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# Prospect Theory and the Risks Involved in Decision-Making: Content Analysis in ProQuest Articles

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## ABSTRACT

In this study, the objective is to perform content analysis on articles of a reliable database, dealing with the prospect theory and the risks involved in the decision making process, evaluating some criteria for the theoretical and methodological approaches that allow a joint analysis and comparative. Therefore, a search in ProQuest database was performed which resulted in 15 articles that were submitted to content analysis process, based on the evaluation of nine factors identified by researchers. Among the results highlight the critical attitude to the prospect theory, in contrast to the assertion of his representative capacity of real situations and application in various situations.

**KEY-WORDS:** Prospect theory. Perceived risk. Decision making. Content analysis.

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# Teoria da Perspectiva e os Riscos Envolvidos no Processo de Tomada de Decisão: Análise de Conteúdo em Artigos do ProQuest

**RESUMO**

Neste estudo, objetiva-se realizar a análise de conteúdo em artigos de uma base de dados confiável, que tratem da teoria da perspectiva e dos riscos envolvidos no processo de tomada de decisão, avaliando alguns critérios referentes a abordagens teóricas e metodológicas que possibilitem sua análise conjunta e comparativa. Para tanto, foi realizada uma busca na base de dados ProQuest que resultou em 15 artigos que foram submetidos ao processo de análise de conteúdo, com base na avaliação de nove fatores identificados pelos pesquisadores. Dentre os resultados, destaca-se a postura crítica à teoria da perspectiva, em contraponto à afirmação de sua capacidade de representatividade de situações reais e aplicação em situações diversas.

**PALAVRAS-CHAVE:** Teoria da Perspectiva. Risco percebido. Tomada de decisão. Análise de conteúdo.

## 1 INTRODUCTION

Every administrative problem is equivalent to a decision-making process (Simon, 1965). However, in terms of decision-making, it remains central to the concept of rational behavior, an orthodox, normative and functionalist concept for decision making (Bueno & Azevedo, 2011). The authors stressed that the field of decision-making overlaps with other areas of organizational studies, being the central rationality for understanding the decision-making process. In terms of areas of study of decision analysis, Bell, Raiffa and Tversky (1988) proposed its division into three branches: prescriptive approach, normative and descriptive.

The prescriptive approach is based on human rationality as an instrument to aid in the decision making (March, 1994). The normative approach, in turn, refers to how decisions are to be taken or, in other words, as a rational "actor" should act to decide under certain conditions precisely defined, involving choice of actions or alternatives (Hansson, 1994). Now the descriptive approach is focused in what human beings really do, and not what they should be doing prescriptively, being a field still relatively new in terms of research on decision-making, because only in the last decades of the 20th century has acquired a greater weight, taking as the driving force the cognitive psychology (Façanha & Yu, 2011).

Among the models describing the decision theory, it is worth mentioning the Prospect theory, by Kahneman and Tversky (1979), which emerged as critical and alternative to the expected utility theory (Von Newmann & Morgenstern, 1944), until then the most recognized and representative theory of the decision of the descriptive approach. The expected utility theory, according to Buchholz and schymura (2012) provides theoretical tools for cost-benefit analysis under conditions of risk.

However, the Prospect theory has emerged showing that there is a new opportunity to measure the usefulness of the choices of individuals, mainly due to the existence of risks inherent to this process, to the extent that analyzes the individual decision taking facing the risk. Indeed, the issue of risk perceived by the decision maker is one of the most relevant aspect to the perspective theory. Furthermore, according to Mercer (2010), among

the behavioral theories, the Prospect theory is the most influential in social sciences in terms of behavior facing the choices.

The seminal article of the theory, "Prospect theory: An analysis of decision under risk" (Kahneman & Tversky, 1979), in addition to having originated the field of study called Behavioral Economics, was the second empirical article most quoted in 41 most prominent journals *ISI Web of Science/Social Science*, in the area of economics, in the period from 1970 to June 2006, with 4,085 citations (Kim, Morse & Zingales, 2006). In addition, the Prospect theory was the main factor, among other studies, Nobel of the Prize winner in economics to Daniel Kahneman in 2002 (Amos Tversky had already died at the time).

Concerning the most direct relation between the concept of risks and decision-making, it is worth mentioning that what makes a decision be complex is the fact that it is based on the perception of risks and benefits, and not at risk and real benefits. If a decision was taken based only on real risks, a *software* could describe it with more precision (Costa & Freitas, 2011). Reinforcing this aspect, Featherman and Savlou (2003) mention that a perceived risk is defined as the combination of uncertainty and relevance of the result involved. In addition, once that many of the theories of decision approach the behavioral issue facing risk, an important point is raised by Rosness (2009), asserting that the decision involving risk of loss occurs in a variety of settings that range from the flight control rooms up to management meetings among executives, as well as in the political sphere, involving governments and parliaments.

On this basis, the theme of this research is the Prospect theory, with a focus on the risks involved in the decision making process This way, the objective of this study is to perform a discerning content analysis on articles listed in a reliable database, which addresses the relationship between the subject and the focus of the research. Thus, some criteria were evaluated relating to theoretical and methodological approaches that have enabled a joint and comparative analysis of these articles, since that it was not identified any studies with these characteristics. Therefore, this work was organized with the following structure:

a) Theoretical referential: decision-making study, Prospect theory and concept of perceived risk;
b) Methodology: Demonstration of the criteria for selection of articles, as well as the procedures adopted in terms of its analysis and obtaining the results;
c) Presentation of the results: Analysis on the selected articles, based on the categories and codes resulting from the analysis of content accomplished;
d) Conclusions and final considerations: conclusions from the results obtained, crossing them with the objective proposed, and limitations of research;
e) Recommendations: suggestions for future studies;
f) References: submission of bibliographic references used in the text.

## 2 THEORETICAL REFERENTIAL

In this section of the study, the decision making, the Prospect theory and the concept of perceived risk are discussed briefly, subjects defined based on the theme and focus of this research, explained in section 1 of this study (Introduction).

### 2.1 DECISION MAKING

Much has been discussed in the literature on how to improve decision-making by means of structured and rational processes (Thaler, 2000). The objective of decision analysis through structured processes is to help the decision maker to think systematically about complex issues, aiming to improve the quality of decision (Clemen, 1996). However, usually the processes of decision are not programmed, then the decision maker ends up using unstructured processes that meet, but do not maximize the results of decision (Mintzberg, Raisinghani & Théorêt, 1976).

In this sense, the structuring of decision-making has two aspects that make it complex: the biases/individual heuristics and the low degree of

structuring of the real world, with its uncertainties, inaccurate and fragmented information. Due to this fact, Macedo, Alyrio and Andrade (2007) emphasized that, from studies on the subject, it is easier to understand the decision based more on the understanding of decision processes effective than through processes that dictate what should be done.

Thus, as it can be seen, the decision analysis can be divided into two branches: prescriptive approach and descriptive approach (Bazerman, 2004; Façanha & Yu, 2011). However, Bell et al. (1988) proposed this division into three branches: prescriptive approach, normative and descriptive. According to the authors, it was common the division of the approaches in descriptive and normative, the latter being used as a synonym of prescriptive.

The fundamental basis of the prescriptive approach is on the rationality of the human being, which serves as a tool to help the decision maker to make decisions (March, 1994). In addition, the prescriptive approach suggests what the individual should do to improve their choices, how they should think (Bell et al., 1988). Whereas the normative approach presents the notion that the action of a conceived, rational and very intelligent human being has as official mark the coherence and rationality, normally observed in a precise and well specified way. (Bell et al., 1988).

The descriptive approach, in turn (Feat & Yu, 2011), is a field which is still relatively new in terms of research on decision-making, because only in the last decades of the 20th century has acquired a greater weight, taking as the driving force the cognitive psychology. In the descriptive approach, the researchers describe how decisions are actually taken, evaluating the personal trials affected by heuristics and cognitive and emotional biases (Bazerman, 2004). For Zsambok (1997), the descriptive approach relates to how people use their expertise to make decisions in their field of expertise. The initial studies in the area were performed with firemen, fighter pilots and corporate executives, among others. In this context, the image of the decision maker is central, because his behavior turns out to define variations in the decision making process (Gontijo & MISA, 2004). For the authors, these variations are related both for the

cognitive constraints and for the determinants of ideological nature and values, or even from other groups or individuals involved.

Among the theories related to the descriptive approach, it is worth mentioning the Prospect theory, by Daniel Kahneman (Nobel Prize in Economics in 2002) and Amos Tversky, which will be briefly explained in the next section.

## 2.2 Prospect theory.

According to Kahneman, Slovic and Tversky (1988) and bazerman (1994), individuals dealing with the risks relating to perceived gains (results presented in positive terms) differently from risks that relate to losses realized (results presented in negative terms), and in this type of behavior use to a great extent the concept of utility (Bazerman, 1994). It is about these issues that treats the Prospect theory, which describes how to decide on the basis of perceived risk, in an attempt to explain the behavioral changes of individuals in terms of risk aversion, which are characterized as deviations from common and systematic rationality (Kahneman & Tversky, 1979).

According to Kahneman et al. 1988), in the Prospect theory it is changed the concept of utility, since the results of the decision are viewed as deviations (gains or losses) in relation to a reference point that the decision maker adopts at the decision. Thus, if the reference point is such that the results are seen as gains, it reflects a position of risk aversion. If, on the contrary, the results are seen as losses, there is a tendency to risk. According to the authors, this is due to the fact that the feeling associated with the loss of a value is stronger than the feeling associated with the gain of the same value.

Another aspect raised by the creators of the Prospect theory concerns to custom, in decision analysis, to describe the results of decisions in terms of total wealth (Kahneman & Tversky, 1979). For them, this is not valid, since that this idea is somewhat unrealistic, since that, in the mold of the Prospect theory, people usually don't think of the results relatively small in terms of wealth, but rather in terms of gains, losses and neutral results

(authors mention as an example the simple desire to maintain the *status quo*). If it is true what the theory suggests, in the sense that the effective carriers of subjective value are not the end of wealth, but, Yes, the changes of wealth, the analysis of psychophysical results must be applied before the gains and losses than the total resources. This assumption, central idea of the Prospect theory, plays a central role in the treatment of choice under risk.

Since the concept of risk in decision-making is a central theme in the Prospect theory, the next section of this article will address the concept of perceived risk.

## 2.3 PERCEIVED RISK

The perceived risk is defined as the combination of uncertainty and relevance of the outcome involved (Featherman & Savlou, 2003). Das and Teng (2004), when doing a review of the perceived risk, claim that the majority of definitions brings the idea of uncertainty or variation in the results (especially related to losses) that have some degree of significance. While the uncertainty refers more broadly to a condition of lack of results, the risk refers to a condition of greater knowledge of the consequences and the likelihood associated with these consequences (Yates & Stone, 1992, mentioned by D & Teng, 2004). So, more broadly, Das and Teng (2004) propose that uncertainty can be part of the construct perceived risk, since the risk also carries a strong subjective burden, both in its formation as in the trend in taking it. For this reason, it appears that, in a context of uncertainty (the probability of occurrence or the impacts are not fully known), the trust turns out to be a more important role in the decision.

For Laroche, McDougall, Bergeron and Yng (2004), the perceived risk has multiple dimensions: (i) social risk: Potential loss of respect, esteem or friendship maintained by the decision maker with other individuals; (ii) risk of time: Potential loss of time in light of the decision taken; (iii) psychological risk: Potential loss of self-image or self-affirmation; (iv) financial risk: Potential loss of financial resources (related to an additional investment or a fall in income); and (v) the risk of

*performance*: potential fails in the *performance* of the decision taken or performance verified lower than the performance expected at the time of the decision.

## 3 METHODOLOGICAL PROCEDURES

As mentioned in the introduction of this article, the objective in this study is to perform the analysis of content in articles appearing in a reliable data base handling the theme and focus of the research. For this, it was used the desk *research* as a technique of data collection. In function of characterizing as a multidisciplinary database with more than 11,000 titles, around 8,000 in full text, besides allowing full access of the researcher, it was chosen the ProQuest databases to perform the consultation, which took place in August of 2014. The query parameters were the following:

- research: TI ("prospect theory") AND AB (risk OR "decision making");
- Research detailing prospect theory' in title of the document (TI) AND (risk OR "decision making") In Summary (AB);
- Additional filters (market):
  - Full text /revised by specialists/journals;
- Results classified by: Relevance (more relevant articles).

The above parameters were used as a function of "*prospect theory*" (*teoria da perspectiva*, in English), as explained in the introduction to this study, is the subject of research. The quotation marks are used so that the term was considered exactly like this in the search. As a result, articles were sought that had the same term in their titles in the same way, as the focus of this research are the risks involved in the decision making process, we used the terms *risk* and "*decision making*" (with quotes for the same reason as explained previously) as constant expressions in the summaries of the articles.

As a result of consultation, 29 articles returned. However, after examining the adherence to the objective of this study, it was ignored the articles that had no relation between the subject and the focus of this research, in addition to the criteria mentioned below. The result was, then,

15 articles which were submitted to content analysis (Bardin, 2011). The additional criterion adopted by the researcher for selection of articles was to compare them in relation to the similarity of content, in addition to their relevance and the preference for those with more pertinent and relevant approaches. Thus, the 15 articles selected are shown in Table 1, arranged in alphabetical order of title.

| Artigo | Autores |
|---|---|
| A tractable method to measure utility and loss aversion under Prospect Theory | ABDELLAOUI, BLEICHRODT e L'HARIDON (2008) |
| An axiomatization of cumulative Prospect Theory for decision under risk | CHATEAUNEUF e WAKKER (1999) |
| Can group decision-making mitigate propensity of escalating commitment?: An experimental research based on the Prospect Theory | LIU e LIU (2008) |
| Expected utility theory and Prospect Theory: one wedding and a decent funeral | HARRISON e RUTSTRÖM (2009) |
| Prospect Theory analysis of guessing in multiple choice tests | BEREBY-MEYER, MEYER e FLASCHER (2002) |
| Prospect Theory: an analysis of decision under risk | KAHNEMAN e TVERSKY (1979) |
| Risk Aversion in Cumulative Prospect Theory | SCHMIDT e ZANK (2008) |
| Solving the St. Petersburg Paradox in cumulative Prospect Theory: the right amount of probability weighting | PFIFFELMANN (2011) |
| Stability of risk preferences and the reflection effect of Prospect Theory | BAUCELLS e VILLASÍS (2010) |
| Static portfolio choice under Cumulative Prospect Theory | BERNARD e GHOSSOUB (2010) |
| Testing Prospect Theory in a deterministic multiple criteria decision-making environment | SALMINEN e WALLENIUS (1993) |
| Too Risk-Averse for Prospect Theory? | RIEGER e BUI (2011) |
| Towards multi-factor models of decision making and risk: A critique of Prospect Theory and related approaches, Part I | NWOGUGU (2005a) |
| Towards multi-factor models of decision making and risk: A critique of Prospect Theory and related approaches, Part II | NWOGUGU (2005b) |
| Towards multi-factor models of decision making and risk: A critique of Prospect Theory and related approaches, Part III | NWOGUGU (2005c) |

**Chart 1: Articles selected for analysis of content**

Source: Elaborated by the author

It should also be noted that the full references of the 15 articles are found at the end of this work, in the References section.

Giving continuity to the methodological procedures in this research, it was conducted content analysis of 15 articles in a Microsoft Excel spreadsheet, as previously mentioned. In this procedure, the first activity

was to define what would be removed from the articles, based on the interests of the researcher regarding the delimitation of the topic and the focus of the research. Thus, nine factors were listed to be evaluated by the analysis of content, following especially the recommendations of Bardin (2011):

1. Objective of the article;
2. Evaluation of the behavioral characteristics;
3. Critics to the prospect theory:
4. Basis theories used;
5. Segments analyzed (industries, companies, groups of professionals, etc.);
6. Did you use the experiment?
7. If you did, does it have control group?
8. What was the respondents' participation like? What kind of participation/role did they have?
9. What kind of results/contributions was reached?

From the definition of the factors to be evaluated in the 15 articles, we went to the organization of content analysis, starting with the pre-analysis, conducting the preparation of material through the organization of articles to the reading stage. Then we started to step up exploration of the material, initially with the identification of relevant texts according to the nine factor of analysis listed above, translating them to Portuguese, since all articles were written in the English language. Then it was carried out the decomposition of the texts selected, with the objective of identifying codes that could emerge from them. To that end, we used the qualitative analysis, as well as the technique of cut with the choice of units. Then, after the identification of the codes from the text, we went to the step of categorization, through the classification of codes, aiming at their aggregation into categories In order to be possible to define the categories, the researcher has evaluated their quality according to the criteria suggested by Bardin (2011):

- mutual exclusion;
- homogeneity;
- pertinence;

- objectivity/faithfulness;
- productivity;

As a result, we identified 80 codes grouped into 15 categories, which will be detailed and analyzed in the next section of this study.

## 4 ANALYS AND PRESENTATION OF RESULTS

In this section, IT will be demonstrated individually the content analysis of each of the nine factors previously mentioned in section 3 (Research method), which have been listed for checking in 15 selected articles. For each of the factors, it will be demonstrated and explained the codes and categories identified, as well as an analysis of the passages of text relating to codes of the factor in question.

In this step of the process, the quantitative and qualitative analysis were performed, in order to also consider the number of occurrences of the codes within each category. It will not be explained in this section the codes and categories, because this has already been demonstrated in Section 3 (Procedure).

Continuing what was exposed aforementioned, follows the individual analysis of the factors for the evaluation of the articles selected.

### 4.1 OBJECTIVE OF THE ARTICLE

From the analysis of content performed in the factor of evaluation **objective of the article**, codes and categories presented in Chart 2 were identified.

| Factor Assessed | Category | Code |
|---|---|---|
| Goal of the article | Action | Test/evaluate/assess/Use |
| | | Propose/Develop/Make/ Offer/Solve |
| | | Check/Analyze |
| | | Criticize |
| | Focus | Theory/Model/Axiom |
| | | Decision-making/Choices |
| | | Risk/Uncertainty |
| | | Usefulness |
| | | Impact/Effects/Trends/Results |

**Chart 2: Categories and codes of objective factor of the article**

Source: Elaborated by the author

The codes for the category **action**, composed by verbs in the infinitive referring to the goals of the analyzed articles were grouped according to the similarity of significance of verbs. When accomplishing the content analysis of this factor, the findings described as follow were highlighted.

- Category **action**
  - It was realized a predominance of articles with the aim at testing and evaluation of the theory of perspective or to propose new methods/axioms from supposed limitations of the theory;
  - the only criticism explicitly took place precisely in one of the seminal articles from the theory of perspective assessed in opposition to the theory of the expected utility.
- Category **focus**
  - The prevalence of outbreaks of articles was related to theories/Models/Axioms, followed by those with a focus in decision-making involving risk and uncertainty;
  - Some articles have focused on the question of expected utility, while few had as objective the issue of impacts, effects and trends.

## 4.2 Evaluation of behavioral characteristics

From the content analysis performed in the evaluation factor evaluation **of behavioral characteristics**, were identified the codes and the categories presented in Table 3.

| Factor Assessed | Category | Code |
|---|---|---|
| Evaluation of the behavioral characteristics | DECISION MAKING | Criteria defined |
| | | Risk/Risk Aversion |
| | | Expected Utility |
| | | Perception of gains/losses |
| | | Stability of preferences |
| | | Stable patterns of choices |
| | | Certainty Effect |
| | | Isolation effect |
| | | Scale of commitment |
| | | Rule of punctuation |
| | | Weighting of probability |

**Chart 3: Categories and codes of the factor of behavioral characteristics**

Source: Elaborated by the author

When accomplishing the content analysis of this factor, it was highlighted the findings described as follows.

- Category **Decision taking**
  - It was noticed that the predominance of articles relating to the issue of perception/aversion to risk, followed by behaviors related to the perception of losses and gains. This corroborates the principles of the theory of perspective, although, as shown in the analysis of the objective factor **objective of the article**, some articles propose new methods/axiom, although supported by the same principles.

## 4.3 Critics to the prospect theory:

From the analysis of content carried out in factor of evaluation critics **to the prospect theory**, it was identified the codes and categories explained in Table 4.

| Factor Assessed | Category | Code |
|---|---|---|
| Critics to the prospect theory | Limitation | Safe behavior |
| | | Risk/Risk Aversion |
| | | Group decision making |
| | Replacement | Proposal for a new model |

**Chart 4: Categories and codes of factor critics to the perspective theory**

Source: Elaborated by the author

Only one third of articles presenting criticism of the theory of perspective (five out of a total of 15). When it was realized the content analysis of this factor, the following discoveries were highlighted:

- Category **limitation**
  - Although its strong appeal to risk perception, it drew attention to the fact of an article arguing exactly that the theory of perspective does not address issues related to various measures of risk (Nwogugu, 2005a), while another stressed that this theory fails when is used to describe the risk aversion in the choices made in simple lotteries (Rieger & Bui, 2011).
- Category **replacement**
  - An article (Nwogugu, 2005b) suggests replacing the theory of perspective for a new model called *Belief Systems*, while another (Nwogugu, 2005c) argues interestingly that the theory of perspective is conceptually the same as the theory of expected utility (the curious fact is that it is precisely this that the theory of perspective opposes in its seminal articles).

Draws attention to the fact that the major arguments in terms of limiting and replacing in relation to the theory of perspective arose from the same author (Nwogugu, 2005a, b, c), in three articles published in series, as it can be seen in Table 1 listed in Section 3 - Research Method.

## 4.4 THEORY OF BASES USED

From the analysis of content performed in the factor of evaluation **objective of the article**, codes and categories presented in Chart 5 were identified.

| Factor Assessed | Category | Code |
|---|---|---|
| Basis theories used | Theory | Prospect theory |
| | | Theory of cumulative prospect |
| | | Expected Utility Theory |
| | Models / Systems / Paradoxes | Escalation of Commitment |
| | | Paradox of Saint Petersburg |
| | | *Sistema de crenças* (*Belief systems*) |
| | | Models VAR/ARCH/GARCH |

**Chart 5: Categories and codes of factor theories of bases used**
Source: Elaborated by the author

When performed the analysis of the content of this factor, the following discoveries highlighted:

- Category **theories**
  - No surprise at this category Nine articles have used the theory of perspective as basis theory, as well as nine also used the theory of cumulative perspective as a base, which is a kind of brief "updating" of the original version. Besides these, four articles used the theory of expected utility, precisely the theory counteracted on articles of the seminal perspective theory.
- Category **model/systems/paradoxes**
  - The four codes identified in this category relate to their respective models/systems/paradoxes and were used as the basis of a single article, separately, which does not imply an emphasis on any of them.

4.5 Segments analyzed (industries, companies, groups of professionals, etc.);

From the content analysis performed in the evaluation **segments analyzed (industries, companies, group of professionals, etc.)**, were identified and codes and categories explained at the Chart 6.

| Factor Assessed | Category | Code |
|---|---|---|
| Segments analysed (industries, companies, groups of professionals, etc.) | Profile | Quantity |
| | | Profession |
| | | Average age |
| | | Professional experience |
| | | Gender |
| | | Course |
| | | Time in course |
| | | Country |

**Chart 6: Categories and codes of factor segments analyzed**

Source: Elaborated by the author

When performed the analysis of the content of this factor, the following discoveries highlighted:

- Category **profile**
  - In eight of the 15 articles evaluated there was the application of the method into specific segments (seven articles were more theoretical, with comparison of theories and change/suggestion of formulas, without practical application);
  - out of the eight articles in which there were practical application, all were conducted with individuals (which is perceived to be a characteristic of the methods applied in decision making); in one of them there was a comparison of behavior between individuals and groups (Liu & Liu, 2008), and on the other we used secondary data from an extensive previous research performed by one of the authors of the article (Rieger & Bui, 2011);
  - In terms of more general survey of codes, it was noticed that in those articles in which there was practical application they were duly informed of the items **profession**, **course** (in case of the students) and **country** where the experiment was carried out. In the other codes, the index of information in articles was low.

## 4.6 DID YOU USE THE EXPERIMENT?

From the analysis of content performed in the factor of evaluation **Did you use the experiment?** codes and categories presented in Chart7 were identified.

| Factor Assessed | Category | Code |
|---|---|---|
| Did you use the experiment? | Experiment | Object |
| | | Groups/quantity of members |
| | | Time/time interval |
| | | Environment |

**Chart 7: In what categories and codes of the factor did you use the experiment?**

Source: Elaborated by the author

This factor was considered due to the fact that the researcher needs to evaluate if experiments are performed in research involving the theory of perspective and, if so, in what way they are made, in general terms. When it was realized the content analysis of this factor, the following discoveries were highlighted:

- Category **experiment**
  - Six of the eight articles of practical use made use of experiment as a research technique, i.e. 75% (it is important to consider that, as previously mentioned, many of the articles in the evaluation deal only with theoretical issues, and not practical);
  - Out of the six articles with experiments, we noticed the application of tests with hypothetical scenarios to evaluate the decision-making process, involving conditions of risk and uncertainty, in the perspective of the theory of perspective;
  - One of the articles compared explicitly in their experiment situations of gains and losses (Harrison & Rutström, 2009);
  - One of the articles (Baucells & Villasís, 2010) assessed whether there was a difference in the behavior of individuals in a time interval of three months, conducting the experiment in two sections.

## 4.7 IF YOU USED THE EXPERIMENT, DOES IT HAVE CONTROL GROUP?

From the analysis of content performed in the factor of evaluation **If you used the experiment, does it have control group?** codes and categories presented in Chart8 were identified.

| Factor Assessed | Category | Code |
|---|---|---|
| If you did, does it have control group? | Control group | Presence |

**Chart 8: Categories and codes of factor If you used the experiment, does it have control group?**

Source: Elaborated by the author

This factor was considered due to the fact that the literature suggests that, in the case of realization of experiments, to be used control groups, with the aim of making the experiment more reliable (Campbell & Stanley, 1970). When performed the analysis of the content of this factor, the following discoveries highlighted:

- Category **Control group**
  - Surprisingly, in only one of the 15 articles evaluated it was verified the presence of control group mentioned explicitly in the method (Bereby-Meyer, Meyer & Flascher, 2002);
  - This does not necessarily mean that only one article used a control group, since some more suggest that they used the mechanism, but without mentioning it explicitly.

## 4.8 WHAT WAS THE RESPONDENTS' PARTICIPATION LIKE? WHAT KIND OF PARTICIPATION/ROLE DID THEY HAVE?

From the content analysis performed in the evaluation What **was the respondents' participation like? What kind of participation/role did they have?** codes and the categories presented in Chart 9 were identified.

| Factor Assessed | Category | Code |
|---|---|---|
| What was the respondents' participation like? What kind of participation/role did they have? | Content | Preference comparations |
| | | Demonstration of phenomena |
| | | Prejudices in decision-making |
| | | Hypothetical situations |
| | | Choices non involving indifference |
| | | Factors evaluated/criteria adopted |
| | | Level of Knowledge required |
| | Form/Instruments | Place |
| | | Computer |
| | | Pesonal interview |
| | | Time |
| | | Questionnaires |
| | | Groups/quantity of participants |
| | | Criteria of groups selection |

**Chart 9: Categories and codes of factor What was the respondents' participation like?**

Source: Elaborated by the author

When it was realized the content analysis of this factor, the following discoveries were highlighted:

- Category **content**
  - In the same way as explained in the Profile category (item s**egments analyzed (industries, businesses, group of professionals, etc.)**), for the same reason of being directly related to this item, there was participation of respondents also in eight of the 15 articles evaluated (seven articles were more theoretical, with comparison of theories and change/suggestion of formulas, without practical application);
  - In the eight articles in which there was participation of respondents, worthy of mentioning is the issue of explanation of the factors evaluated and criteria adopted in the experiments, which was expected due to the behavioral nature and subjective intrinsic to the study of decision-making processes, aiming at a greater clarification of the procedures adopted.
- Category **form/instruments**
  - It was noticed that the increased use of questionnaires as an evaluation instrument, and in some articles also explained the time of completion of each experiment, as well as the selection

criteria to divide the participants into different groups, aiming at the practical application of the method.

## 4.9 WHAT KIND RESULTS/PARTICIPATION WAS ACHIEVED?

From the analysis of content carried out in factor of evaluation What **kind of results/participation was achieved**, it was identified the codes and categories explained in Chart 10.

| Factor Assessed | Category | Code |
|---|---|---|
| What kind of results/contributions was reached? | Criteria and Factors | Capacity of explanation |
| | | Effect of reflexion |
| | | Value functions |
| | | Escalation of Commitment |
| | | Ambiguity of measures |
| | | Coefficient of correlation |
| | | Choice of weighting |
| | | Psychometric standards analyzes |
| | | Interference of parameters |
| | | Individual decision making X group decision making |
| | Behavioral issues | Assessment of the behavior of decision makers |
| | | Investors profile |
| | | Perception of usefulness (gains and losses) |
| | | Preference among risk options |
| | | Safe behavior |
| | | Human behavior in tests involving uncertainty |
| | Theoretical conclusions | Representativeness of real situations |
| | | Comparison with the theory of expected utility |
| | | Union of Theories |
| | | Proposal of a new theory/model |
| | | Applicability of the theory in several situations |
| | | Limitations of the theory of perspective/cumulative basis |

**Chart 10: Categories and codes of factor What kind of results/participation was achieved**

Source: Elaborated by the author

When performed the analysis of the content of this factor, the following discoveries highlighted:

- Category **criteria and factors**
  - In terms of criteria and values, no code was highlighted, since almost all was covered in just one article. It is worth mentioning that the only code explicitly quoted twice was functions of value.

- Category **behavioral questions**
  - It was noticed a prevalence of articles with results relating to preferences between options for risk, followed by the perception of usefulness, relating to losses and gains and the issue of testing to evaluate human behavior in situations of uncertainty.
- Category **Theoretical conclusions**
  - In terms of theoretical conclusions, what called attention were the results of the comparison of the theory of perspective with the expected utility theory, present in seven of the 15 articles evaluated;
  - Another aspect that stood out was that five articles presented conclusions regarding limitations of the theory of perspective;
  - Although they appear in smaller quantities, they deserve special mention, by appearing in three or four articles each one, the ability of representativeness of the theory of perspective in real situations, as well as the possibility of its applicability in various situations, in addition to the situations in which there were proposals for new theories or models;
  - Finally, although appearing in only one of the 15 articles (Harrison & Rutström, 2009), proved to be quite interesting the proposal of "marriage" between the theory of perspective and the theory of expected utility, since the second source of inspiration for the creation of the first, in the form of criticism.

Completed the analysis and presentation of results, at the next section will be demonstrated the conclusions and final considerations this research.

## 5 FINAL CONSIDERATIONS

The main contribution of this research took place due to the fact that it explores a subject in focus currently, the behavioral aspects of decision-making, using as its theme the perspective theory (Kahneman & Tversky, 1979), with a focus on the risks involved in the decision making process. To that end, we performed a search on the database ProQuest

based on the theme and focus explained, which resulted in 15 articles submitted to the process of content analysis (Bardin, 2011), based on the analysis of nine factors. Respecting the relevant steps to content analysis, we obtained 80 codes grouped into 15 categories, which were subsequently analyzed and the presentation of the results is in section 4 of this study.

In relation to the aims of the research, it is considered to have been fully met, once it was performed the content analysis in 15 articles listed in a reliable database (ProQuest) which treated the topic and research focus. The results were the most diverse:

- Focus of the articles in decision-making involving risk and uncertainty, as well as the perception of gains and losses (which was expected);
- Critical posture of some articles to the theory of perspective, even to the point of suggesting to replace them;
- Considerable emphasis given in some cases to expected utility theory, both in terms of comparison of counterpoint to the theory of perspective (and even of "marriage" between the two theories, which is interesting due to the fact of the creation of the theory of perspective to be precisely as idea contrary to expected utility theory);
- Strong appeal of about half of the articles, without any form of practical applicability;
- A considerable number of experiments among those practical (75%), although, surprisingly, only a mention explicitly the use of the control group;
- Necessity for explanation of the factors evaluated and the criteria adopted in experiments of this kind, given its high degree of subjectivity;
- Ability of representativeness of the theory of perspective in real situations, as well as the possibility of its application in different situations.

So, therefore, it should be noted that there are different thoughts regarding the importance of the theory of perspective, at least in the analyzed articles that relate to the risks involved in the decision making

process, being now criticized, sometimes praised, as well as observing that this theory has greater applicability in scientific research, especially by means of experiments with individuals, although without the use of the control group.

The results also indicate that there is space for the applicability of theories covered in the articles evaluated, since the greater part of them is limited only to explain the mathematical models relating to theories. So, what usually happens is the mere comparison of these mathematical models for purposes of attestation of its presuppositions, which suggests a lack of studies that addresses objective and practical tests about these theories.

Although it has been taken the necessary methodological care , identified some limiting factors to the conclusions listed here, such as the small number of articles analyzed, the fact of the query has been performed in only a database (ProQuest), the absence of qualitative criteria in relation to the editors of articles (impact factor, *H-Index*, number of citations, etc.), as well as a possible subjectivity in the analysis, according to the perceptions and experiences of researchers, since the analysis was performed by only two people.

As continuity for this research, it is suggested the implementation of the same analysis by another researcher, in order to verify that the new results are similar or not, and the query to a larger quantity of articles, considering the qualitative aspects of the editors, as well as other data bases. In addition, it is important that the results from this study are confronted with those who will be obtained in future studies, for the purpose of verification of its validation. Furthermore, the categories and codes obtained from the content analysis performed in this study can serve as a basis for future research concerning the topic and the focus of this study, respectively, theory of perspective and risks involved in the decision making process.

Finally, it is called the attention to the fact that the articles analyzed in this study, as previously stated, address primarily the mathematical models relating to theories, and not the applicability of same in practical situations, with humans, involving experiments that simulate situations of risk (loss and gain). This contrasts the essentially practice nature of the

perspective theory, highlighted in its scientifically relevant article, as mentioned in the introduction to this study. Thus, it is important that future research address these theories to practical application. In addition, by means of these research of nature, it is also important that both the issue of criticism in relation to the theory of perspective, based on the limitations mentioned in some studies, as the possible synergy of the same with the expected utility theory, as suggested by the analysis performed in this study.

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