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The Best Theory for Decision Making with Framed Information

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Abstract

Previous studies established that the information framed in different ways leads to distinct decisions. In general, framing is tested using two main theories, including Prospect and Fuzzy-Trace. This study compares the two theories to determine the better one in explaining a phenomenon. It also examines two conditions that might influence decision making regarding risk-taking or avoidance. Additionally, the study focuses on three main things, including preparing for decision alternatives, precisely positive frame, and negative frame, Making decision alternatives with a different theory, precisely Prospect and Fuzzy-Trace Theory, and the level of responsibility for previous related choices. Experimental research was used with a between-subject design 2x2x2. The participants include 180 students and 16 people for first and second pilot projects, as well as 81 doctoral students for a real experiment. The results of the study showed that decision making is different when information is framed positively or negatively. In using different theories for decision making, a considerable number of individuals are willing to take risks, though many also avoid. When someone is responsible or not for the initial investment, different decisions are made.

Keywords: *Framing, Prospect theory, Fuzzy-trace theory, responsible*

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1. Introduction

Due to a very complex, competitive, and dynamic environment, managers need to make decisions. However, competitiveness and dynamism render effective decision making more challenging and critical than in the past (Radovic-markovic & Vucekovic, 2015). Decision making requires complete and detailed information by both internal and external parties (Laudon & Laudon, 2018; Lewandowski, 2015).

Managers in decision making widely use the information from the accounting process (Anthony, 2007; Chapman et al., 1996). Anthony (2007) stated that accounting provides relevant and timely information about events in business and non-profit entities to help internal and external users make economic decisions.

Accounting assignments require accountants to be careful in gathering and providing information for decision making by managers (Ashton, 1988; Birnberg et al., 2007; Hansen, 2012). According to Ashton (1988), there are possibilities for managers to decide or justify their decisions based on the accounting information provided without examining the details. Consequently, managerial decisions resulting from such deviations might lead to significant losses.

Identifying the impact of packaging accounting information or framing is critical in understanding the way accounting information should be collected and provided to maximize

the company value (Bonner, 1999; Shen et al., 2017). Framing deals with how humans feel or structure a decision (Anderson, 1999; Main, 1998; Rutledge & Harrell, 1994; Yeung, 2014).

The companies often construct information regarding reality based on their interests (Bowditch, 1990; Kriyantono, 2012). Therefore, framing theory applies to intrapersonal, group, organizational, inter-organizational, and communication levels with the social environment, and the information presented might turn negative into positive opinions, and vice versa (Camerer, 2000; Chapman et al., 1996; Hallahan, 1999; Sumarto, 2016). The processed information is expected to change the decision-makers' opinion, from positive to negative or vice versa (Camerer, 2000; Handoko, 2007).

Research on framing shows differences in decision making by individuals in a similar problem (Chang, 2002; Rutledge & Harrell, 1994; Z. J. Wang et al., 2018). In general, the rule of thumb is often used in decision making (Cheng et al., 2003; Dearman & Shields, 2005). The framing effect shows that decision-makers will respond differently to the same problem in case it is presented in a different format (Brainerd & Reyna, 2015; Choo & Trotman, 1991; Kühberger & Tanner, 2010; Levin et al., 1998; Reyna & Brainerd, 1991a).

Prospect Theory explains the influence of framing and remains usable today (Barberis, 2013; Birnbaum, 2018; Schmidt et al., 2008; Z. Wang et al., 2018). However, the Fuzzy Trace Theory developed in the early 1990s is an alternative in the analysis of the framing effects (Reyna & Brainerd, 1990, 1991a, 1991b). according to Chang et al. (2002) and Li et al. (2017), fuzzy-trace theory explains the effect of framing in managerial accounting decision making better than prospect theory. Moreover, the Fuzzy-trace theory has been widely used in various cross-sciences research (Corbin et al., 2010; Elwyn et al., 2011; Keller et al., 2014; Krockow et al., 2018).

This research compares the ability of prospect and fuzzy-trace theories in explaining the framing effects on investment decisions due to the inconsistency of many studies. Different theories use distinct cognitive processes to describe the decision-making process. In several previous studies, there are a lot of inconsistencies in the results and opinions (Agranov et al., 2014; Bazerman, 1984; Bazerman et al., 1982; Chakravarty et al., 2011; Reynolds et al., 2016; Susanto, 2012).

This research provides new insights into decision making by individuals while in risky conditions. The adjustment process comes from the psychological influence on responsibilities and emotional factors due to involvement in the design of an investment project. Therefore, managers are reluctant to stop the project. Additionally, the study also provides an overview of decision making in Indonesia. Since some of the research references were carried out in Europe, therefore there are possible differences in the results due to different cultures. Some previous research stated that communication culture in Asia, especially in Indonesia, is different from Europe (Harrison & McKinnon, 1999; Tsakumis et al., 2007). Due to cultural differences, the information provided might be different, leading to diverse decision making.

The problem in this research involves the influence of framing and responsibility in making investment decisions, as well as the ability of Prospect Theory and Fuzzy-Trace Theory in explaining the influence of framing when individuals are either responsible or not for decision making.

2. Theory

2.1 Prospect Theory

Prospect Theory was developed by Tversky & Kahneman (1979, 1981) and stated that the frame adopted depends on the formulation of the problem faced, the norms, habits, and

characteristics of the decision-maker. According to previous studies, this theory is still applicable today (Barberis, 2013; Birnbaum, 2018; Schmidt et al., 2008; Z. Wang et al., 2018).

Wang et al. (2018) stated that the main contribution of prospect theory is that the subjective weighting function changes investors' objective probability preferences. This implies that all objective probabilities can be transformed. Prospect theory is widely applied in studies using financial ratios (Z. Wang et al., 2018; Yao & Li, 2013; Zhao et al., 2018) and cross-sciences studies (Bouchouicha & Vieider, 2017; Jhala et al., 2018; Krohling & De Souza, 2012; Passos et al., 2014; Thaler, 2016; Tykocinski et al., 2017). According to Baucells & Heukamp (2006) and Schmidt et al. (2008), variations of cumulative prospect theory are increasingly applied both in theoretical and empirical works. Other studies show that the theory has the potential to replace the expected utility theory for a particular purpose (Baucells & Heukamp, 2006; Fox & Poldrack, 2009; Schmidt & Zank, 2008; Wu, 2005). Therefore, it was necessary to examine the limitations of using Prospect Theory in explaining the effect of framing.

2.2 Fuzzy Trace Theory

Fuzzy Trace Theory developed in the early 1990s as an alternative approach for analysing the effects of framing (Reyna & Brainerd, 1990, 1991a, 1991b). It assumes decision-makers prefer using simplifications in presenting information unless they cannot simplify the choice of decisions in complex information. The theory has been used to test the effect of framing in making various standard risk choices. Chang et al. (2002) and Li et al. (2017) established that the fuzzy-trace theory better explains the effect of framing in managerial accounting decision making compared to prospect theory.

Li et al. (2017) research method was based on information from decision-making problems to determine the weight and alternative ranking. Fuzzy-trace theory has also been widely used in various interdisciplinary studies (Corbin et al., 2010; Elwyn et al., 2011; Keller et al., 2014; Krockow et al., 2018). In case it uses data from historically successful decision-making cases to assist decision making, the theory explains the effect of framing better than prospect theory (Reyna, 2012).

3. Hypothesis and Conceptual Framework

This study examines each theory (H1 and H2) and compares which one is stronger in explaining the effect of framing (H3).

Hypothesis 1 (H1) is proposed to determine how prospect theory explains the effect of information on decisions, precisely, the willingness to take or avoid risks. The hypothesis proposed is as follows

H1a: When the presentation of information in decision making is stated in positive framing and high responsibility, decision-makers prefer taking risks

H1b: When the presentation of information in decision making is stated in positive framing and low responsibility, decision-makers prefer to avoid the risk

H1c: When the presentation of information in decision making is stated in negative framing and high responsibility, decision-makers take risks

H1d: When the presentation of information in decision making is stated in negative framing and low responsibility, decision-makers prefer to take risks

Hypothesis 2 (H2) is proposed to determine how fuzzy-trace theory explains the effect of information on decisions regarding the willingness to take risks. To test this issue, the hypothesis proposed is as follows:

H2a: When the presentation of information in decision making is stated in positive framing and high responsibility, decision-makers prefer to take risks.
H2b: When the presentation of information in decision making is stated in positive framing and low responsibility, decision-makers prefer to avoid risks.
H2c: When the presentation of information in decision making is stated in negative framing and high responsibility, decision-makers prefer to take risks.
H2d: When the presentation of information in decision making is stated in negative framing and low responsibility, decision-makers prefer to take risks.

According to Reyna et al. (2015) and Stone et al. (1994), the fuzzy-trace theory is better in explaining the framing effect. Chang (2002) and Klaczynski & Narasimham (1998) in judgment and decision making also used Fuzzy-Trace Theory. Additionally, Chang (2002) also stated that this theory is better in explaining the effects of framing.

Hypothesis 3 (H3) compares the magnitude of preferences between fuzzy trace and prospect theory in the framing effect and responsibility for the initial investment process. The hypothesis proposed to test the magnitude of each theory's preferences is as follows
H3a: Preference for taking risks of fuzzy-trace theory is higher than prospect theory when the presentation of information is stated in positive framing and high responsibility
H3b: Preference for avoiding the risk of fuzzy-trace theory is higher than prospect theory when the presentation of information is stated in positive framing and low responsibility
H3c: Preference for taking the risk of fuzzy-trace theory is higher than prospect theory when the presentation of information is stated in negative framing and high responsibility
H3d: Preference for taking the risk of fuzzy-trace theory is higher than prospect theory when the presentation of information is stated in negative framing and low responsibility

The overall hypotheses and conceptual framework of the study are presented in Table 1 and Figure 1, respectively.

Table 1. Research model

		Prospect Theory		*Fuzzy-Trace Theory*
Positive framing (+)	High responsibility	*risk-taker* H1a	H3a ⟷	*risk-taker* H2a
	Low responsibility	*risk-averse* H1b	H3b ⟷	*risk-averse* H2b
Negative framing (-)	High responsibility	*risk-taker* H1c	H3c ⟷	*risk-taker* H2c
	Low responsibility	*risk-taker* H1d	H3d ⟷	*risk-taker* H2d

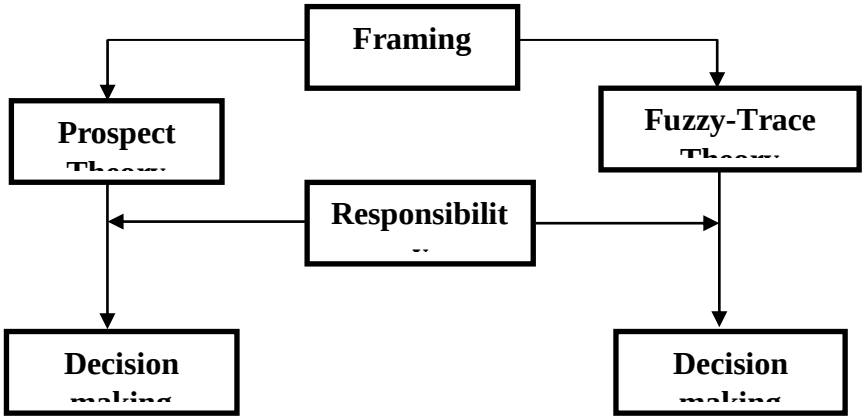

Figure 1: Research Conceptual Framework

4. Method

This study uses an experimental method in three stages, including the first and second pilot projects, and the actual experiment.

4.1 Research Participants

The participants were 180 students for the first pilot project, 16 for the second pilot project, and 81 doctoral students in Central Java for the actual experiment.

4.2 Research Design

This experiment uses a between-subjects design with 2x2x2 factorial with two framing variables, including gain-domain / positive-frame and loss-domain / negative-frame. Two variables consist of high and low responsibility, while the two theories include fuzzy-trace and prospect. The experiment design is presented in table 2.

Table 2: 2x2x2 Experiment Design

		Prospect Theory	Fuzzy Trace Theory
Positive-Frame	High Responsibility	Positive-Frame / High Responsibility /Prospect Theory	Positive-Frame / High Responsibility /Fuzzy Trace Theory
	Low Responsibility	Positive-Frame / Low Responsibility /Prospect Theory	Positive-Frame / Low Responsibility /Fuzzy Trace Theory
Negative-Frame	High Responsibility	Negative-Frame / High Responsibility /Prospect Theory	Negative-Frame / High Responsibility /Fuzzy Trace Theory
	Low Responsibility	Negative-Frame / Low Responsibility /Prospect Theory	Negative-Frame / Low Responsibility /Fuzzy Trace Theory

4.3 Experiment Procedure

The implementation of the first and the second pilot project, as well as the actual experiment, have the same procedure, hence does not cause bias. The participants were given 8 different treatments in the form of case questions with symbols A to H in sequence. Subsequently, those receiving case questions with the symbol A to D in the first stage were given case questions with the symbol E to H in sequence. Conversely, those receiving case questions with the symbol E to H in the first stage were given problem cases with the symbol A to D in sequence. This was carried out to maintain the internal validity of the study. In this experiment, each participant was given 10 minutes to solve the case questions.

4.4 Data Analysis Methods

The Data obtained from the experiments were then analysed, and the analytical tool used was Cross Tabulation with the help of the SPSS program.

5. Result and Discussion

5.1 Prospect theory, positive frame and with responsibility

Total participants in hypothesis 1a were 76 participants, including 49, 5, and 22 participants for the first and second pilot projects and the last experiment, respectively. In the first pilot project with 49 participants, 22 chose option A which is less risky, while 27 opted for B, the risk-taker. In the second pilot project, 2 individuals chose option A (less risky) while 3 opted for B (risk taker).

In the actual experiment with 22 participants, 9 chose option A (less risky), and 13 chose option B (risk taker). The analysis shows that hypothesis 1a is supported. These results are consistent with Susanto (2012) and Tykocinski et al. (2017), as shown in table 1.

Table 1: Percentage of Answers for High Positive Prospect

Group	Option				Total
	A (Risk-Averse)	Confidence Scale	B (Risk Taker)	Confidence Scale	
Step 1	22 (44.9%)		27 (55.1%)		49
Step 2	2 (40%)	3	3 (60%)	4.5	5
Step 3	9 (40.9%)	1,2,3	13 (59.1%)	4.5	22

5.2 Prospect theory, positive frame and without responsibility

The total participants in hypothesis 1b were 68, including 44, 3, and 21 individuals for the first pilot project, the second pilot project, and the last experiment, respectively. In the first pilot project, 30 (68.2%) people chose option A (less risky), while 14 (31.8%) opted for B (risk taker). In the second pilot project, 2 (66.7%) people chose option A (less risky), while 1 (33.3%) selected B (risk taker). The actual experiments showed that 11 (52, 4%) people choose option A (less risky), while 10 (47.6%) opted for B (risk taker). The analysis shows that hypothesis 1b is supported, and this is consistent with Susanto (2012) and Tykocinski et al. (2017) as shown in table 2.

Table 2: Percentage of Answers for Low Positive Prospect (H1b)

Group	Option				Total
	A (Risk-Averse)	Confidence Scale	B (Risk Taker)	Confidence Scale	
Step 1	30 (68,2%)		14 (31,8%)		44
Step 2	2 (66,7%)	3	1 (33.3%)	4	3
Step 3	11 (52,4%)	2, 3	10 (47,6%)	4, 5	21

5.3 Prospect theory, negative frame, and high responsibility

The total participants in hypothesis 1c were 68, including 44, 5, and 19 individuals for the first and second pilot project and the last experiment, respectively. In the first pilot project with 44 participants, 15 (34.1%) chose option A (less risky), while 29 (65.9%) opted for B (risk taker). In the second pilot project, 2 (40%) people chose option A (less risky), while 3 (60%) opted for B (risk taker). In the actual experiment, 7 (36.8%) individuals chose A (less risky), while 12 (63.2%) opted for B (risk taker). The analysis shows that hypothesis 1c is supported, and this is in line with Susanto (2012) and Tykocinski et al. (2017). Table 3 shows more details.

Table 3: Percentage of Answers for High Negative Prospect (H1c)

Group	Option				Total
	A (Risk-Averse)	Confidence Scale	B (Risk Taker)	Confidence Scale	
Step 1	15 (34,1%)		29 (65,9%)		44
Step 2	2 (40%)	3	3 (60%)	4, 5	5
Step 3	7 (36,8%)	2, 3	12 (63,2%)	4, 5, 6	19

5.4 Prospect theory, negative frame and without responsibility

The total participants in this hypothesis 1c were 65, including 43, 3, and 19 individuals for the first and second pilot projects and the last experiment, respectively. In the first pilot project with 44 participants, 14 (32.6%) chose option A (less risky), and 29 (67.4%) opted for B (risk taker). In the second pilot project, 1 (33.3%) person selected A (less risky), while 2 (66.7%) opted for B (risk taker). In the actual experiment, 8 (42.1%) individuals chose A (less risky), while 11 (57.9%) opted for B (risk taker). The analysis shows that the 1d hypothesis is supported and these results are consistent with Susanto (2012) and Tykocinski et al. (2017). Table 4 shows more details.

Table 4: Percentage of Answers for Low Negative Prospect

Group	Option				Total
	A (Risk-Averse)	Confidence Scale	B (Risk Taker)	Confidence Scale	
Step 1	14 (32,6%)		29 (67,4%)		43
Step 2	1 (33.3%)	3	2 (66,7%)	4	3
Step 3	8 (42,1%)	1, 2, 3	11 (57,9%)	4, 5	19

5.5 Fuzzy-trace theory, positive frame and with responsibility

Total participants in hypothesis 2a were 76, including 49, 5, and 22 individuals for the first pilot and second pilot projects and the last experiment, respectively. In the first pilot project with 49 participants, 15 (30.6%) and 34 (69.4%) chose A (less risky) and B (risk taker), respectively. In the second pilot project, 1 (20%) person chose A (less risky), while 4 (80%) opted for B (risk taker). In the actual experiment, 7 (31.8%) and 15 (68.2%) chose A (less risky) and B (risk taker), respectively. The analysis shows that hypothesis 2a is supported, and this is consistent with Reyna (2012). More information is presented in table 5.

Table 5: Percentage of Answers for High Positive Fuzzy

Group	Option				Total
	A (Risk-Averse)	Confidence Scale	B (Risk Taker)	Confidence Scale	
Step 1	15 (30,6%)		34 (69,4%)		49
Step 2	1 (20%)	3	4 (80%)	4, 5, 6	5
Step 3	7 (31,8%)	2, 3	15 (68,2%)	4, 5, 6	22

5.6 Fuzzy-trace theory, positive frame and without responsibility

The total participants in hypothesis 2b were 68, including 44, 3, and 21 individuals for the first and second pilot projects and the last experiment, respectively. In the first pilot project with 44 participants, 32 (72.7%) and 12 (27.3%) chose option A (less risky) and B

(risk taker), respectively. In the second pilot project, 2 (66.7%) and 1 (33%) opted for A (less risky) and B (risk taker), respectively. In the actual experiment, 13 (61.9%) and 8 (38.1%) people chose option A (less risky) and B (risk taker), respectively. The analysis shows that hypothesis 2a is supported, and this is consistent with Reyna (2012). More details are shown in table 6.

Table 6: Percentage of Answers for Low Positive Fuzzy

Group	Option				Total
	A (Risk-Averse)	Confidence Scale	B (Risk Taker)	Confidence Scale	
Step 1	32 (72,7%)		12 (27,3%)		44
Step 2	2 (66,7%)	2	1 (33.3%)	4	3
Step 3	13 (61,9%)	1, 2, 3	8 (38,1%)	4, 5	21

5.7 Fuzzy-trace theory, negative frame and with responsibility

The total participants in hypothesis 2c were 68, including 44, 5, and 19 individuals for the first and second pilot projects and the last experiment, respectively. In the first pilot project with 44 participants, 13 (29.5%) and 31 (70.5%) opted for A (less risky) and 31 B (risk taker), respectively. In the second pilot project, 1 (20%) person chose option A (less risky), while 4 (80%) opted for B (risk taker). In the actual experiment, 6 (31.6%) and 13 (68.4%) individuals opted for A (less risky) and 13 B (risk taker), respectively. The analysis shows that hypothesis 2c is supported and this is consistent with Reyna (2012). More details are presented in table 7.

Table 7: Percentage of Answers for High Negative Fuzzy

Group	Option				Total
	A (Risk-Averse)	Confidence Scale	B (Risk Taker)	Confidence Scale	
Step 1	13 (29,5%)		31 (70,5%)		44
Step 2	1 (20%)	3	4 (80%)	4, 5	5
Step 3	6 (31,6%)	2, 3	13 (68,4%)	4, 5, 6	19

5.8 Fuzzy-trace theory, negative frame and without responsibility

The total participants in hypothesis 2d were 65, including, 43, 3, and 19 individuals for the first and second pilot projects and the last experiment, respectively. In the first pilot project with 43 participants, 13 (30.2%) and 30 (69%) people opted for A (less risky) and 30 B (risk taker), respectively. In the second pilot project, 1 (33.3%) opted for A (less risky), while 2 (66.7%) chose B (risk taker). Furthermore, the actual experiment, 7 (36.8%), and 12 (63.2%) people chose option A (less risky) and B (risk taker), respectively. The analysis shows that the 2d hypothesis is supported and this is consistent with Reyna (2012). Table 8 shows more details.

Table 8: Percentage of Answers for Low Negative Fuzzy

Group	Option				Total
	A (Risk-Averse)	Confidence Scale	B (Risk Taker)	Confidence Scale	
Step 1	13 (30,2%)		30 (69,8%)		43
Step 2	1 (33.3%)	3	2 (66,7%)	4, 5	3
Step 3	7 (36,8%)	1, 2, 3	12 (63,2%)	4, 5, 6	19

5.9 Competing between Prospect theory, positive frame and with responsibility and Fuzzy-trace theory, positive frame and with responsibility

In the first pilot project with 49 participants, 44.9% and 55.1% chose the less risky option (A), and risk-taking option to continue investing (B), respectively. Subsequently, the FTT showed that 30.6% and 69.4% of the participants chose the less-risky (A) and the risk-taking options to continue investing (B), respectively. In the second pilot project, 40% and 60% of the participants chose the less-risky and risk-taking options to continue investing, respectively.

When the theoretical framework used is the fuzzy-trace theory, with positive framing and high responsibility, participants also tend to choose alternative answers with a risk-taking option (B). However, the preferences seem to be higher, with 80% than using prospect-theory, which scored 60%. Of the 22 participants, 9 (40.9%) chose Option A (less risky), while 13 (59.1%) opted for B (risk taker).

In case the theoretical framework used is the fuzzy-trace theory, with positive framing and high responsibility, participants tend to choose alternative answers with the risk-taking option (option B). The preference seems to be higher compared to using prospect theory, with 31.8% and 68.2% for options A and B, respectively. Based on these results, the overall comparative preference of the two theories was 59.1% for prospect and 68.2% for fuzzy-trace. Therefore, the hypothesis 3a (H3a) is supported empirically. The complete results are shown in Table 9.

Table 9: High Positive Prospect VS High Positive Fuzzy

	Theory	Option				Total
		A (Risk-Averse)	Confidence Scale	B (Risk Taker)	Confidence Scale	
Step 1	*Prospect*	22 (44,9%)		27 (55,1%)		49
	Fuzzy	15 (30,6%)		34 (69,4%)		49
Step 2	*Prospect*	2 (40%)	3	3 (60%)	4, 5	5
	Fuzzy	1 (20%)	3	4 (80%)	4, 5, 6	5
Step 3	*Prospect*	9 (40.9%)	1,2,3	13 (59.1%)	4, 5	22
	Fuzzy	7 (31,8%)	2, 3	15 (68,2%)	4, 5, 6	22

5.10 Competing between Prospect theory, positive frame and without responsibility and Fuzzy-trace theory, positive frame and responsibility

In the first pilot project, when experiment treatment was stated in the framework of prospect theory with positive framing of information and low responsibility, 30 (68.2%) and 14 (31.8%) of the participants chose options A (less risky) and B (risk taker), respectively. In the Fuzzy-trace theory, with positive framing of information and low responsibility, 32

(72.27%) and 12 (27.3%) of the participants choose A (less risky) and B (risk taker), respectively.

The results of the second pilot project showed that 66.7% and 33.3% of the participants chose the less risky and risk-taking options to continue investing, respectively. When the theoretical framework used is the fuzzy-trace theory with positive framing of information and low responsibility, participants tend to choose alternative answers with the risk-averse option (option A). However, the preferences seem to be the same compared to prospect-theory. Specifically, the scores were 66.7 % and 33.3% for prospect and fuzzy-trace theory, respectively. Therefore, the magnitude of the confidence level chosen from the participants was compared. In this treatment, participants seem to be certain in selecting answers with a higher confidence level compared to the prospect-theory treatment.

The results in table 4.36 show that in the final experiment with 21 participants, 11 (52.4%) and 10 (47.6%) chose options A (less risky) and B (risk taker), respectively. In the fuzzy-trace theory with positive framing of information and low responsibility, participants tend to choose alternative answers with a risk-averse option (option A). However, the preferences seem to be higher compared to using prospect theory, with 61.9 % and 38.1% for options A and B, respectively. These results show that the overall comparative preference of the two theories was 52.4% and 61.9% for prospect and fuzzy-trace theories, respectively. The complete analysis results are shown in Table 10.

Table 10: Low Positive Prospect VS Low Positive Fuzzy

	Theory	Option				Total
		A (Risk-Averse)	Confidence Scale	B (Risk Taker)	Confidence Scale	
Step 1	*Prospect*	30 (68,2%)		14 (31,8%)		44
	Fuzzy	32 (72,27%)		12 (27,3%)		44
Step 2	*Prospect*	2 (66,7%)	3	1 (33,3%)	4	3
	Fuzzy	2 (66,7%)	2	1 (33,3%)	4	3
Step 3	*Prospect*	11 (52,4%)	2, 3	10 (47,6%)	4, 5	21
	Fuzzy	13 (61,9%)	1, 2, 3	8 (38,1%)	4, 5	21

5.11 Competing between Prospect theory, negative frame and with responsibility and Fuzzy-trace theory, negative frame and with responsibility

In the first pilot project, when the experimental treatment was stated in the framework of prospect theory with negative framing of information and high responsibility, 15 and 29 participants chose options A (less risky) and B (risk taker), respectively. This means that 34.1% and 65.9% of the participants preferred the less risky and risk-taking options.

In the Fuzzy-trace theory with negative framing of information and high responsibility, 13 and 31, or 29.5% and 70.5%, of the participants chose options A and B, respectively. The results of the second pilot project, with 5 participants, are shown in table 4.40. From table 2 and 3, or 40% and 60% of the participants chose options A and B, respectively. In the fuzzy-trace theory with positive framing of information and high responsibility, participants tend to select alternative answers with a risk-taking option. However, the preference seems to be higher compared to prospect theory. Specifically, the scores were 60% and 80% for prospect and fuzzy-trace theory, respectively. Also, 7 and 12, or (36.8%) and 63.2% of the participants chose options A and B, respectively.

In the fuzzy-trace theory with negative framing of information and high responsibility, the participants tend to select alternative answers with the risk-taking option. However, the preference seems to be higher compared to using prospect theory. The specific scores were 22.2% and 77.8% for options A and B, respectively. The results show that the overall comparative preference of the two theories were 63.2% and 77.8% for prospect-theory and fuzzy-trace theory, respectively. Therefore, the hypothesis 3c (H3c) is supported empirically. The complete analysis results are shown in Table 11.

Table 11: High Negative Prospect VS High Negative Fuzzy

	Theory	Option				Total
		A (Risk-Averse)	Confidence Scale	B (Risk Taker)	Confidence Scale	
Step 1	Prospect	15 (34,1%)		29 (65,9%)		44
	Fuzzy	13 (29,5%)		31 (70,5%)		44
Step 2	Prospect	2 (40%)	3	3 (60%)	4, 5	5
	Fuzzy	1 (20%)	3	4 (80%)	4, 5	5
Step 3	Prospect	7 (36,8%)	2, 3	12 (63,2%)	4, 5, 6	19
	Fuzzy	6 (31,6%)	2, 3	13 (68,4%)	4, 5, 6	19

5.12 Competing between Prospect theory, negative frame and without responsibility and Fuzzy-trace theory, negative frame and with no responsibility

In the first pilot project, when the h experiment treatment was stated in the framework of prospect theory with negative framing of information and low responsibility, 14 and 29, or 32.6% and 67.4% of the participants chose option A (less risk) and B (risk taker), respectively.

In the Fuzzy-trace theory with negative framing of information and low responsibility, 13 and 30 participants, or 30.2% and 69.8%, chose options A and B, respectively. In the second pilot project with 3 participants, 1 and 2, or 33.3% and 66.7% chose options A and B, respectively. However, in the fuzzy-trace theory with negative framing of information and low responsibility, participants tend to choose alternative answers with the risk-taking option (B). However, the preference seems to be higher compared to using prospect theory, although with the same percentage, 66.7%. However, the confidence level of each group in decision making is 4 for prospect theory and 4.5 in fuzzy-trace theory.

In the final experiment with 19 participants, 8 and 11, or 42.1% and 57.9% opted for A and B, respectively. In the fuzzy-trace theory with negative framing of information and lowest responsibility, participants also tend to choose alternative answers with the risk-taking option. However, the preference seems to be higher compared to using prospect theory, with 36.8% and 63.8% for options A and B, respectively. The overall comparative preference of the two theories was 57.9% and 63.2% for prospect and fuzzy-trace. Therefore, the hypothesis 3d (H3d) is supported empirically. The complete analysis is shown in table 12.

Table 12: Low Negative Prospect VS Low Negative Fuzzy

	Theory	Option				Total
		A (Risk-Averse)	Confidence Scale	B (Risk Taker)	Confidence Scale	
Step 1	Prospect	14 (32,6%)		29 (67,4%)		43
	Fuzzy	13 (30,2%)		30 (69,8%)		43
Step 2	Prospect	1 (33.3%)	3	2 (66,7%)	4	3
	Fuzzy	1 (33.3%)	3	2 (66,7%)	4, 5	3
Step 3	Prospect	8 (42,1%)	1, 2, 3	11 (57,9%)	4, 5	19
	Fuzzy	7 (36,8%)	1, 2, 3	12 (63,2%)	4, 5, 6	19

6. Conclusion

The results of this study show that the fuzzy-trace theory was stronger in explaining the influence of framing on individuals than the prospect theory. Additionally, the statistical test on the data collected shows that all hypotheses were supported empirically. Therefore, there is a need to include responsibility for accountants to consider and adjust the information along with the reporting requirements appropriate for management needs.

7. References

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