CHAPTER
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# Studying mitigating factors of the framing effect: a survey of Brazilian university students

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**Filipe Ferreira dos Santos**
Master's Degree in Accounting Sciences, Federal University of Pernambuco – UFPE
E-mail: filipe.ferreirasantos@ufpe.br

**Daniel Jose Cardoso da Silva**
Doctor in Controllership and Accounting, University of São Paulo – USP
E-mail: daniel.jcsilva@ufpe.br

**ABSTRACT**
This research sought to identify whether factors such as age, level of Education, and Religiosity could influence the behavior of people regarding decision-making in situations where there is exposure to financial risk. The study has as its theoretical foundation the prospect theory, proposed by Kahneman and Tversky (1979), and seeks to understand the influence of the framing effect in the decision process. The sample included observations from all political regions of the country and had the participation of 423 students distributed among undergraduate courses in Business Administration, Accounting, and Economics. As an instrument of data collection, a questionnaire was applied to the students to get to know their profile, in addition to submitting them to problem questions to assess whether their behavior would be affected by the presence of financial risk in their investments. Based on the answers sent by the respondents and using Logit regressions, the results show that the variable age did not present, in any of the constructed scenarios, statistical significance to explain the rationality (or lack of it) of the choices. The results also suggest that there is no accuracy in the claim that Education can be considered a mitigating driver of the framing effect. Finally, the results indicate that only Religiosity, among the factors analyzed here, can statistically significantly influence the behavior of respondents, being considered a mitigating driver of the effects of the prospect theory, including its framing effect.

**Keywords:** Framing Effect, Decision Making, Financial Risk, Students.

## 1 INTRODUCTION

Throughout history, the need for decision-making has always been present in the life of the human being. Since this financial decision is influenced by behavioral factors, principles, values, norms, and even religious behaviors, it is expected that it will be able to propose an effective result for the individual who makes it. From this premise, decision-making, as an element of human development, points to the need for studies that are dedicated to the relationship between this decision-making and the other scientific, social, and economic spheres that compose it. This study focuses on specific research on the relationship between the behavior of the individual and his financial decisions when subjected to exposure to financial risk. This article follows the scholarly interest in exploring the determinants of financial well-being and the aspects surrounding it (Wahla, Akhtar, Shah, 2019).

Writing about the relevance of the study of financial behavior and how the cognitive structure of the individual can exert a significant influence on decision-making, Cescon (2018) ensures that these types of studies promise not only to promote a better economic perception but also to generate

information about an area whose effects can be felt directly by the market, showing how the economy and economic models can be affected by the most diverse factors that influence decision makers.

Based on this understanding, previous studies have shown a relationship between behavioral biases and financial decision-making outcomes (Tversky & Kahneman (1974), Kahneman & Tversky (1979), Shefrin & Thaler (1988), Thaler (1990), Barber & Odean (2000), Barber & Odean (2001), Barberis & Thaler (2003), Pompian (2006), Stango & Zinman (2009), Antonides, Groot, & Raaij (2011), Barber & Odean (2013), Groot & Raaij (2016), Frydman & Camerer (2016), Kohsaka et al. (2017) and Kartin & Nahda (2021). The researchers Kahneman and Tversky (1979), when developing the *Prospect Theory*, observed that individuals were influenced by factors that involved their emotions and feelings when making decisions, especially the riskier ones, which resulted in decisions that would not always be the most coherent and error-free. Thus, these authors demonstrated that human beings tend to adopt different decisions when exposed to different formulations of the same problem. When dealing with the manipulation of how the same situation is presented to decision-makers, making it possible to lead them to make different decisions, the Prospect Theory pointed to the existence of the *framing* effect (picture).

The *framing* effect can be understood as an antagonist to rational man and refers to the conceptions that individuals have when exposed to decision-making moments. For Frydman & Camerer (2016) the existence of a *framing* can affect the financial behavior of individuals when other psychological factors are activated. This is because this *framing* can be seen as an opportunity to influence the decision-maker, leading him to a change or activation of attitude (Hameleers & Boukes, 2021). Thus, the present work has as motivation for its elaboration, the following question: factors such as age, academic background, and religiosity would-be *drivers* that would mitigate the cognitive biases caused by the *framing* effect in decisions involving financial risk?

Thus, the objective of this research is to identify whether factors such as age, academic background, and religiosity can influence people's behavior regarding decision-making in risk conditions. Thus, the study will analyze whether such factors tend to contradict, in behavioral terms, what is expected and announced by *Prospect Theory* in its *framing effect.*

The realization of the current research, in addition to presenting advances about previous studies, as it brings the variable Religiosity closer to the studies of Kahneman and Tversky (1979), is also justified because of the current relevance and prominence of the theme in question. Demonstrating its impact on economic and financial studies, and proving, therefore, essential for the development of the areas addressed here. This relevant search also leads us to the fusion between scientific interest and social interest, pointing out a marked concern in the combination of theory and social practices.

As for its construction, the present work is initially constituted of the referred introduction, soon after, the theoretical framework is presented and, subsequently, the methodological procedures adopted for the construction of the study. Still, later, the results obtained from the research are demonstrated, and finally, the final considerations are pointed out.

## 2 THE THEORETICAL T REFERENCE FRAME

For the objectives of the present work to be achieved, it is necessary to point out and understand issues that are intrinsically related to the theme addressed. Therefore, the first subject to be pointed out will be the Theory of Prospects. Soon after, the *framing* effect will be addressed. And finally, the relevance of religiosity and its influence on decision-making will be considered.

### 2.1 THE THEORY OF PROSPECTS

The theory of prospects, proposed by Kahneman and Tversky (1979), brought into its scope a new perspective on the behavior of investors. According to the aforementioned scholars, decision-makers are victims of their cognitive biases; which resulted in the discovery that these agents, in certain contexts, may not be fully rational, thus pointing to the fact that individuals did not make their decisions based on absolute levels of utility (Tapas, P. & Pillai, D., 2021). This finding resulted in a theoretical structure that reshaped and redirected the behavioral understanding of individuals, marking a different prism from what was presented, until then, by the Theory of Expected Utility (TUE), proposed by professors Neumann and Morgenstern (1947). This last theory, based on the individual's ability to discern the best decision from the risks that involve it, proposed that decision-makers made rational choices, being able to use their capacity to maximize utility, thus presenting a constant behavior before decisions. (Leddo & Shukla, 2021).

In its propositions, the theory of prospects states that individuals, in addition to not being rational in their choices, also evaluate their losses and gains with different perspectives, that is, asymmetrically, resulting in inconstant behaviors at the time of decision making. As for the perception of gains and losses, the theory observed here predicts that decision-makers are usually risk averse in a scenario that is possible to seek gains, but that they accept and seek risk when it comes to a scenario of losses. Fisher and Mandel (2021) corroborate by stating that, such perceptions are possible thanks to the way value is perceived and conceptualized by the theory, which in technical terms, conceives of value as a concave function of gains, but convex for losses. In their studies, Kahneman and Tversky exposed what they would later conceptualize as "loss aversion," a concept in which losses impact decision-makers more negatively than gains affect them positively. Thus, individuals feel the pain of loss stronger than the pleasure in an equal gain (Kartin & Nahda, 2021).

According to Martins et al. (2013), after pointing to other perspectives, which distanced themselves from traditional models of finance and added new and relevant variables to explain the behavior of the individual, the study of behavioral finance began to gain remarkable importance. After all, the papers presented not only found the anomalies of the financial market, which were often not possible to be explained by traditional models but also presented new directions for a better understanding of the financial market and decision-makers.

## 2.2 THE FRAMING EFFECT

The *framing* effect, formulated from the theory of prospects of Kahneman and Tversky (1979), predicts the existence of a change in the decisions made by individuals when they are submitted and presented, in different ways, to the same decision-making problem. So now, in addition to the principles, values, norms, and beliefs, the decision can also be influenced by how the problem is presented and whether it is evidencing gains or losses in its dispositions (Tversky & Kahneman, 1981).

An example elaborated by Tversky and Kahneman (1981, p. 453) to illustrate the *framing* effect, brought in its presentation, of a scenario in which, to avoid the death of 600 people due to an epidemic, caused by an Asian disease, people had to choose between two distinct programs. In the first program (program A), the lives of 200 people would be saved. In the second program (program B), there would be a probability of saving 1/3 of the 600 people, while 2/3 would not be saved. The study pointed out that most people chose the first program (program A), thus demonstrating a risk aversion and a preference for certainty in their decisions. However, the researchers realized that if the problem was reformulated, and now a third program (program C), which would cause the death of 400 people, would be presented at the expense of a fourth program (program D), which would cause the death of 600 people with a 2/3 chance of happening, but save the 600 with only a 1/3 chance of happening, most individuals began to choose the fourth program (program D); accepting the propensity to risk. Tversky and Kahneman (1984), based on the theory of prospects, then observed that the problem was the same, but the new picture presented influenced the choice of many people.

Pontes et al. (2014), when analyzing the *framing* effect and its power of impact on the final decision, state that it can be produced from changes in the structuring of the problem, even if the truths already exposed are maintained and the situations presented are not distorted.

Pereira (2019), demonstrating how the construction of framing can reformulate the way individuals perceive what is relevant to them, ensures that the *framing* effect manifests itself in the life of the decision-maker because their choices are affected and influenced by their heuristics (beliefs), which lead their behaviors to biases, often unexpected, at the time of decision making (Kahneman & Tversky, 1979). According to Wahla et al. (2019), these financial investment behaviors can be from

illogical to even surprising, since they will be guided by emotions, personality traits, and also by the mental "errors" (heuristics) of individuals, which can occur even unconsciously; pointing out that the existence of such a framework can, therefore, lead to the occurrence of abnormalities both at the individual and market level.

From this, when there is the addition or perception of some variable not previously considered, or when this variable arises through a change in the relevance of some aspect already conceived, there is thus the *framing* effect. Expanding the studies on the behavioral biases present in financial investment decisions, Kartin and Nahda (2021), when analyzing the importance, applicability, and usefulness of the *framing* effect, point out that such a finding makes framing an important substance that cannot be ignored by the study of behavioral finance.

## 2.3 RELIGION AND DECISION MAKING

Throughout history, religiosity has always been buttoned to the human being and his development, exerting, to a greater or lesser degree, influence on its adherents, modeling their behaviors, and being responsible for the diffusion of values, norms, and doctrinal conducts (Funari, 2009). Dalgalarrondo (2009), states that, unlike religion, which is based on the belief that leads man to the relationship with the transcendent, religiosity, can be seen and understood as being the commitment to a religious doctrine, which involves institutional practices (which can be prayers, readings of the holy book, dances, songs, etc.), frequency and participation in the rituals of religion and a commitment to the system of dogmas of religious organizations that the subject may come to attend.

According to McGuire et al. (2012), religiosity should be perceived as a variable that, in addition to being present in the lives of many individuals, should not be neglected or removed from economic and financial studies. Thus, the need for research that focuses on the study of the relationship between religiosity and decision-making should be widely understood. From the above, it becomes relevant the perception of the narrow degree of affinity that exists between religiosity and decision-making, moves the investigation of the theme, seeking to analyze whether this variable would also be a *driver* that would mitigate the cognitive biases arising from the *framing* effect.

When describing the importance of the study of religiosity and how it reverberates in the financial and economic behaviors of individuals, Iannaccone (1998), already at the end of the twentieth century, pointed out that these types of research would not only collaborate with economic studies but also promote knowledge and information about a field often neglected, thus contributing, for a better understanding of the financial behavior of decision makers.

Over the years, other studies have corroborated the existence of the relationship between religiosity and the behavior of the individual, regarding their financial decisions (Leventis, Dedoulis, & Abdelsalam, 2018; Longenecker, McKinney, Moore, 2004; McCullough & Willoughby, 2009; McGuire, Omer, Sharp 2012; Vitell, 2009; Abdelsalam, Duygun, Matallín-Sáez & Tortosa Ausina, 2017). Abdelsalam (2021), for example, points out that religious norms, when absorbed and practiced by those who believe in them, convert emotions, point to behaviors and deliberations that lead them away from guilt and shame, and propagate a sense of responsibility among their actors, directing them to a specific choice at the time of decision making.

In recent decades, scientific discoveries have enabled the perception of the influence of religiosity in the most diverse economic sectors. Miller and Hoffmann (1995), for example, perceived the existence of a negative correlation at the individual level between religiosity and attitudes toward risk and danger. Years later, Osoba (2003) showed that individuals who are more averse to financial risks attend church more often than those who seek risk. Such findings are reinforced by the results found by Hilary & Hui (2009) who, in their experimental studies, pointed out that individuals who practiced religiosity more frequently were less likely to accept remuneration situations in which there was exposure to financial risk. More recently, Cebula and Rossi (2021), in their empirical estimates, pointed out a statistically significant negative relationship between corporate risk-taking and religiosity, revealing that greater religiosity reduces corporate risk-taking behavior.

These findings reinforce the need to investigate whether religiosity influences decision-making when there is exposure to financial risk, verifying whether it behaves as one of the mitigating effects of *the framing* effect.

## 3 METHODOLOGY

Taking into account the existence of the framing effect, its relevance to the study of behavioral economics, and how it acts as an influencer in decision-making, this research has as the object of analysis the following factors: age, academic background, and religiosity; analyzing whether they can mitigate the *framing* effect and influence the behavior of individuals regarding decision-making in a scenario where there is exposure to financial risk.

The data collection strategy was employed from 01/26 to 02/03/2022. To collect the data, a questionnaire was applied to the students of the undergraduate course in Administration, Accounting, and Economics in all regions of the country. Such students were used as proxies for reasonably informed investors and therefore able to discern the choices made. This assumption is based on the certainty that, as students who are inserted in courses that, naturally, involve financial studies, they are, therefore, able or minimally qualified to answer the questionnaire distributed to them. According

to Libby et al. (2002), it is more difficult to use more improved participants, which can make the research unfeasible in many cases. Therefore, the use of these students is considered appropriate.

This data collection instrument (questionnaire) was distributed in a period when, due to the changes and adaptations made in the academic calendars of Higher Education Institutions (HEIs), due to the COVID-19 pandemic, many students were still in full student activity, despite being a period in which, normally, they would be on vacation from their student activities. This reality contributed to the dissemination of the questionnaire among students and, consequently, the greater scope of the research.

The tool that was applied in the elaboration of this research, is a molding of the original study of the researchers Kahneman and Tversky (1979), in addition to the studies of Silva et al (2012) and Hilary and Hui (2009); and they acted as guidance and motivation for the present study.

The research had the participation of students from the HEIs that contained one or all of the courses mentioned and observed here. The sample included observations from all political regions of the country and totaled 423 respondents ranging from the first to the last period of the undergraduate course to which they were submitted. The questionnaire with the problem questions was applied and answered by the students through the *Google Forms* platform. The *link* that led to the questionnaire was disseminated among the students through their coordinators, study groups, and student groups existing in the most diverse social networks, among others.

In the search to achieve the objectives of this research, the proposed questionnaire presented its framework questions that contemplated several areas of students' lives, as well as their behaviors when exposed to situations of financial risk. Regarding the general perceptions of the interviewee, the questionnaire was formulated to understand aspects such as age, gender, federative unit, religiosity, and period in which the student was attending the graduation, in addition to containing three specific questions, which simulated a decision making in which the presence of financial risk was involved. The answers were dichotomous and, to answer them, the interviewees had to choose between "yes" or "no", for the religious question, for example; and "yes" or "no" for questions regarding financial investments. Therefore, the respondents had to choose whether or not to risk their investments, and they were presented with three different scenarios: a first scenario of comfort (gain), a second scenario, now a little more unfavorable and, finally, a third scenario, more uncomfortable and with imminent loss. The study was conducted presenting these three scenarios in different ways, aiming to verify the existence of the *framing* effect and whether any of the variables studied here could mitigate this effect.

The treatment used for the analysis of the collected data refers to the descriptive analysis of the information obtained during the application of the questionnaire. For the present study, we used the

software R, or environment R, or simply "R", as usually called by its users, and also the software Microsoft Excel® (2016). Thus, based on the nature of the data collected, descriptive and non-parametric statistics were used to give a procedure for the analysis. To recognize the statistical significance between the decisions made and the other variables (Age, Education, and Religiosity), *Logit* regressions will be used, being a general regression for each defined set.

The logistic regression model consists of a clinically interpretable model that aims to describe the relationship between an outcome variable, which we call dependent (Y), which, in the present study, were the specific questions that were asked to the students (Q1, Q2, and Q3), and a set of independent variables (predictive or explanatory). In particular, what distinguishes a logistic regression model from a linear regression model is that the outcome variable in the logistic regression is binary or dichotomous (Hosmer, 2013). Thus, the model applies to studies in which the dependent variable should be binary (admitting values of 0 and 1) and will seek to perceive the probability (π) that the dependent variable is 1, from the variables presented.

The initial identification of the model included, in addition to the dependent variable, the variable Age, the variable "period", which we will here call Academic Education (FA), and the *variable dummy* Religiosity. The final composition of the general model can be observed according to Equation (1). For the study and data analysis, a significance level of 5% was established.

$$\ln\left(\frac{P}{1-P}\right) = \alpha_0 + \beta_1 Idade + \beta_2 FA + \beta_3 Religiosidade + \epsilon_i \quad (1)$$

## 4 ANALYSIS AND DISCUSSION OF RESULTS

### 4.1 PROFILE OF STUDENTS

As mentioned above, 423 students participated in the research. The profile of these students was traced a priori. In this first moment, we sought to investigate aspects related to sex, age, course, current period, federative unit, religiosity, and frequency of participation in religious services. Tables 1, 2, 3, 4, and 5 show the first distributions found.

Table 1. Student Profile - Gender

| Sex | Male | Female | I'd rather not answer |
|---|---|---|---|
| **Total** | 47,8% | 48% | 4,2% |

Source: Research Results, 2022

Table 2. Profile of students - Age

| Age | From 16 to 20 years | From 21 to 25 years | From 26 to 30 years | From 31 to 35 years | Over 35 years |
|---|---|---|---|---|---|
| **Total** | 18,2% | 40,7% | 20,1, % | 13% | 8% |

Source: Research results, 2022.

Table 3. Student Profile - Course

| Course | Accounting | Administration | Economy |
|---|---|---|---|
| Total | 64,1% | 20,1% | 15,8% |

Source: Research Results, 2022

Table 4. Profile of students – Current period

| Period | First | 2nd | Third | 4th | 5th | 6th | 7th | 8th | Others/ Graduates |
|---|---|---|---|---|---|---|---|---|---|
| Total | 8,3% | 12,1% | 14,9% | 11,6% | 13,2% | 11,8% | 9,5% | 13,9% | 4,7% |

Source: Research results, 2022.

The analysis of the data collected in Tables 1, 2, 3, and 4 reveals that, regarding gender (table 1), there is an almost perfect similarity between the students, since the difference between males and females was only 0.2%, highlighting that 4.2% of the respondents chose not to answer about the question "sex". Regarding the distribution by age group, among the students who answered the questionnaire, 18.2% of the interviewees were between 16 and 20 years old; 40.7% are between 21 and 25 years old; 20.1% are between 26 and 30 years old; 13% are 31 to 35 years old and 8% are older than 35 years. This allows us to note that the predominance of age consists of students from 21 to 25 years old who are enrolled in any of the courses analyzed here.

Concerning the undergraduate courses to which the students are linked, the study pointed out (table 3) that 64.1% are studying Accounting, 20.1% are studying Administration and 15.8% are Economics students. Regarding the distribution of students by period (table 4), the research presented the following configuration: 8.3% of the students are in the first period; 12.1% are in the second; 14.9% are in the third period, 11.6% attend the fourth period; another 13.2% are in fifth; 11.8% are enrolled in the sixth period, 9.5% are in the seventh; 13.9% attend the eighth period and another 4.7% are in specific situations, but that, in its majority, refers to students who are already in the final phase of the course. It is noted, therefore, that it was the students of the third period who answered the questionnaire the most.

After answering these questions, the students were asked about their religious convictions. They were introduced to the definition of religiosity proposed by Dalgalarrondo (2008) and had to answer whether they considered themselves a religious person or not. 61.9% of the students said they were religious, while 38.1% said they were not. Next, the questionnaire sought to understand from the students who claimed to be religious, how often they participated in these religious activities. To survey the answers, the Likert scale was used. Table 5 shows how the students responded to the question they were asked.

Table 5. Attendance at religious services

| Age | Never | Rarely | Occasionally | Frequently | Very Often |
|---|---|---|---|---|---|
| **Total** | 11,2% | 16% | 26,3,% | 28,7% | 17,8% |

Source: Research results, 2022.

Of the 262 students who participated in the questionnaire, and said they were religious, we have that 11.2% never participated in religious services, this being the alternative less indicated by those who were able to answer this question. Already 16% of the students said they rarely attend religious activities. 26.3% said they participated occasionally, while 28.7% of the students reported participating frequently in these activities. Finally, 17.8% of the students said that they attended very often the religious services to which they were subjected. The results presented here indicate that the sample is composed mostly of religious students and that, among them, 72.8% usually participate in religious activities to a degree ranging from "occasionally" to "very frequent".

After answering these questions, the students were submitted to the different financial investment scenarios (presented in section 3.2) with the presence of the *framing* effect. In addition to seeking to identify the profile of students, the present study also investigated whether factors such as Age, Academic Education, and Religiosity contradict what was announced by *Prospect Theory,* acting as mitigators of the *framing effect.*

## 4.2 STATISTICAL ANALYSIS OF DATA

Tables 6, 7, and 8 present the descriptive statistics of the categorical variables analyzed here. The results of the estimation for **Q1** (a specific question that asked students to choose between "receiving $100.00 for sure, or receiving $200.00 with a 50% probability, or $0 with a 50% probability") will be presented below. For the execution of the model, the data were coded to represent the information obtained. In addition to age, the variables AF and religiosity were also coded. The answers attributed to **Q1**, according to Table 6, were coded so that respondents who chose to "receive R$ 200.00 with a probability of 50%, or R$ 0 with a probability of 50%" were coded as 0 and those who chose to "receive R$ 100.00 with certainty" were coded as 1. The variable age, on the other hand, was coded in a structure that each age group corresponded to a specific number (ranging from zero to four).

Table 6. Statistical analysis of data – Age (**Q1)**

| AGE | From 16 to 20 years | From 21 to 25 years | From 26 to 30 years | From 31 to 35 years | Over 35 years |
|---|---|---|---|---|---|
| **Q1** | 0 | 1 | 2 | 3 | 4 |
| 0 | 38 | 14 | 9 | 15 | 14 |
| 1 | 134 | 71 | 25 | 40 | 63 |

Source: Research results, 2022.

This same methodology was also applied to the variable AF, as shown in Table 7. The distribution regarding the periods in which the students were enrolled followed the same classification criterion as the previous variable. Thus, the periods were coded from 0 to 8, and the responses to **Q1,** were from 0 and 1.

Table 7. Statistical analysis of data – Education (FA) (**Q1)**

| FA | Concluding | 1st P | 2nd P | 3rd P | 4th P | 5th P | 6th P | 7th P | 8th P |
|---|---|---|---|---|---|---|---|---|---|
| **Q1** | 0 | 8 | 7 | 3 | 5 | 4 | 6 | 1 | 2 |
| 0 | 6 | 8 | 15 | 15 | 10 | 10 | 10 | 9 | 7 |
| 1 | 14 | 27 | 36 | 48 | 39 | 46 | 40 | 31 | 52 |

Source: Research results, 2022.

The methodology was also applied to the variable religiosity, in which it was sought to know whether or not the students were religious. Students who said they were religious were coded as 0, while those who said they were not religious were coded as 1. Table 8 shows the result found.

Table 8. Statistical analysis of data – Religiosity (**Q1)**

| RELIGIOUS | Yes | No |
|---|---|---|
| **Q1** | 0 | 1 |
| 0 | 40 | 50 |
| 1 | 222 | 111 |

Source: Research results, 2022.

The results of the estimation for **Q1** point to the non-significance of the variable Age. However, the variables AF, about the students of the 8th period (coded with the number 2 in Table 7), and religiosity were statistically significant. The results are shown in Table 9.

Table 9. Statistical analysis of the data – Result of the general model (**Q1)**

| Variables | Coefficient | Standard deviation | P-value |
|---|---|---|---|
| **Age** | - | - | - |
| **FA** | 135.071 | 0.65939 | 0.040519 |
| **Religiousness** | -0.88247 | 0.26108 | 0.000725 |

Source: Research results, 2022.

Thus, as the results obtained indicate, students who are in the eighth period of their respective graduations tend to answer 1 (Receive R$ 100.00 for sure) to the first question asked. That is, students who are in the fourth year of the course, tend to go against what the *Prospect Theory* recommends, while the others do not.

Regarding the variable religiosity, the data indicate that students who are **not** religious tend to have a lower chance of answering 1 in **Q1**. Thus, the results indicate that there is a greater inclination to certainty on the part of religious students, while students who say they are not religious have a greater propensity to take financial risks in a scenario where there is the possibility of imminent gain.

Next, we have the results of the estimation for **Q2** (a specific question that brought to the students the following hypothetical scenario: "Suppose you are about to lose $ 100.00. However, you are given the chance to risk your luck, and, depending on the outcome, you can lose $ 200.00 or not lose at all. What would be your choice?"). For the execution of the model, the data, as well as the variables, were coded following the same patterns of the previous question (**Q1**), to represent the information obtained. The option of "risk luck, being able to lose R$ 200.00 or not lose anything", was coded with 0 and the option of "lose R$ 100.00" was coded with 1. Tables 10, 11, and 12 present the descriptive statistics of the categorical variables and show the coded responses referring to the variables age, AF, and religiosity of **Q2**.

Table 10. Statistical analysis of data – Age (**Q2**)

| AGE | From 16 to 20 years | From 21 to 25 years | From 26 to 30 years | From 31 to 35 years | Over 35 years |
|---|---|---|---|---|---|
| **Q2** | 0 | 1 | 2 | 3 | 4 |
| 0 | 78 | 35 | 19 | 25 | 33 |
| 1 | 94 | 50 | 15 | 30 | 44 |

Source: Research results, 2022.

Table 11. Statistical analysis of data – Education (FA) (**Q2**)

| FA | Concluding | 1st P | 2nd P | 3rd P | 4th P | 5th P | 6th P | 7th P | 8th P |
|---|---|---|---|---|---|---|---|---|---|
| **Q2** | 0 | 8 | 7 | 3 | 5 | 4 | 6 | 1 | 2 |
| 0 | 14 | 11 | 25 | 28 | 18 | 29 | 20 | 20 | 25 |
| 1 | 5 | 24 | 26 | 36 | 31 | 27 | 30 | 20 | 34 |

Source: Research results, 2022.

Table 12. Statistical analysis of data – Religiosity (**Q2**)

| RELIGIOUS | Yes | No |
|---|---|---|
| **Q2** | 0 | 1 |
| 0 | 96 | 94 |
| 1 | 166 | 67 |

Source: Research results, 2022.

The results of the estimation for **Q2** point once again to the non-significance of the variable Age. However, the variables AF, this time concerning the students of the 1st, 2nd, 4th, 6th, and 8th period (coded with the numbers 2, 5, 6, 7, and 8 in table 11), and religiosity were once again statistically significant. The results are shown in Table 13.

Table 13. Statistical analysis of the data – Result of the general model (**Q2)**

| Variables | Coefficient | Standard deviation | P-value |
|---|---|---|---|
| **Age** | - | - | - |
| **FA (8th P)** | 1.389.910 | 0.600174 | 0.020567 |
| **FA (6thP)** | 1.391.810 | 0.646723 | 0.031390 |
| **FA (4th P)** | 1.647.853 | 0.630809 | 0.008994 |
| **FA (2nd P)** | 1.266.119 | 0.623134 | 0.042168 |
| **FA (1st P)** | 1.921.058 | 0.670587 | 0.004174 |
| **Religiousness** | -0.793020 | 0.219478 | 0.000302 |

Source: Research results, 2022.

The results indicate a higher probability of the students of the 1st, 2nd, 4th, 6th, and 8th periods opting for option 1 (Lose the R$ 100.00). These results lead us to a contrary direction to what was predicted by *Prospect Theory*. Therefore, in a slightly more unfavorable scenario, students who are in the aforementioned periods of their respective courses, tend not to take a risk position in their financial investments.

Regarding the variable religiosity, the data also indicate that, once again, students who are **not** religious have a lower probability of answering 1 in **Q2**. This then points to the reality that religious students have a preference for loss (when it comes to the scenario presented), while students who say they are not religious, have an easier time taking financial risks when it comes to a slightly more unfavorable scenario.

Finally, we now have the results of the estimation for **Q3** (a specific question that questioned the students about their behaviors in the following scenario: suppose you have already lost $ 100.00. Would you risk another $100 on a new investment with a chance to win $300, or would you accept the loss of the $100 invested?"). For the execution of the model and survey of the results, the data and the variables were coded following the same patterns of the previous questions (**Q1** and **Q2**). The option of "would risk winning R$ 300.00" was coded as 0 and the option of "would accept the loss of the R$ 100.00 invested" was coded as 1. Tables 14, 15, and 16 present the descriptive statistics of the categorical variables and the coding attributed to the variables age, AF, and religiosity of **Q3**.

Table 14. Statistical analysis of data – Age (**Q3)**

| AGE | From 16 to 20 years | From 21 to 25 years | From 26 to 30 years | From 31 to 35 years | Over 35 years |
|---|---|---|---|---|---|
| **Q2** | 0 | 1 | 2 | 3 | 4 |
| 0 | 90 | 36 | 22 | 24 | 40 |
| 1 | 82 | 49 | 12 | 31 | 37 |

Source: Research results, 2022.

Table 15. Statistical analysis of data – Education (FA) (**Q3)**

| FA | Concluding | 1st P | 2nd P | 3rd P | 4th P | 5th P | 6th P | 7th P | 8th P |
|---|---|---|---|---|---|---|---|---|---|
| **Q2** | 0 | 8 | 7 | 3 | 5 | 4 | 6 | 1 | 2 |
| 0 | 12 | 17 | 28 | 28 | 18 | 27 | 22 | 24 | 36 |
| 1 | 7 | 18 | 23 | 35 | 31 | 29 | 28 | 17 | 23 |

Source: Research Results, 2022

Table 16. Statistical analysis of data – Religiosity (**Q3)**

| RELIGIOUS | Yes | No |
|---|---|---|
| **Q2** | 0 | 1 |
| 0 | 103 | 109 |
| 1 | 159 | 52 |

Source: Research Results, 2022

The results of the estimation for **Q3** also pointed to the non-significance of the variable Age. Thus, it did not reach a degree of significance in any of the scenarios presented. However, the variables AF, now referring only to the 4th period students (coded with the number 5 in table 15) and religiosity were also statistically significant in **Q3**. The results are shown in Table 17.

Table 17. Statistical analysis of the data – Result of the general model (**Q3)**

| Variables | Coefficient | Standard deviation | P-value |
|---|---|---|---|
| **Age** | - | - | - |
| **FA** | 121.399 | 0.60621 | 0.0452 |
| **Religiousness** | -112.060 | 0.22649 | 0.000725 |

Source: Research results, 2022.

Table 17, which shows the statistical results for an uncomfortable scenario with imminent loss, reveals that faced with the certainty of loss, most students tend to throw themselves at financial risk (risk winning R$ 300.00 and losing another R$ 100.00). The only exception was with students who are in the fourth period of their academic activities (coded as 5 in Table 15), who tend to opt for the loss of R$ 100.00. This finding indicates that, in a scenario of imminent loss, students are more likely to act by what is recommended by Prospect *Theory* and its *framing* effect.

Finally, from the perspective of the religiosity variable, students who are **not** religious tend to have a lower chance of accepting the loss of the money invested. Thus, the results suggest that Religiosity acts as a mitigating driver of the *framing* effect in a scenario where there is imminent loss.

Thus, students who call themselves **non-religious** have a greater willingness to throw themselves at financial risk to avoid financial loss.

## 5 FINAL CONSIDERATIONS

This research sought to identify and analyze whether factors such as Age, Academic Education, and Religiosity could influence people's behavior regarding decision-making in which there is exposure to financial risk. Thus, the present study examined and analyzed whether the aforementioned factors tended to contradict, in behavioral terms, what is announced by the studies of Kahneman and Tversky (1979), through the *Prospect Theory* and the *framing effect.*

This study used a sample of 423 undergraduate students in Administration, Accounting, and Economics, from which it was sought to verify, before the statistical tests, the profile of the respondents and identified that, regarding gender, age group, and period, the numbers remained balanced regarding the level of participation in the research, with a slight emphasis on the predominance of the age of students who attend their graduations aged between 21 and 25 years, which represented 40.7% of respondents. The study included observations from all political regions of the country and had a greater participation of students of the Accounting Sciences course, who represented 64.1% of the sample. Regarding religiosity, 61.9% of the students who answered the questionnaire said they were religious. Of this group, 72.8% usually participate in their religious activities to a degree ranging from "occasionally" to "very frequently."

The statistical results indicate that the variable Age did not present, in any of the scenarios presented, statistical significance to explain the rationality of the choices. As for the variable Academic Training, the results also suggest that the students of the 8th period, that is, those who are in the fourth year of their respective graduations, in a scenario of imminent gain, tend to opt for the certainty of gain. However, this same behavior cannot be observed in the students of the other periods. Thus, the results were found to suggest a partial alignment, and not integral, with the assumptions that are proclaimed by the theory of prospects and its certainty effect. About the variable Religiosity, the results indicate that, in the scenario of gain, there is a greater inclination to certainty on the part of religious students. Therefore, religiosity tends to reverberate and have a greater certainty effect on the lives of respondents than that proposed by the theory presented here. As such, religious survey respondents tend to be averse to financial risk in the earnings domain.

The results also showed that, in a slightly more unfavorable scenario, several students of the 1st, 2nd, 4th, 6th, and 8th periods chose to lose the investment made, preferring not to take risks. Once again, the variable Academic Education went against what was predicted by the theory of prospects. After all, there was no desire on the part of the students to throw themselves at financial risk in this

scenario. Regarding the variable Religiosity, the results indicate that, as in the previous scenario, religious students have a preference for loss over risk. Thus, in an unfavorable and more uncomfortable scenario, Academic Education does not seem to be driven by the theoretical assumptions of prospect theory and religiosity also seems to act as a mitigating driver of its effects.

Finally, the present work investigated the opinion of the students in a scenario of imminent loss. The results indicate that, in this context, most students tend to throw themselves at financial risk, having their behaviors remodeled to accept the risk of the operation. The only exception, according to the results, would be students who are in the fourth period of their academic activities, and who chose not to take the financial risk, even in this scenario. Therefore, it is noted that there is a tendency to risk propensity in the field of losses in the scenario recorded here. This context points to and reinforces what was advocated in the studies of Kahneman and Tversky (1979) regarding the ability of individuals to make rational choices in environments where there is the presence of financial risk. Thus, the results suggest that Academic Education does not act as a mitigating driver of the effects of the theory of prospects when there is imminent loss. Regarding Religiosity, the results showed that students who are not religious tend to have a lower chance of accepting the loss of the money invested. Thus, the results suggest that religion, in all the proposed scenarios, acts as a mitigating driver of prospect theory and the *framing effect.*

Based on this study, it is argued that, among the variables analyzed here (Age, Academic Education, and Religiosity), only Religiosity acts as a clear mitigating factor of the effects of prospect theory, including its *framing effect.* More studies are needed so that Academic Education can also be considered as a mitigating driver of the aforementioned theory.

This statement can be explained and understood by the fact that religions, in general, preach prudence in the most diverse areas of life, including the financial. The conclusions found here can be justified by the constant messages, preaching, and reflections on the non-accumulation of wealth on this earth, the fight against superfluous expenses, the constant guidance against financial mismanagement, the guidelines to its adherents so that they never forget that true wealth is in heaven, in heavenly things or another paradisiacal plane, among other statements that result in the reshaping of the economic behaviors of the religious. The result also reinforces the perception that religiosity can be a determining factor for decision-making and understanding of economic behavior.

The present research is also subject to limitations. Therefore, it is recommended that future investigations add to the logistic model other variables that may affect the decision and decisions of individuals and, therefore, interfere with the *framing effect.* As a suggestion, it is recommended to broaden the scope of the sample so that it can cover other variables that were not the objects of this

study. In addition, new research related to this aspect is proposed, aiming to further identify which factors could act as mitigators of the effects proclaimed by the theory of prospects.

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