Geetha and Selvakumar (2016).	0 - More tolerant 1 - Less tolerant
CAM	Field in which the decision is being made	Independent (Explanatory) (Dichotomous)	Eriksen and Kvaløy (2010); Andersson <i>et al.</i> (2014); Pahlke, Strasser and Vieider (2015); He and Villeval (2017); Schultz <i>et al.</i> (2018).	0 - Personal 1 - Organizational
GEN.	Respondent gender	Independent (Explanatory) (Dichotomous)	Grable (2000); Maxfield <i>et al.</i> (2010); Dohmen <i>et al.</i> (2011); Yao, Sharpe and Wang (2011); Montinari and Rancan (2013); Francis <i>et al.</i> (2015); Ramiah <i>et al.</i> (2016); Geetha and Selvakumar (2016); Brooks <i>et al.</i> (2018).	0 - Men 1 - Woman
IDA	Respondent's age	Control (Continuous)	(2010); Dohmen <i>et al.</i> (2011); Yao, Sharpe and Wang (2011); Ramiah <i>et al.</i> (2016); Geetha and Selvakumar (2016); Brooks <i>et al.</i> (2018).	Discrete Quantitative 0 - 99
CIV	Marital status	Control (Dichotomous)	Yao, Sharpe and Wang (2011); Geetha and Selvakumar (2016).	0 - Single 1 - Not single
GIN	Level of education:	Control (Polytomics)	Geetha and Selvakumar (2016).	0 - Primary school 1 - High school education 2 - Technical school 3 - Graduation 4 - Specialization

Abbreviation	Variable	Category	Authors	Metrics
				5 - Master's degree 6 - Doctorate
FRM	MONTHLY INCOME LEVEL	Control (Polytomics)	Grable (2000); Yao, Sharpe and Wang (2011); Geetha and Selvakumar (2016); Brooks <i>et al.</i> (2018).	0 - Up to R\$ 1,908.00 1 - More than R\$ 1,908.00 to R\$ 3,816.00 2 - More than R\$ 3,816.00 to R\$ 9,540.00 3 - More than R\$ 9,540.00 to R\$ 19,080.00 4 - More than R\$ 19,080.00
FFA	Organization's annual income range	Control (Polytomics)	(2015); Ramiah <i>et al.</i> Geetha and Selvakumar (2016).	0 - Up to R\$ 81,000.00 1 - From R\$ 81,000.01 to R\$ 360,000.00 2 - From R\$ 360,000.01 to R\$ 4,800,000.00 3 - Over R\$ 4,800,000.00
VRO	Respondent's link to the organization	Control (Dichotomous)	Rocha, Albuquerque Filho, Freire and Ramos (2018).	0 - Owner 1 - Employee
EXI	Existence of the organization (in years)	Control (Continuous)	(2015); Ramiah <i>et al.</i> Geetha and Selvakumar (2016).	Discrete Quantitative 0 - 99
FUN	Number of employees	Control (Polytomics)	(2015); Ramiah <i>et al.</i> Geetha and Selvakumar (2016).	0 - Up to 9 employees 1 - From 10 to 99 employees 2 - From 100 to 999 employees 3 - More than 1000 employees
EXP	Manager's experience (in years)	Control (Continuous)	Shepherd, Williams and Patzelt (2015).	Discrete Quantitative 0 - 99
DEP	No. Dependents	Control (Continuous)	Yao, Sharpe and Wang (2011)	Discrete Quantitative 0 - 99
PCP	Perception of own financial condition	Control (Polytomics)	Viscusi, Magat and Huber (1987); Camerer (2005).	0 - Very indebted 1 - Little indebted 2 - Financially balanced 3 - Financially balanced with leftovers and/or applications/investments
PCO	Perception of the organization's financial condition	Control (Polytomics)	Viscusi, Magat and Huber (1987); Camerer (2005).	0 - Very indebted 1 - Little indebted 2 - Financially balanced 3 - Financially balanced with

Abbreviation	Variable	Category	Authors	Metrics
				leftovers and/or applications/investments

Source: Prepared by the authors.

After applying the questionnaires, the answers were tabulated using Microsoft Excel and the data were analyzed quantitatively through logistic regression, which allows knowing the relationship between variables from a dichotomous (binary) variable. Thus, it became possible to estimate the chance of the dependent variable (risk tolerance) taking on certain values as a function of other variables (Wooldridge, 2006).

A multicollinearity test of the data was carried out, which is a problem in model fitting that can impact parameter estimates. After performing the Variance Inflation Factor Test (VIF), values between 1.0 and 2.8 were found, confirming no multicollinearity problems among the variables, according to Wooldridge (2006).

A selection of the Stepwise model selection was also performed, whereby the importance of the variables entered in the initial model is evaluated by including or excluding them. The most important variables, statistically speaking, are those that produce the largest change in the log-likelihood relative to the model that does not contain the variable. It was observed that the model that contemplated all the control variables was the most adequate, considering the scenarios in which the regressions will be applied.

Tests of difference of means (test t) indicated for testing the difference between two population means and test of difference of proportions (test z) indicated for testing the difference between population proportions were performed (Larson & Farber, 2016). Thus, for demographic characteristics represented by continuous variables the t test was used and for characteristics represented by categorical variables the z test was used. The test results indicated that the control and experimental groups do not differ in gender, age, marital status, education, monthly income range, experience, number of dependents, and perceived financial condition.

After the tests and the choice of models, the hypotheses were tested. For hypotheses H1a and H1b, Model 1 was estimated initially for survey managers with decisions in the personal field (H1a) and subsequently for survey managers with decisions in the organizational field (H1b). In Model 1, gender assumed the role of independent variable, attempting to verify the influence of gender on the risk tolerance of managers, separately in each of the groups. Model 1 was estimated for each of the 20 decisions, in each field, from the following equation (Wooldridge, 2006).

$$P(TR) = \frac{1}{1 + e^{-g(x)}}$$

Where:

$$g(x) = \beta_0 + \beta_1 GEN + \beta_2 IDA + \beta_3 CIV + \beta_4 GIN + \beta_5 FRM + \beta_6 FFA + \beta_7 VRO + \beta_8 EXI + \beta_9 FUN + \beta_{10} EXP + \beta_{11} DEP + \beta_{12} PCP + \beta_{13} PCO + \mu$$

And:

$TR$  is the dependent variable (Risk tolerance);

$\beta_0$  is the intercept;

$\beta_{1,2,3}$  are the angular coefficients;

$GEN, IDA, CIV, GIN, FRM, FFA, VRO, EXI, FUN, EXP, DEP, PCP$  E  $PCO$  correspond to the independent variables;

$\mu$  are the regression residuals.

To test hypothesis H2, in Model 2, women were isolated in a single data set, with the decision field taking the role of independent variable. For the experimental group questionnaires, in which the participants answered the instrument with organizational decisions, the decision field variable was assigned a value of 1, and then the field became a dichotomous variable. Therefore, based on Model 2, an attempt was made to verify the influence of the decision field on women's risk tolerance. Model 2 was estimated for each of the 20 decisions made by the respondent women. The field in which the decision was made became an independent variable in the model, according to the following equation (Wooldridge, 2006).

$$P(TR) = \frac{1}{1 + e^{-g(x)}}$$

Where:

$$g(x) = \beta_0 + \beta_1 CAM + \beta_2 IDA + \beta_3 CIV + \beta_4 GIN + \beta_5 FRM + \beta_6 FFA + \beta_7 VRO + \beta_8 EXI + \beta_9 FUN + \beta_{10} EXP + \beta_{11} DEP + \beta_{12} PCP + \beta_{13} PCO + \mu$$

And:

$TR$  is the dependent variable (Risk tolerance);

$\beta_0$  is the intercept;

$\beta_{1,2,3}$  are the angular coefficients;

$CAM, IDA, CIV, GIN, FRM, FFA, VRO, EXI, FUN, EXP, DEP, PCP$  E  $PCO$  correspond to the independent variables;

$\mu$  are the regression residuals.

Table 3 presents the hypotheses built along the theoretical framework, relating them to the expected signal of the independent variables tested, referring to the objectives that are sought to be answered. In other words, Table 3 highlights, for each hypothesis, the expected signal of the coefficient of the independent variables under study, in order to confirm or not the research hypotheses.

**Table 3**  
Expected Signals versus Research Hypotheses

Hypothesis	Expected signal
H1a: On the personal front, women are less risk tolerant in making decisions than men.	+
H1b: In the organizational field, women are less risk tolerant in decision making than men.	+
H2: Women are more risk tolerant in the personal field than in the organizational field.	+

Source: Prepared by the authors.

## 4 RESULTS

As mentioned, of the 236 participants with valid answers, 120 made up the control group (personal decisions) and 116 participated in the experimental group (organizational decisions). Of the total, 115 declared themselves women and 121 men. The control group had an equal number of women and men, while the experimental group was composed of 47% women and 53% men.

The average age of the respondents is 39 years, being 37 years in the control group and 41 years in the experimental group. The average length of experience is 8 years, and they have, on average, one dependent. Most of the respondents (57%) reported that they have a post-graduate degree (post-graduate, master's or doctorate). Regarding income, 59% informed that they have a monthly income above 4 minimum wages.

### 4.1 Differences in Risk Tolerance of Women and Men

Initially, the influence of gender on the risk tolerance of managers in the control (which deals only with decisions in the personal field) and experimental (which deals only with decisions in the organizational field) groups was analyzed separately, in order to compare risk tolerance between women and men in each of the groups. Table 4 presents the results of the separate analysis of the two groups from the perspective of gains and losses, indicating the coefficients obtained for the independent variables tested in Model 1 in each decision analyzed.

**Table 4**  
Results of Logistic Regressions - Model 1

Decisions in the personal field (control group)										
	1	2	3	4	5	6	7	8	9	10
Gains	1.248**	1.260**	0.638	0.748*	0.917	0.937**	1151	-0.334	0.316	0.870*
Losses	11	12	13	14	15	16	17	18	19	20
	0.355	0.942*	-0.041	0.263	-0.318	-0.276	-0.678	-0.779	1.178**	-0.110
Decisions in the organizational field (experimental group)										
	1	2	3	4	5	6	7	8	9	10
Gains	-0.357	-1.021*	0.004	0.245	-0.244	-0.256	0.897**	0.769	1.165***	0.673
Losses	11	12	13	14	15	16	17	18	19	20
	-0.269	-0.355	0.238	-1.156**	-0.107	-0.481	-0.069	0.318	-0.037	-0.262

Source: Prepared by the authors.

Note: \* significance at the level of 10%; \*\* significance at the 5% level, and; \*\*\* significance at the 1% level.

The coefficients shown in the results of a logistic regression do not represent the chance variations, and it is necessary to calculate the exponential of each coefficient to achieve the influence of the significant variable. These percentages are shown in Table 5, for Model 1.

**Table 5.**

Efeitos da variável gênero na tolerância ao risco de mulheres e homens

<b>Decisions in the personal field (control group)</b>										
Gains	1	2	3	4	5	6	7	8	9	10
	+ 248%	+ 253%		+ 111%		+ 155%				+ 139%
Losses	11	12	13	14	15	16	17	18	19	20
		+ 157%							+ 225%	
<b>Decisions in the organizational field (experimental group)</b>										
Gains	1	2	3	4	5	6	7	8	9	10
		-64%					+ 145%		+ 221%	
Losses	11	12	13	14	15	16	17	18	19	20
				-69%						

Source: Prepared by the authors.

In the personal field, the gender variable was significant in five decisions involving gains and in two involving losses - see highlighted cells in Table 4. When it involved gains, women showed less tolerant behavior compared to men, since positive coefficients of the independent variable were observed in decisions 1, 2, 4, 6, and 10. In these cases, women were less risk tolerant than men, being 111% to 253% more likely to choose alternatives that offered safer, albeit lower, gains over options with higher, but riskier, gains.

Still relating to personal decisions, but involving losses, the gender factor presented significance as a factor that influences risk tolerance in decisions 12 and 19, indicating that women presented 157% and 225% greater chances of choosing the less risk tolerant alternative, that is, the one that presented less loss, even though the probability of occurrence was greater.

Hence, in relation to decisions taken in the personal field, whether involving gains or losses, the results in relation to the gender factor as an influencer of the risk behavior of individuals corroborate the literature, when it presents that women are less tolerant to risk than men. Moreover, the influence of gender on the risk tolerance of managers was more evident in a win-win perspective than in a lose-lose perspective when it comes to decisions in the personal field.

In the experimental group that responded about organizational decisions, significance was observed in four decisions presented, involving gains and losses - see highlighted cells in Table 4. In two decisions involving gains, women were less risk tolerant, as positive coefficients of the independent variable were observed in decisions 7 and 9. In these cases, women were 145% and 221% more likely to opt for safer, albeit smaller, gains than for larger but riskier gains.

The behavior presented in decisions 7 and 9, regarding the gender factor as an influencer of managers' risk behavior, corroborates the literature that treats women as less risk tolerant than men.

On the other hand, in decision 2 in the organizational field and in the earnings perspective, women present a 64% higher chance of choosing the more risk-tolerant alternative, assuming a riskier stance than men - according to Table 4,

a negative coefficient of the independent variable is observed. This decision was a choice between making a cash sale for a lower amount, or a forward sale for a higher amount, but with the risk of not receiving it. Moreover, when the organizational decisions involved losses, gender was significant only in decision 14, which dealt with two options of contracts involving risk with two suppliers, indicating that women presented a higher risk tolerance behavior, with a 69% greater chance of opting for a greater loss, but with lower probability of occurrence - according to Table 4, there is a negative coefficient of the independent variable in this decision.

In these two cases of organizational decisions - 2 (gain perspective) and 14 (loss perspective) - the results diverge from the literature, which presents that women are less risk tolerant than men. Such divergence may indicate the influence of the decision field on risk tolerance greater than the influence of gender, to the extent that in these cases women are more risk tolerant than men. It is possible that when making decisions for others (in this case, for the organization) women exhibit different behavior than they would if the decisions affected them directly. Another justification for women taking more risk in these two decisions is that they involved negotiations with customers (decision 2) and suppliers (decision 14), possibly giving women more security by making them take more risks, since these are routine situations in organizations.

In general, the results obtained indicate that women are less risk tolerant when making decisions than men when it comes to decisions in the personal field (H1a), corroborating the literature. As reported, women in the control group were less risk tolerant in decisions 1, 2, 4, 6, 10, 12, and 19 in the personal field. However, in decisions in the organizational field (H1b), ambiguous behavior was found - in decisions 7 and 9 it was observed that women in the experimental group were less tolerant to risk, corroborating the literature; however, they showed more risk-tolerant behavior in decisions 2 and 14 which dealt with sales to customers and contracts with suppliers, respectively.

#### **4.2 Influence of the Decision Field on Women's Risk Tolerance**

From the 236 responding managers who participated in this experiment, a new data set was created, composed only of women, totaling 115 responses. Of this subtotal, 60 were allocated to the control group and 55 to the experimental group.

This analysis was performed considering as independent variable the field in which the decision was being made (personal or organizational). Questionnaires answered based on personal field decisions were assigned a value of zero to the decision field variable. Questionnaires answered based on decisions from the organizational field were assigned a value of 1 for this variable. It was then possible to analyze the influence of the decision field on the risk tolerance of the 115 women. The other variables included in Model 2 maintain their role as control variables, and the results of the logistic regressions are presented in Table 6.

**Table 6**  
Results of Logistic Regressions - Model 2

		Decisions in the organizational field					Decisions in the personal field				
		1	2	3	4	5	6	7	8	9	10
Gains		-0.517	-0.569	-0.447	-0.583	0.412	-0.392	-2.176***	-0.603	0.804**	1.119*
Losses		11	12	13	14	15	16	17	18	19	20
		0.475	-0.709	-0.908**	-1.561***	-0.260	-0.513	-0.812*	0.325	-0.394	0.261

Source: Prepared by the authors.

Note: \* significance at the level of 10%; \*\* significance at the 5% level, and; \*\*\* significance at the 1% level.

As already mentioned, the coefficients presented in the results of a logistic regression do not represent chance variations, and it is necessary to calculate the exponential of each coefficient to know the real influence of each significant variable. These percentages are shown in Table 7, for Model 2.

**Table 7**  
Effects of the field variable on women's risk tolerance

		Decisions in the organizational field					Decisions in the personal field				
		1	2	3	4	5	6	7	8	9	10
Gains								-89%		123%	206%
Losses		11	12	13	14	15	16	17	18	19	20
				-60%	-79%			-56%			

Source: Prepared by the authors.

The data in Table 6 indicate that the decision field influenced risk tolerance when the decisions involved gains (7, 9 and 10) and losses (13, 14 and 17). In decisions 7 (gain perspective), 13, 14 and 17 (loss perspective), the results indicate a more risk-tolerant behavior in organizational decisions than when these decisions involved the personal field - according to Table 6, one observes a negative coefficient of the independent variable. Decision 7 was about a travel draw in the personal field and a negotiation with clients in the organizational field. Decisions 13 and 14 involved choosing mechanical services in the personal field and choosing supplier contracts in the organizational field. Decision 17, on the personal side, dealt with a job interview, and on the organizational side with customer post-sales service. In all of these cases, women felt more comfortable taking risks in organizational decisions. It is possible that they are more accustomed, while managers, to taking risks involving customers and suppliers, and are more tolerant to risk in these decisions. In situations of choosing a mechanical service, a travel draw, and a job interview, on the other hand, they may not feel comfortable, making them less tolerant of risk.

However, unlike the previous decisions, in decisions 9 and 10 (gains perspective), women were less risk tolerant in organizational decisions than in personal ones - according to Table 6, a positive coefficient of the independent variable is observed. Such findings corroborate the Prospect Theory, indicating that in gains, individuals are less risk tolerant than in losses. In the case of this research, in decisions 9 and 10, in the organizational field, women were even less tolerant of risk than in the personal field. Decision 9 involved choosing between two investment options. In the personal field the resources were personal, while in the organizational field the resources were those of the organization. In both situations, the probability of winning was very small (0.1%), while the probability of

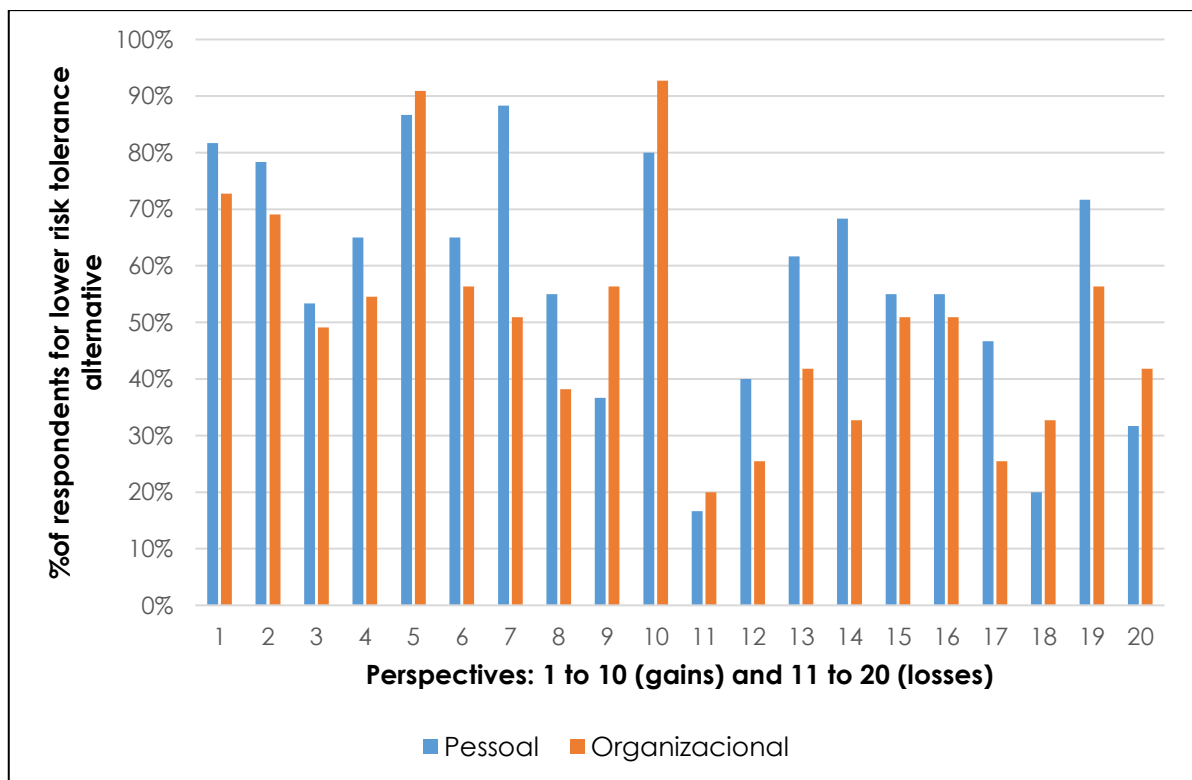


winning nothing was very high (99.9%). This may have contributed to the women being even more cautious with the organization's resources than with their own. Decision 10, on the other hand, dealt with a rental service of a private property in the personal field and an post-sales service in the organizational field. In both situations there was a 55% probability of winning nothing, which may also have contributed to women being even less risk tolerant in the organizational decision.

Overall, the results indicate that women are less tolerant of risk in the personal than in the organizational field, a behavior observed in four decisions (7, 13, 14, and 17). However, for two other decisions (9 and 10) the field influenced risk tolerance in the opposite direction, that is, women were even less tolerant in organizational decisions. Such behavior, which can be explained by the Prospect Theory, indicates that individuals are less tolerant of risk in earnings.

### 4.3 Comparison Between Groups of Women, in Personal and Organizational Decisions

As a complement, the percentages of women's answers were analyzed, separately analyzing the women according to: (i) groups - control (personal field) and experimental (organizational field); and (ii) perspectives - of gains (decisions from 1 to 10) and losses (decisions from 11 to 20). Figure 1 illustrates the differences in behavior, showing the percentage totals of women who chose the least tolerant alternative in each decision.



**Figure 1** - Percentage of answers for women's lower risk tolerance  
Source: Prepared from the research data.

Observing Figure 1, it is possible to see that in decisions involving gains (1 to 10), the percentages of women who chose the least tolerant alternative were higher than in decisions involving losses (11 to 20). With regard to the decision field,

it can be seen that in most personal decisions (control group) there is a higher percentage of less tolerant women compared to organizational decisions (experimental group). This indicates that women managers become more risk tolerant when making decisions in the organizational field, compared to decisions made in the personal field.

#### 4.4 Discussion of Results

The literature presents which characteristics of the decision maker can impact practices adopted or alternatives chosen in a decision-making process. The field in which one is deciding is also presented as a possible factor influencing risk tolerance.

Table 8 presents the consolidated results of this study, highlighting the research hypotheses and the signals of the independent variables tested in Models 1 and 2, in which decisions were simulated considering perspectives of gains (1 to 10) and losses (11 to 20). Hypothesis H1a deals with the behavior of women and men in the control group on personal decisions, H1b refers to the experimental group of women and men on organizational decisions, and H2 dealt only with women.

**Table 8**  
Summary of results obtained by tested hypothesis

Hypothesis	Expected signal of the independent variable tested	Signal found - decisions with Gain Perspective										Signal found - decisions with Loss Perspective									
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
H1a: On the personal field, women are less tolerant of risk than men.	+	+	+		+		+			+			+							+	
H1b: In the organizational field, women are less risk tolerant than men.	+		-					+		+											
H2: Women are more risk tolerant in the personal field than in the organizational field.	+								-		+	+								-	

Source: Prepared by the authors.

Overall, it can be seen that gender influenced the risk tolerance of managers. In situations involving decisions in the personal field, women were found to be less risk tolerant than men, corroborating what the literature indicates (Grable, 2000; Dohmen et al., 2011; Montinari & Rancan, 2013; Geetha & Selvakumar, 2016; Sarin & Wieland, 2016). Such behavior occurred mainly when decisions were made in prospect of gains. For loss prospects this influence was less, that is, women behaved less risk tolerant when decisions involved choices between larger and less likely gains or smaller and more likely gains. This finding is justified by the

Prospect Theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991), which states that in situations of loss, individuals seek risk. In this case, the gender factor influences in win-win situations, but has less influence in situations involving losses.

Based on these findings, this study deepens the understanding about risk tolerance when comparing the risks taken by women and men in the personal field. For Sarin and Wieland (2016), it has become accepted that women are less risk tolerant than men. Complementarily, the results of the study show that this difference in the risk-taking behavior of women and men is different in win-win and win-lose situations, and that women's lower risk tolerance is more evident in win-win situations. It is possible to find justification for this finding in the Prospect Theory, which presents individuals as less tolerant to risk in gains than in losses (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991).

Another finding is that in organizational decisions, in some cases the respondents' behavior diverged from the literature, which presents women as less risk tolerant than men (Grable, 2000; Dohmen et al., 2011; Montinari & Rancan, 2013; Geetha & Selvakumar, 2016; Sarin & Wieland, 2016). In organizational decisions, in some situations, women proved to be more risk tolerant than men. Those organizational decisions where the identified behavior was contrary to the literature dealt with negotiations with customers and suppliers. Because they are part of the routine of an organization acting as managers, it is possible that in these cases women were already more comfortable with the risks involved in these types of negotiations, so they ended up taking more risks.

This finding deepens the understanding about risk tolerance in different decision fields. He and Villeval (2017) stated that it is unclear whether differences in risk tolerance are stronger or weaker in the organizational versus personal field. Therefore, from this result, it could be observed that the decision field influences the difference between the risk tolerance of women and men, indicating that in organizational decisions, women can present higher risk tolerance, being in some cases more risk tolerant than men.

When only the responses from women were analyzed and the decision field was considered as an independent (explanatory) variable, it was confirmed that, in some cases, the field influences risk tolerance. This influence had been assumed in the separate analyses of the respondent groups, and through Model 2, this result was confirmed. In two decisions (9 and 10) the results converge with H2, in which women are more tolerant in decisions in the personal than in the organizational field. This finding is in line with the literature that presents individuals are more risk tolerant when making decisions for themselves than for others (Reynolds, Joseph & Sherwood, 2009; Eriksen & Kvaløy, 2010). In the two decisions where behavior consistent with the prediction in H2 was observed, the decisions involved gains.

In decisions 7, 13, 14 and 19, still in the responses from women only, results were obtained that indicate behavior contrary to H2, that is, women were more tolerant in organizational decisions than in personal decisions. Of the four decisions where this result was observed, in three of them the results can be explained by the Prospect Theory, which states that individuals are more risk tolerant in losses (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991), since decisions 13, 14 and 19 dealt with losses. In those cases, involving losses, the results were divergent from the behavior of hypothesis H2, since it was observed that when deciding in the

organizational field and in perspective of losses, women are more risk tolerant than in the personal field.

In decisions involving gains, the influence of the organizational field on women's risk tolerance occurred in two directions: it increased risk tolerance in some cases and decreased it in others. As for decisions involving losses, in all the decisions that presented significant results, it was found that women were more tolerant to risk in organizational decisions than in personal decisions.

When considering that the literature presents women as less tolerant to risk than men, the results of this research allow advancing the understanding of individuals' risk tolerance behavior. While confirming in personal field decisions what has been accepted in the literature, that women are less risk tolerant than men (Grable, 2000; Dohmen et al., 2011; Montinari & Rancan, 2013; Geetha & Selvakumar, 2016; Sarin & Wieland, 2016), this study adds that this is more evident in prospects of gains than losses, finding support for these results in the Prospect Theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991).

Regarding the difference between the risk tolerance of women and men, this research advances by presenting that in organizational decisions, specifically in decisions involving losses, women were even more tolerant to risk than men, contradicting what has been accepted in the literature, but finding support in the Prospect Theory.

It is also possible to compare the results of this research with the study of Fisher and Yao (2017), who acknowledge that there is an influence of gender on risk tolerance, but state that other characteristics cause an individual's gender to influence their risk tolerance. They mention that individual characteristics such as uncertainty of income and equity are what lead to differences in risk tolerance between different genders. Comparing this statement with the results of the research, it is possible that in an organizational environment, if there is homogeneity between the individual characteristics of women and men, there could be no difference in risk tolerance between the two groups.

In general, these findings broaden the knowledge about risk tolerance, more specifically of women, indicating the decision field as a factor that influences their behavior toward risk, bringing evidence that, in organizations, women may present behavior different from that presented by studies in the personal field.

## **5 CONCLUSIONS**

Studies on risk tolerance have been developed more frequently in the last decades, and it is considered an emerging theme in management accounting. There is also a substantial literature on the relationship between risk tolerance and the gender of individuals, but predominantly in the personal field. On organizational decisions, research and discussions are still incipient and not conclusive.

With regard to gender, there is near consensus in the literature that women are less risk tolerant than men. However, it is possible that in organizational decisions, women managers may exhibit similar risk tolerance to men when making decisions for organizations.

Thus, this study sought to verify whether, in organizational decisions, women have a lower risk tolerance than men, as evidenced by previous studies on personal decisions. The results corroborate the literature when it indicates that gender influences risk tolerance, so that women are less risk tolerant than men. However, situations of behaviors that do not fully meet this premise have been identified. These convergent and divergent behaviors, in a certain way, follow the literature, which is not unanimous about the subject either, indicating the need for more research and further reflection on the subject.

The influence found, convergent with the literature, was most evident in personal decisions and in situations involving gains. When decisions involved the organizational field and loss prospects, this influence of gender on risk tolerance was less evident. It was also found that, in organizational decisions involving gains, the gender factor maintained an influence on the risk tolerance of managers, but presenting cases in which the behavior identified was contrary to that presented in the literature. In other words, in some organizational decisions, women behaved more risk-tolerant than men.

Possibly, in some organizational decisions that are routine, such as decisions involving negotiations with customers and suppliers, because they are used to them, women may feel more comfortable with the risk involved, in which case they are more risk tolerant.

In specific analysis of the data of the 115 women, it was found that the decision field influences risk tolerance. In organizational decisions involving gains, women behaved more risk tolerant in some cases and less tolerant in others. As for organizational decisions involving losses, women were found to be more risk tolerant in organizational decisions than in personal decisions.

In the decisions where women were more tolerant in the organizational field than in the personal field, the justification may lie in the comparison between the decision situations presented. While the personal field involved decisions on choosing mechanical services and interviewing for a job, decisions in the organizational field involved contracts with suppliers and post-sales services. Thus, it is possible that situations presented in the personal field make women managers less comfortable with risk than situations presented in the organizational field.

This study presents theoretical and practical contributions. For the theory, the findings of this research correspond to an expansion of knowledge about the themes of risk tolerance and gender, more precisely when it comes to managers, indicating that in organizational decisions the assumptions hitherto pointed out by the literature may not be applicable or valid in all situations. Greater understanding of the determinants of risk tolerance, such as gender, contributes to the literature by reinforcing that in the personal field women are less risk tolerant than men, while in the organizational field, there is divergence in the results, indicating that in certain situations women are more risk tolerant than men.

Practical contributions are also presented by this research. The study of the gender factor on risk tolerance from different perspectives (gains and losses) and in different fields (personal and organizational) has contributed by allowing a better understanding of women's behavior in organizations. Understanding the reasons that alter women's risk tolerance in organizational decision making may allow organizations to adopt measures or strategies that develop in their female

managers behavior of higher or lower risk tolerance in organizational decisions, depending on their interest.

As limitations of this study, it can be mentioned that, to increase the external validity of the field experiment, variables that influence risk tolerance were obtained from the literature and used as control variables; however, it is known that it is not possible to identify or measure all these variables. Another limitation refers to possible biases in the interpretation of the survey instruments by the respondents. Furthermore, the study was limited to individual decisions and group or collective decisions, which might differ in some respects from individual decisions, were not considered.

This research does not deplete the possibilities of studying risk tolerance, so future studies are suggested by adding variables, applying to other audiences, or even replicating this study at other times and in other decision-making situations.

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