

Thinking ahead: The impact of anticipatory emotions on risk preferences for the acquisition of long-term financial alternatives.

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ABSTRACT

When we think about the future we tend to produce emotions that serve as information for the decision-making process. Thus, when we seek to acquire a product that provides financial security for our future selves and that of our loved ones, it is to be expected that emotions play a role.

This thesis shows the results of an experiment carried out with the responses of 97 participants divided into two treatment groups and one control group to validate whether there is an influence of anticipatory happiness and anticipatory fear on risk preferences for the long-term financial products acquisition.

After the treatment groups were manipulated to feel the target emotion, and the control group received no manipulation at all, participants made a series of choices between risky and risk-free investment options.

Contrary to the empirical evidence that tests the emotional causality on choices with immediate returns, the results of this study did not show evidence that anticipatory emotions had an effect on the choice of long-term financial alternatives.

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I. INTRODUCTION

It is inherent in human nature to be concerned about ensuring the financial safety of ourselves and our families when we are no longer able to generate income due to old age or death. To reduce this risk, people might make decisions today to enjoy its results in the future, such as purchasing long-term financial products. In fact, Maslow (1958) qualifies these products as expressions of the safety need in adults. If the well-being of our future selves depends on the decisions of our present selves, then it is essential that, as individuals and as a population, we understand the process of making these decisions so that they are as wise as possible.

Emotions seem to play a fundamental role in the decision-making process. In fact, in the last decades, a stream of theories and empirical studies (e.g. Gilbert and Wilson, 2017; Foo, 2009) has shown evidence of the influence of emotions in the decision-making process. This can be explained by limitations to access all existing information and the limitations of our brain to process much information (Chavas, 2004), thus making our brain resort to emotional sources when making decisions.

Moreover, it may be that emotions not only influence the decision-making process but are essential for our decisions to be rational. In 1990 the neurologist Antonio Damasio conducted several experiments on patients with damage to the ventromedial frontal cortex of the brain. This damage leaves cognitive abilities intact but impairs the ability to feel. The results of Damasio's multiple experiments showed destruction in the ability of these patients to make sensible choices, such as responding appropriately to social situations or not repeating past mistakes, concluding then that emotions are an integral component of rational decision-making.

If emotions play an essential role in decision making, it is not only important to analyse whether their influence is also present when these decisions involve the economic stability of our future selves and our families, but also the mechanisms by which this influence occurs and how specific emotions affect this decision-making process.

When making these decisions, we will inevitably think about our future. Studies in neuroscience show that prospective thinking arouses emotions that serve as a source of information (e.g. Gilbert and Wilson, 2017). When consulting the existing literature for

this thesis, empirical evidence was found that explains how future-oriented emotions influence behavioural intention (see Baumgartner et al., 2008); however, no studies were found in this field that shows the influence of these emotions on long-term financial decisions.

On the other hand, for the present thesis, there were also found studies showing evidence of the influence of emotions on decisions with monetary returns through risk assessments (e.g. Kugler et al., 2010). The general conclusion of these studies is to expect that positive valence emotions (i.e., emotions that give rise to pleasure) lead to taking more risk and negative valence emotions (i.e., emotions that give rise to displeasure) lead to taking less risk when choosing between monetary options. However, these studies do not provide evidence of the emotional influence when the alternatives involve the future.

Therefore, the present study attempted to provide empirical evidence on the emotional influence on long-term financial decision-making through risk assessment when people think about their future. Moreover, this study tested whether two specific emotions of different valence: anticipatory happiness and anticipatory fear, can explain this influence. Consequently, the present thesis sought to answer the following research question:

Do anticipatory fear and happiness influence risk assessments in individual long-term investment decisions?

Knowing more about the impact of emotions on long-term financial decisions could be helpful for policymakers and theorists. For policymakers, it may be in the interest of the population to take less risk in long-term decisions, as greater risk-taking in the present would increase the likelihood that the elderly population would not have sufficient resources to sustain a good quality of life, thus demanding more resources from the state and increasing the nation's poverty levels. This interest is not exclusive to countries with private pension systems, but even in countries where the government runs the pension system, it may be in the government's interest to purchase successful long-term financial products for people whose projected retirement funds are not sufficient to

guarantee their quality of life. Thus, the government could frame its communication campaigns to arouse the emotion that drives the desired behaviour.

Strengthening knowledge about the decision-making process for long-term financial products can also help theorists improve predictive models for buying, selling and/or cancelling in the investment market and other risk-free alternatives such as bonds and life insurance. It could ultimately facilitate optimal decision-maker behaviour.

Given the importance of studying the decision-making process of long-term financial alternatives, this thesis experimented with the responses of 97 participants who were manipulated to perceive either anticipated fear, anticipated happiness or do not receive any manipulation. Right after, participants under emotional conditions completed a questionnaire to elicit the degree to which they felt the target emotion. Then, they were exposed to a series of options in which they had to choose between two long-term alternatives, one involving risk and the other risk-free. The posterior analysis compared the different risk preferences of the three groups to test for evidence of the putative emotional influence in the context of long-term investment evaluation. The results showed no statistical significance of the pursued influence. The experiment, however, was bound by limitations that call for further research by other authors.

II. LITERATURE REVIEW

The present literature review scrutinises the existing evidence and theory about the emotions triggered by future thought and their impact on decision making, the general classification of emotions by valence and their impact on risk assessments for alternatives with monetary outcomes. Additionally, it reviews the consumption determinants of two of the most common financial alternatives with long-term outcomes: Portfolio investments and life insurance.

II.1. Mental simulation: How our brains work when we think about the future.

Unlike animals, humans are the only species able to formulate mental simulations of possible future scenarios. This foresight capacity allows us to pre-feel the potential pleasure or pain these scenarios could cause us if they occur (Gilbert and Wilson, 2017). Gilbert and Wilson (2017) reviewed scientific neuroscience findings on the human ability to simulate future events. They pointed out that the purpose of this process is the production of emotions as an encoding of information acquired by our ancestors over thousands of years to protect us from potentially costly events. For example, experiencing a bear attack is a costly way to learn about its adaptive significance compared to feeling fear; therefore, evolution has provided us with a method of obtaining this information before the encounter.

Similarly, we could expect our brains to follow the same process to protect us from financial hazards, such as not having enough economic resources to sustain ourselves and our dependents in the future. If, in our aim to guarantee financial safety, we think about what could happen in the future, then the emotions triggered should influence our choices for long-term financial products as mechanisms to reduce future risks.

II.1.1. Future-Oriented emotions:

Mental simulation and future thought trigger two types of emotions: Immediate emotions (referring to in this thesis and in other literature sources as Anticipatory emotions, e.g., Baumgartner et al., 2008) and Expected emotions (referring to in this thesis and in other literature sources as Anticipated emotions, e.g., Baumgartner et al., 2008). Loewenstein and Lerner (2003) defined immediate emotions as currently experienced in response to the prospect of a future event and, expected emotions as those which we expect to experience in the future if the event does or does not occur. Thus, immediate emotions can be explained as the response to the question *“How does the prospect of a future event make me feel now?”* while expected emotions can be explained as the response to the question: *“How would I feel if the event X does or does not occur?”*.

According to Loewenstein and Lerner (2003), both types of emotions are relevant influences on the decision-making process. While anticipated emotions influence is indirect (i.e., people tend to predict their future emotions and then change the course of action to avoid undesirable emotions or pursue the desirable ones) (Rolls, 1999), anticipatory emotions influence is direct, by its intensity (i.e., the larger the intensity, the more difficult to produce a reasonable and effective behaviour response) and indirectly, by altering the decision-maker subjective probabilities that the target event occurs, the desirability of its future consequences or by changing the way how these consequences are processed (Rolls, 1999).

Later, Baumgartner et al. (2008) conducted two waves experiment with 812 students in the context of the millennium transition in 1999–2000 (the so-called Y2K problem) to show empirical evidence of the influence of future-oriented emotions on behavioural intention and actual behaviour. In the first wave, participants rated their current feeling about the possibility of the event occurring and their expected emotional state when the event occurs. Additionally, they were asked to rate how certain was for they to do certain things in order to avoid the potential negative effects of the Y2K occurring, for example *“getting extra cash to be able to make payments”* or *“building an extra supply of batteries, candles, fire wood, propane gas, and water”*. In the second wave, the authors tracked how the intention becomes true behaviour. The obtained results showed a stronger correlation between reported immediate emotions and behaviour change than with reported expected emotions. Additionally, this effect was stronger for negative emotions than for positive emotions.

The results obtained by Carrera et al. (2013) when experimenting to test the influence of future-oriented emotions on binge drinking behaviours also support the arguments of Loewenstein et al. (2001) and the findings of Baumgartner et al. (2008). Through a questionnaire, Carrera et al. (2013) collected responses from 151 students who declared having experienced drinking excessive alcohol in the past. To induce anticipated and anticipatory emotions, participants were asked to rate how they think they would feel if they engaged in binge drinking in the future and how they felt at that moment after prospecting that future. Students then responded about their intention of drinking heavily in the future and their expectation of doing so. Carrera et al. (2013) found a

significant effect of future-oriented emotion on behaviour intention and behaviour expectations and a larger effect when anticipatory emotions were induced compared to anticipated emotions.

Based on the empirical findings mentioned, the presented thesis study focused on testing the influence of anticipatory emotions rather than expected future-oriented emotions.

II.2. Emotions by valence and its influence on risk assessments.

Emotions have also been commonly classified by their valence [i.e., The extent to which an experience is pleasurable) as positive (e.g., happiness) or negative (e.g., fear) (e.g., Foo, 2009). In 1983 Johnson and Tversky tested the impact of emotions from different valences on risk perceptions. Reading constructed stories of tragic deaths from specific causes to be induced by emotion, the participants were asked to qualify the degree of possible risky events to occur. The results argued that negative emotions trigger more pessimistic risk perceptions, while positive emotions evoke more positive risk perceptions, and this leads individuals in a more positive mood to take more risks. This conclusion has been named *“The affective Generalization Hypothesis”*. Table 1 shows the main pieces of evidence for this thesis study that are consistent with the mentioned hypothesis.

“The mood maintenance hypothesis” (Isen and Patrick, 1983) was also born in the same year but contradicts Johnson and Tversky’s prediction. According to the former, individuals in a positive mood decide against gambling because losing could undermine their positive mood. Thus, individuals feeling negative emotions would display more risk-taking behaviour by seeking out risks that might improve their mood than those individuals feeling positive emotions. However, in contrast with the Affective Generalization Hypothesis, the empirical evidence of this theory has mixed results (e.g., Arkes et al., 1988; Mano, 1992).

Therefore, this thesis research is based on the *“Affective Generalization Hypothesis”* (Johnson and Tversky, 1983) to formulate its hypothesis. H1: Induced anticipatory fear

produces higher levels of risk aversion, and H2: Induced anticipatory happiness produces lower levels of risk aversion.

Table 1:
Empirical review evidence of emotions in risk assessments with monetary tasks

Author	Tested emotions	Summary	Findings
Foo (2009)	Anger, happiness, fear, and hope	After induced emotions through a writing task, 181 students qualified for hypothetical business opportunities by their level of perceived risk.	Emotion induction leads to a change in risk perceptions. Positive valence emotions enhance riskier perceptions than negative ones. Anger and happiness enhance lower risk perception and fear and hope higher.
Kugler et al. (2010)	Fear and anger	After induced emotions through a writing task, 80 US university students faced individual choices between lotteries with different degrees of risks and real monetary rewards.	Induced emotions could have a significant effect on actual behavioural measures of risk-taking. Negative emotions have a positive influence on the choice of risk-averse. The effect is stronger when fear is induced compared to anger.
Nguyen and Noussair (2014)	Fear, anger, happiness, and surprise	30 Tilburg students make choices between risky lotteries and riskless options. Their emotions were elicited by their facial expressions using the software Facereader [®]	More positive emotional valence is associated with greater risk tolerance. Stronger emotions are associated with more risk-averse decision-making.

II.3. Anticipatory fear and anticipatory happiness:

There are a large number of emotions listed in the literature. Cowen and Keltner (2017) identified 27 distinct categories of emotions when conducting a self-reported study after showing emotional videos on the internet. While the number of human emotions can be large (or even limitless, as considered by other authors, e.g., Kemper, 1987), the range of anticipatory emotions seems to be shorter. Baumgartner et al. (2008) argue that anticipatory emotion is a shorter subset of discrete emotions. Drawing from this concept, one can look at the list of discrete emotions classified by the insiders. Perik et al. (2018) did such scrutinise and concluded that the emotions most commonly accepted

in the literature as discreet are fear, happiness, sadness, and anger. Sadness and anger, however, are described as signalling the irreversible loss of a goal and the obstruction of a goal by something or someone, respectively (Ekman and Friesen, 2003). Seems to be unlikely, then, that sadness and anger are triggered by mental prospection in the financial context, while happiness and fear are described as signalling a pleasurable or threatening scenario, respectively (Ekman and Friesen, 2003). Based on the mentioned distinction, this thesis proposed that fear and happiness are prototypical categories for negative and positive anticipatory emotions.

II.3.1. Anticipatory fear:

Anticipatory fear results from the prospecting of an undesirable future and leads to avoidance behaviours (Knutson, 2008). Fear seems to be characterised by uncertainty about whether or not one will be able to escape or avoid an unpleasant outcome (Smith and Ellsworth, 1985). The appraisal of fear will rise when the uncertainty is high. While the future itself can be defined as uncertain (Virlics, 2013), uncertainty is mainly present in investment as more than one outcome is usually possible (Belli, 1996). Consequently, if anticipatory fear is critical in driving the choice of long-term investments, then such anticipatory fear can cause deviations from optimal choices as, in order to reduce the risk of the feared scenario occurring, people may end up overpaying for sure alternatives or, extrapolating it to our example of riskless option, paying higher primes for life insurance. Given the importance of analysing such a particular effect and following Johnson and Tversky's "*The affective Generalisation Hypothesis*" (1983), this study posits hypothesis H1.

Hypothesis H1: Induced anticipatory fear produces higher levels of risk aversion

II.3.2. Anticipatory happiness:

Opposite to anticipatory fear, anticipatory happiness results from the prospecting of a desirable future and leads to approach behaviours (Knutson, 2008). Happiness is

commonly linked to heuristic processing (Bless et al., 1990); as motivational reasoning predicts (Kunda, 1990), people tend to adjust their reasoning to protect their hope of a desired outcome. Therefore, anticipatory happiness may lead us to irrational optimism and to believe that the odds will play in our favour when choosing an investment product, taking more risk in decisions that compromise our financial security. If that is the case, then it is essential to validate its specific effect in acquiring long-term financial products. Following Johnson and Tversky's "*The affective Generalisation Hypothesis*" (1983), this study posits hypothesis H2.

Hypothesis H2: Induced anticipatory happiness produces lower levels of risk aversion

II.4. Emotional influence on the present versus the future:

As previously mentioned, Table 1 summarises the main empirical work on the relevance of emotions in judgements under risk that served as the basis for the present study. As can be seen, these pieces of evidence have as common conclusion the influence of emotion on risk assessments when testing the pursue relationship in risky tasks with monetary outcomes. Moreover, Foo (2009) and Kugler et al. (2010), following Johnson and Tversky's (1983), also provided evidence for a significant influence even when the emotion is induced externally and not related to the risk choices faced.

While Table 1 studies provide precise evidence of the impact of emotion in the decision-making process under risk in tasks with monetary outcomes, they do not test the particular effect of emotions in similar scenarios but when the outcome is planned to be received in the long future, as it is the case for long-term investments and life insurances. Actually, non-studies that tested the mentioned specific relationship were found in the present literature review. However, one cannot simply assume that the same relationships hold when changing the time frame of the choices faced. This intuitive reasoning is supported by Phelps et al. (2004), who studied the neural functioning of emotional and cognitive systems when the human participant faces decisions involving risk. One of their results, as the authors argue, is that the response to the choices made does not depend only on the characteristics of the emotions

generated but also on the characteristics of the choices faced (i.e., the emotions aroused will influence differently when the characteristics of the choices vary).

Actually, it is possible that the influence of emotions on long-term decisions is not as significant or notable as it is for short-term decisions. In fact, discounted utility theory involves the concept of impatience, which tells us that utilities at a later point in time get a lower weight, which seems to be positively correlated with the level of emotion one can experience. Neuroscience studies provide some evidence about this relationship. For example, multiple brain imaging experiments by McClure et al. (2004) demonstrated that the brain's emotional systems place more value on immediate gratification and that being more patient is predicted by stronger cognitive activation.

II.5. Determinants of financial long-term products purchase

The present section reviews the main determinants of two of the most common long-term financial alternatives: Portfolio investments (seen as a risky financial alternative) and Life insurance (seen as a riskless alternative with fixed returns). Both products involve high commitment and uncertainty in their decisions as both involve the distant future (Virlics, 2013). According to Baron (2008) and Forgas (1995), the impact of emotions in their acquisition decisions thus should be especially significant.

Avram et al. (2009) define investments as expenditures made now to make gains in future where the amount of the gain is uncertain. Harcourt et al. (1967) suggest that its acquisition decision depends on the investor's profit expectation, cost of the asset and availability to finance the investment, and how to finance it; thus, this decision is subjective as it is enhanced by the investor's expectations, his knowledge and risk perception (Virlics, 2013). Chavas (2004) argues that risk exists in investments because, among other factors, getting information is expensive and processing it all is almost impossible. Because people cannot obtain or process all the information gathered, they use other sources to take an investment decision at risk. i.e., emotions. Thus, emotions should be another determinant of the decision-making process when investing.

On the other hand, insurers are commonly seen as a risk-free alternative to investments (e.g., Eeckhoudt, 2005), where, in its more basic shape, the insured pays a fixed amount

of money to the insurer to obtain coverage for a specific risk. Life insurance specifically will return a fixed amount of money to the family in case of the death of the contractor. Life insurance could also work as a saving tool, returning a fixed amount of money to the insured in case of survival after a certain period.

Following the Utility Theory, the degree of risk aversion is a determinant when explaining people's preferences between a risky lottery and a riskless option with a similar value (Neumann and Morgenstern, 1944). In that sense, as the empirical evidence shown in Table 1 pointed out, negative emotions should enhance the life insurance purchase by increasing the degree of an individual risk aversion.

Another relevant determinant of the demand for long-term financial products, both investments and life insurance, among other alternatives, is the presence of the family. Cutler (1993) points out that financial decisions are family decisions and that this is one of the basic tenets of gerontology. The author refers to Doyle's (1992) research on the stress presented in family dynamics in dealing with the financial strategies needed to protect family wealth from being consumed by health care costs. This stress has as one of its branches the preoccupation with covering the expenses of children and parents as they grow older. Cutler (1993), therefore, pointed to a need for families to obtain an adequate mix of financial services and products against the background of planning ahead, as money in the bank does not ensure a non-stressful development of the wealth span. In line with this stated need of families for financial protection, Brighetti et al. (2014) found empirical evidence to support that the precedence of dependents in a household significantly correlates with life insurance purchases when conducting an in-person survey with 645 responses of the financial decision taker in a household in the Italian territory.

III. METHODOLOGY

To find evidence of the potential influence of anticipatory fear and anticipatory happiness on risk assessments when making decisions between long-term financial choices, the present research conducted an experiment where volunteer participants

filled an online survey to receive emotional manipulation or non-manipulation and made choices between risky long-term and riskless alternatives. Finally, responses were contrasted across groups under different emotional conditions to answer the research question, *“Do anticipatory fear and happiness influence risk assessments in individual long-term investments decisions?”*

In this chapter, the reader will be able to review the details of the experiment design, participants' characteristics, procedure and materials.

III.1. Experiment Design:

The experiment began by asking the participants to choose a preferred language (English or Spanish) and their declaration of consent by reading the general survey instructions. Afterwards, all participants were randomly allocated into three groups: “Fear”, “Happy”, and “Control”. Later, three main steps previously used by Johnson and Tversky (1983) were applied here to test the potential impact of emotions on risk aversion; those steps were: Emotion induction, Manipulation check and Risk preferences measure.

In the Emotion induction step, participants on the fear and happiness condition completed a writing task to induce the target anticipatory emotion through mental prospection. In the Manipulation check step, all subjects completed a small questionnaire to validate if the emotion induction succeeded. In the Risk preferences measure step, they faced a series of choices between risky and riskless financial long-term alternatives to elicit the degree of risk taken. Finally, the participants filled in their demographic information.

Figure 1 shows a graphic representation of the experiment design where the described steps can be seen. The reader can find precise information about what was shown in the survey in Appendix A1.

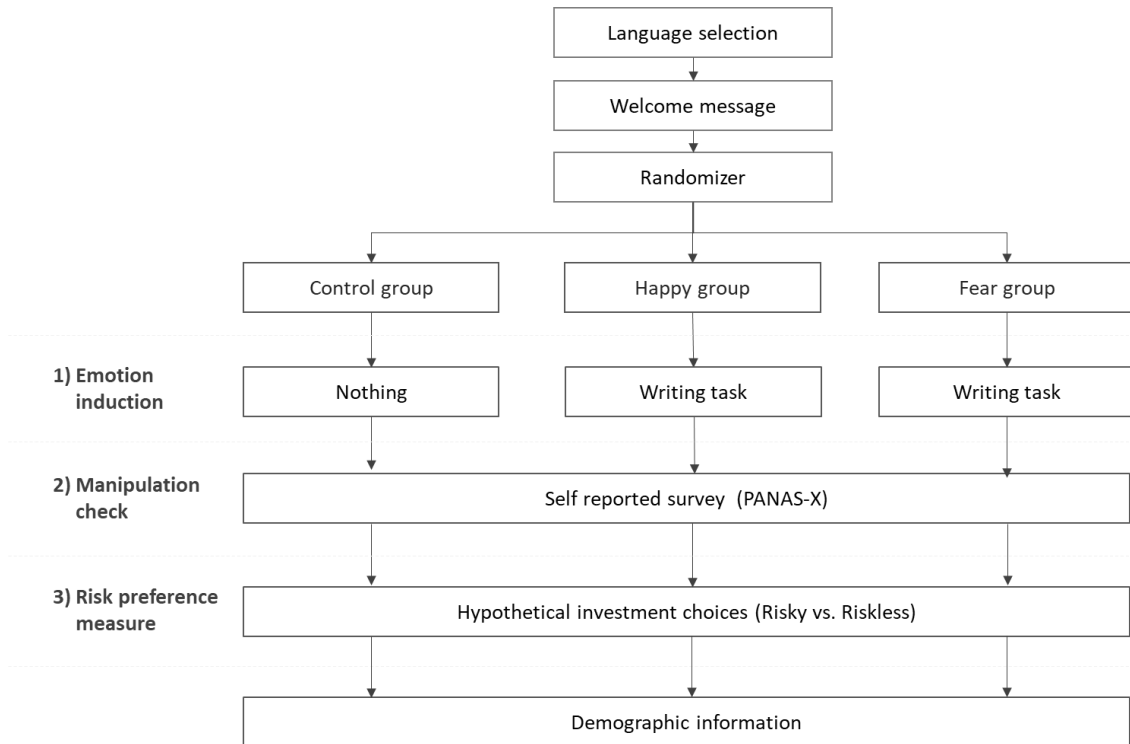


Figure 1: Experiment Design

To ensure the correct study of the anticipatory emotions' influence on risk choices, all participants had to complete the survey in one session (i.e. the possibility to pause the survey and return later was not enabled). Capra (2004) described emotions as short-lived, thus restricting the experiment to one session aimed to increase the probability of the emotional effect lasting for when the subjects made their choices.

The anonymity of the participants was indicated in the initial instructions and guaranteed by not asking for any personal details. Additionally, the study was conducted in two languages to enhance the chances of obtaining enough responses to reach power calculation.

III.2. Procedure:

III.2.1. Emotion Induction:

After choosing the preferred language and reading the welcome message (see appendix A1-a and A1-b for detail), participants were randomly allocated into three groups. The

"Happy" group received stimulation to feel anticipatory happiness; the "Fear" group received stimulation to feel anticipatory fear and the "Control" group which did not receive any emotional stimulation.

A writing task was used to induce emotions externally. This procedure is based on the autobiography task developed by Strack et al.(1985) and has been successfully used in several studies (e.g., Kugler et al., 2012; Bodenhausen et al., 1994; Dunn and Schweitzer, 2005; Lerner and Keltner, 2000). This task consists of asking the participants to write about a situation they have experienced and caused the target emotion, including enough detail so the person who read the story can perceive the same emotions as the writer. By relying on personal experiences rather than external stimulators (e.g., videos, stories), this task reduces the variance in judgment and perception of the tool used for emotion induction; in other words, people's personal characteristics may generate misinterpretations when emotion induction is performed with a tool external to the subjects' particular characteristics. However, to induce future-oriented emotions, the task was modified to make the participants think about the future.

Additionally, a suggested time of five minutes and a requirement of at least two hundred characters were added at the bottom of the indications for its completion to establish an anchor of time spent writing the essay. Those instructions were intended to get participants to think deeply about the requested scenario and increase the chances of evoking the intended emotion.

Additionally, as diverse authors pointed out that family is an important determinant when choosing a long-term financial decision (e.g., Cutler, 1993; Brighetti et al.,2014), the consideration of the loved ones was included in the writing task instructions as a manner to approximate the task to the real mental prospection an individual would experience when choosing between these options.

Thus, the following task was given to induce fear:

*"For this task, you will imagine a future scenario that scares you. **How do you fear that the future and that of your loved ones will be in ten years if everything goes wrong?***

Include enough detail that a person reading the description would feel the same emotion just

from reading about the scenario. When you finish, be sure you read your story before going to the next step.

Note: It should take you around 5 minutes to complete this task. You will need to write at least 200 characters.”

Similarly, the following task was given to induce happiness:

“In this task, you will imagine a future scenario that gives you happiness.

How do you expect that future and that of your loved ones to be in ten years if everything goes well?

Include enough detail that a person reading the description would feel the same emotion just from reading about the scenario. When you finish, be sure you read your story before going to the next step.

Note: It should take you around 5 minutes to complete this task. You will need to write at least 200 characters.”

III.2.2. Manipulation check:

To validate if the writing task succeeds in inducing the target emotion, a simplified version of the Positive and Negative Affect Schedule-expanded PANAS-X form (Watson and Clark, 1994) was used. The original PANAS-X includes specific affect scales to measure eleven emotions, in which joviality (in this study, used as a proxy of happiness) and fear are included. The former scale originally consisted of eight items to elicit the intensity of joviality; the latter of six items to elicit fear. Subjects need to rate, on a scale of five points, the degree to which the target item was felt.

Following Capra’s (2004) description of emotions as short-lived, the present study used a reduced version of each scale, considering only the top three items with the greatest significance in explaining the target emotion for each scale. This criterion was made following the results of the Varimax-Rotated Factor Loadings analysis presented in the same PANAS-X manual by Watson and Clark (1994) (see appendix A2 for detail). This simplification was carried out in order to reduce the time invested in filling out the PANAS-X questionnaire and, with this, the possible distortions of the emotions previously induced (when applicable) by the writing task.

Consequentially, the subjects filled the PANAS-X questionnaire, rating the six items on the degree to which they felt in the moment. To test for anticipatory happiness, subjects rated “enthusiastic”, “happy”, and “joyful”. To test for anticipatory fear, subjects rated “scare”, “afraid”, and “frightening”. Answers were recorded on a Likert scale (Likert, R. (1932) from 1 (very slightly or not at all) to 5 (extremely). See Appendix A1-e for detail.

The survey was configured to show the PANAS-X item belonging to both scales interspersed and randomly reverse their order (i.e., the order how the items were shown changed aleatory). Both settings were made to reduce any possible effect of the anchoring and adjustment heuristic caused by the starting point (Tversky and Kahneman, 1974).

III.2.3. Risk preference measure:

Following the emotion induction and manipulation check (when applicable), participants were asked to fill a certainty choice list questionnaire. The choice list use can be traced to Cohen et al. (1987). In their study, Cohen and colleagues asked their participants to make a series of binary choices between a risky prospect with unknown probabilities and a sure prospect. This way, the authors aimed to compare behaviour under risk versus behaviour under uncertainty. Contrary to Cohen et al. (1987), here, the goal was to observe the participants’ behaviour under risk only; therefore, probabilities were known.

Consequentially, subjects of the present experiment faced a set of eleven choices between two investment options: One, a portfolio with a 50% probability of receiving 10,000 dollars and a 50% probability of receiving 20,000 dollars after ten years. The other, a riskless investment option with a certain return to be received for sure after the same period of time. To complete the questionnaire, every participant was required to think of a hypothetical scenario where they had 100 dollars of their incomes leftover after expenses every month and the intention of investing them over the next ten years (see appendix A1-f for detail). Table 2 shows the options presented. As can be seen, the portfolio option maintains the same payoff and probabilities across each pair of options. Contrary, the riskless investment varies its return along with every pair of options,

offering to return 10,000 dollars in the first row to 20,000 dollars in the last one and incrementing this amount by 1,000 dollars in every row. For every pair of options, participants had to choose either the portfolio investment or the riskless investment. And in every row, it was mandatory to take a decision to continue with the experiment.

Table 2:

Choice list with alternatives presented to the subjects. Portfolio (risky alternative) versus Riskless investment

Decision #	Portfolio investment	Riskless investment
1	Receiving \$10,000 with 50% chance or \$20,000 otherwise	Receiving 10,000 for sure
2	Receiving \$10,000 with 50% chance or \$20,000 otherwise	Receiving 11,000 for sure
3	Receiving \$10,000 with 50% chance or \$20,000 otherwise	Receiving 12,000 for sure
4	Receiving \$10,000 with 50% chance or \$20,000 otherwise	Receiving 13,000 for sure
5	Receiving \$10,000 with 50% chance or \$20,000 otherwise	Receiving 14,000 for sure
6	Receiving \$10,000 with 50% chance or \$20,000 otherwise	Receiving 15,000 for sure
7	Receiving \$10,000 with 50% chance or \$20,000 otherwise	Receiving 16,000 for sure
8	Receiving \$10,000 with 50% chance or \$20,000 otherwise	Receiving 17,000 for sure
9	Receiving \$10,000 with 50% chance or \$20,000 otherwise	Receiving 18,000 for sure
10	Receiving \$10,000 with 50% chance or \$20,000 otherwise	Receiving 19,000 for sure
11	Receiving \$10,000 with 50% chance or \$20,000 otherwise	Receiving 20,000 for sure

Note: The first columns did not appear in the questionnaire completed by participants.

The choice list was designed to deliberately prompt the subjects to display monotonic preferences (i.e., to prefer the option that gives more money than less). As can be observed in Table 2, the portfolio option always gave at least 10,000 dollars and potentially even 20,000 dollars. In the first row, the subjects could only get 10,000 dollars at most while choosing the riskless option. So, under the monotonicity assumption, it was expected for a rational subject to choose the portfolio option when facing the first-row choice. Opposite, in the very last row, it was expected for a rational subject to choose the riskless option, as it gave 20,000 dollars for sure while the portfolio option gave that amount at most.

III.3. Participants:

III.3.1. Recruitment:

All participants belonged to the author's personal network and were recruited through personal social media accounts (i.e. Facebook, Instagram, LinkedIn and WhatsApp). No nationality filter was applied to increase the chances of collecting the necessary data to reach power. Thus the survey was conducted in English and Spanish for the participants' understanding. See appendix A3 for the example model of the message shown to recruit participants.

The data collection received the ethical approval of Erasmus University Rotterdam throughout the completion of the survey "*Behavioral Economics - ethical questionnaire before collecting data for your thesis*".

III.3.2. *Sample size:*

Sample sizes were determined prior to data collection by conducting a power calculation analysis to determine the sample needed to detect at least a large effect (Cohen's $d=0.80$) with Power $(1-\beta) = 0.95$ when comparing groups with the use of parametric tests. This analysis was realized with the use of GPower 3.1[®]. The results indicated a minimum sample size of 42 per group of participants (i.e., Happiness, Fear and Control group). Therefore a total of 126 participants were needed. The online survey was opened to collect responses for three weeks (between the 4th of May 2022 and the 26th of May 2022); during this time, 146 responses were collected, but 49 responses were removed, remaining a total of 97 observations for this study. In the next chapter, the reader can review detailed information on observation deletion by criteria.

III.3.3. Sample Description:

The final sample had an average age of 37.2 years old, being a minimum age of 22 and a maximum of 70. Of the 97 participants considered for the analysis, 62 chose Spanish as their preferred language to respond, 58 reside in Peru (see appendix A4 for exact

distribution by country), and 57 declared to have previous experience in banking or finance. Additionally, the participants took, on average, 8.6 minutes to answer the entire survey.

Table 3 and Table 4 show the detailed descriptives by groups. Overall, one can see a similar distribution between groups on the number of observations, age, language, country of residence and banking or financial experience. Later analysis of proportions showed no significant differences in participants' characteristics between groups (see appendix A5 for detail), which points to the homogeneity of groups.

Contrary, there were differences between groups in the time taken to complete the survey, with the participants in the control group finishing the survey in a significantly shorter time than the participants in the Fear and Happy group. That is not a surprise as the control group faced a shorter questionnaire as not having the emotion induction step section on their surveys. Appendix A6 shows the results of the proportion test for the variable *Duration* when comparing the proportion of subjects who filled the survey in a lower time than the average versus those who completed it in a larger time.

Table 3:
Sample descriptive of continuous variable Age and Duration by group

Group	N	Age				Duration			
		Mean	SD.	Min	Max	Mean	SD.	Min	max
Control	37	37.7	12.7	22	65	5.0	3.7	2.0	23.1
Fear	31	39.3	12.2	25	70	12.4	8.5	3.4	44.0
Happy	29	34.5	10.0	23	54	9.3	5.5	3.0	24.3
Total	97	37.2	11.9	22	70	8.6	6.8	2.0	44.0

Note. N, SD, Min and Max are abbreviations for number of observations, Standard deviation, Minimum value and Maximum value respectively.

Table 4:

Sample proportions of dichotomous variables Language, Country of residence and Experience in banking or finance.

Group	N	Language		Country		Experience	
		English	Spanish	Develop	Peru	No	Yes
Control	37	38%	62%	43%	57%	38%	62%
Fear	31	39%	61%	39%	61%	42%	58%
Happy	29	31%	69%	38%	62%	45%	55%
Total	97	36%	64%	40%	60%	41%	59%

Note. For ease of comparison, the distribution by variable is presented in percentage of the number of observations in every group. Additionally, the variable “Country” was grouped into two categories: Developed and developing countries. This distinction was based on the United Nations Human Development Report 2020. In the table Develop is the abbreviation for developed countries. Peru was the only developing country reported in the sample.

III.4. Materials:

III.4.1. Online survey, time and compensation:

As mentioned in previous paragraphs, the experiment was conducted with the use of an online survey. This survey was written and completed on the Qualtrics® platform. A complete version of this survey by section can be found in appendix A1.

In the introduction part of the online survey, participants were told that the survey was made to last around ten minutes. None of the participants received any type of economic compensation for filling out the survey.

III.4.2. Tested variables:

The output of the Manipulation check step was the creation of the following variables to later test whether anticipatory fear and happiness were successfully induced. These variables were created using the PANA-X manual (Watson et al., 1988).

- *PANAF*: It is a continuous variable that measured the level of anticipatory fear induced in the participants. It was calculated as the sum of all rates a subject gave to the items of the fear scale (i.e., “scare”, “afraid”, and “frightening”) in the PANA-X

questionary. This variable was later used to test whether the writing task succeeded or failed in inducing anticipatory fear.

- *PANAH*: It is a continuous variable that measures the level of anticipatory happiness induced in the participants. It was calculated as the sum of all rates a subject gave to the items of the fear scale (i.e., “enthusiastic”, “happy”, and “joyful”) in the PANA-X questionnaire. This variable was later used to test whether the writing task succeeded or failed in inducing anticipatory happiness.

On the other hand, the output of the Risk preference measure step was the creation of the variable *Risk Index* explained in the following paragraph.

- *Risk Index*: It is a continuous variable and the dependent variable to later test whether anticipatory emotions influenced choices in the present experiment. This variable was created by coding the choices made by each subject, giving a value equal to 1 if the choice was the Risky investment option (i.e., Portfolio) and equal to 0 if the subject chose the riskless investment option. This procedure was made for every row of the choice list. Then, the Risk Index was computed as the sum of all choices 0 and 1 for every observation independently. Thus, this indicator could take values from 1 to 10. Later, the value of this indicator was interpreted as the level of risk acceptance for the hypothetical investment scenarios outlined by a subject. To facilitate the understanding of how this variable was calculated, Equation 1 is shown below representing the mathematical formula for the calculation of the Risk Index for every respondent *i*.

Equation 1: Risk Index calculation

$$Risk\ Index_i = \sum_{i \neq 0}^n Risky\ Investment_i + Riskless\ Investment_i ;$$

where Risky Investment choices = 1 and Riskless Investment Choices = 0

III.4.3. Control variables:

After completing the Risk Preference step, participants were asked about their age, country of residence and whether or not they had experience and/or knowledge in banking and finance. These questions were added to describe the participants’

characteristics and were used, in combination with the variable language asked at the beginning of the survey, to later validate the quality of the randomization by testing for differences in the proportions of each variable' categories between groups. Additionally, the control variables were also used to validate if the main results differ across different ages, countries or prior financial knowledge. The reader will be able to find these discussions in depth in the following chapter IV.

III.4.4. Statistical tests:

The observations collected did not reach the minimum number needed to achieve valid results using parametric tests, even for a large effect (Cohen's $d=0.80$). Thus, a non-parametric Mann-Whitney U test was chosen to test for significant differences between the scores of emotion induction (PANAF and PANAH) and the Risk index within pairs of groups. The Mann-Whitney U test null hypothesis (H_0) stipulates that the two compared groups come from the same population. As a two-sided test was required to test for differences (either positive or negative) between groups, the alternative hypothesis (H_1) against which the null hypothesis was tested stipulates that groups differ in their data distribution. In other words, to find evidence of the success of emotion induction and the influence of emotion on risk preferences, it was necessary for H_0 to be statistically rejected¹.

When using the Mann-Whitney U test, three assumptions must hold in order to verify the null hypothesis according to Nachar (2008):

Assumption #1: "The two investigated groups must be randomly drawn from the target population" (Nachar, 2008). This assumption is presumed to be satisfied as an algorithm of the platform Qualtrics® randomly allocated participants, so randomisation was not subject to any human factor bias. Moreover, a proportion analysis between groups by each one of the control variables showed no significant difference¹ between the proportions of variables by groups (see appendix A5 for details). These results show evidence that randomisation in the experiment was proper.

¹ A 5% of significance level was used in all statistic test to validate significance.

Assumption #2: *"There is independence within groups and mutual independence between groups"* (Nachar, 2008). Every participant only fulfilled the sample once, and participants did not interact between them as the sample was online. Thus, this assumption is presumed to be satisfied.

Assumption #3: *"The data measurement scale is of ordinal or continuous type"* (Nachar, 2008). In both cases, when testing for the success of emotion induction and the influence of anticipatory emotions on risk preferences, continuous data were used as the variables PANAF, PANAH and Risk Index are continuous. Thus, this assumption is presumed to be satisfied.

IV. RESULTS

At the beginning of this chapter, the reader could find the details of how the data cleaning was done. The core of this chapter, however, is to show the results of the Manipulation check and Risk preference measure instances. In the former, the results of the Mann-Whitney U tests pointed to success when trying to induce anticipatory fear with the writing task used and failure when trying to induce anticipatory happiness. In the latter, the results of the conducted tests pointed to the non-significant effect of induced anticipatory emotions (nor fear or happiness) on the level of risk taken when choosing between long-term financial alternatives.

IV.1. Data cleaning:

The online survey collected 146 observations but 49 were deleted following the criteria shown in Table 5.

Table 5:
Deleted observations by criteria

Criteria	Observations deleted	Observations remain
Total data collected	-	146
Duration to fill the survey lower than 2 minutes	11	135
Mistakes in writing task	1	134
Switch in the choice list more than once	6	128
Never switch in the choice list	31	97

The experiment was pre-tested with a small sample of five (two English speakers and three Spanish speakers) volunteers to test the approximate duration of the questionnaire and its correct understanding. The minimum completion time was two minutes, and the maximum was thirteen minutes. Following this timing, eleven observations were excluded from the sample, as can be seen in Table 5, because they took less than two minutes to complete the questionnaire. These observations were interpreted as a possible risk of response bias due to not dedicating the necessary time to the understanding and development of the tasks.

During the emotion induction, one participant completed the writing task wrongly. That is, the subject wrote about a happy future when the indication pointed out to write about a fearful future. Thus, this observation was deleted because it was interpreted as a misunderstanding of the task.

Six participants switched in the choice list from one option to another more than once, and thirty-one participants never switched. Similarly to Cohen et al. (1987), those observations were eliminated from the study as they were interpreted as misunderstandings of the task as its indications deliberately prompted the subjects to display monotonic preferences.

Finally, ninety-seven observations remained in the data for its study. Thirty-one observations remained in the Fear group, twenty-nine in the Happy group and thirty-seven in the Control.

IV.2. Manipulation check results:

It was important for this study to validate if the writing task successfully induced the desired emotion. To do so, first, the variables PANAF and PANAH with the scores of anticipatory fear and anticipatory happiness induction, respectively, were created. Secondly, those scores were compared between groups to test for significant differences in the respective score.

IV.2.1. Anticipatory fear induction:

The results of the PANAF score were individually compared between the Fear and Control group and between the Fear and Happy group to validate the success of the anticipatory fear induction. Table 6 shows the results of PANAF across groups; as can be seen, the Fear group obtained a higher score than the other groups on average and median.

Table 6:
Results of variable PANAF, an indicator of anticipatory fear-induced, across groups

Group	N	mean	median	SD	min	max
Control	37	4.70	4.00	2.30	3.00	13.00
Fear	31	7.74	7.00	3.99	3.00	15.00
Happy	29	4.62	4.00	1.86	3.00	10.00
Total	97	5.65	5.00	3.17	3.00	15.00

Note: N, SD, min and max are abbreviations for the number of observations, Standard deviation, minimum value and maximum value respectively.

A Mann-Whitney U test indicated that the PANAF score was significantly greater for the Fear group (Mdn= 7) than for the Control group (Mdn = 4), $U= 195$, $p= 0.0003$. Similarly, the PANAF score was greater for the Fear group (Mdn= 7) than for the Happy group (Mdn = 4), $U= -241$, $p= 0.0007$. Thus, at a 5% of significance level, the results pointed out that fear was successfully induced in participants allocated in the Fear group.

IV.2.2. Anticipatory happiness induction:

The results of the PANAH score were individually compared between the Happy and Control group and between the Happy and Fear group to validate the success of the anticipatory happiness induction. Table 7 shows the results of the PANAH score across groups; as can be seen, the Happy group obtained a slightly higher score than the Control group and larger than the Fear group, on average and median.

Table 7:
Results of variable PANAH, an indicator of anticipatory happiness induced, across groups

Group	N	mean	median	SD	min	max
Control	37	10.11	11.00	2.86	3.00	15.00
Fear	31	8.13	9.00	3.67	3.00	14.00
Happy	29	11.17	12.00	2.58	4.00	15.00
Total	97	9.79	11.00	3.27	3.00	15.00

Note: N, SD, min and max are abbreviations for the number of observations, Standard deviation, minimum value and maximum value respectively.

However, a Mann-Whitney U test did not indicate that the PANAH score was significantly greater for the Happy group (Mdn= 12) when compared with the Control group (Mdn = 11), $U = -1$, $p = 0.0932$. Contrary, the PANAH was significantly greater for the Happy group (Mdn= 12) when compared with the Fear group (Mdn = 9), $U = 204.5$, $p = 0.0010$.

Fear and happiness are emotions of different valence, i.e. feeling happiness causes pleasure and feeling fear causes displeasure. In that sense, they could be interpreted as emotionally antonymous. If, as the results indicate, participants in the Fear group felt displeasure at the time of completing the questionnaire, then it is understandable that they rate the items related to a pleasurable emotion as very low. Therefore, the fact that the happiness indicator PANAH was better in the Happy group than in the Fear group does not necessarily mean success in the induction of anticipatory happiness but rather reinforces the anticipatory fear induction finding in the Fear group.

Therefore, to reach a conclusion in this section, the author of the present thesis relies on the results when comparing the Happy group with the Control group. In this

comparison, the results pointed out that, at a 5% of significance level, anticipatory happiness was unsuccessfully induced.

IV.3. Risk preference measure results:

As mentioned in chapter V, a Risk Index variable was created with the results of choices made by the participants between risky and riskless long-term alternatives. This indicator shows the level of risk taken by the participants on their choices. Thus, a higher Risk Index pointed toward a risk-seeking attitude, and a lower Risk Index pointed toward a risk aversion attitude when making these choices. The Risk Index was compared within pair of groups to test the hypothesis formulated in this study. Table 8 shows the results of the Risk Index indicator per group. As can be seen, the average of this indicator was slightly larger for the Happy group and slightly lower for the Fear group. However, the median did not vary between groups.

Table 8:
Results of Risk Index, an indicator of risk taken, by groups.

Group	N	mean	median	SD	min	max
Control	37	5.32	5.00	1.73	1.00	9.00
Fear	31	4.90	5.00	2.01	1.00	10.00
Happy	29	5.17	5.00	1.93	1.00	9.00
Total	97	5.14	5.00	1.87	1.00	10.00

Note: N, SD, min and max are abbreviations for the number of observations, Standard deviation, minimum value and maximum value respectively.

IV.3.1. Hypothesis results:

H1: "Induced anticipatory fear produces higher levels of risk aversion"

It was expected that the Fear group would have a lower Risk Index than the other groups in order to not reject the H1 hypothesis.

However, the Mann-Whitney U test did not indicate that the Risk Index score was statistically lower for the Fear group (Mdn= 5) when compared with the Control group (Mdn = 5), U= -150.5, p= 0.4677. Similarly, statistically speaking, no differences were

found when comparing the Fear group (Mdn= 5) with the Happy group (Mdn = 5), $U= 2.5$, $p= 0.7780$.

As can be seen in Table 8, on average, the Fear group did have a lower Risk Index compared with the other groups. Still, these differences did not reach statistical significance at the 5% of significance level when comparing the medians with the Mann-Whitney U test. Therefore, this study failed to provide evidence to not reject H1.

H2: "Induced anticipatory happiness produces lower levels of risk aversion"

To not reject the H2 hypothesis, it was expected for the Happy group to have a lower Risk Index compared with the other groups.

However, the Mann-Whitney U test did not indicate that the Risk Index score was statistically higher for the Happy group (Mdn= 5) when compared with the Control group (Mdn = 5), $U= -150.5$, $p= 0.7857$. Similarly, as was shown in the previous paragraphs, no differences were found when comparing the Fear group (Mdn= 5) with the Happy group (Mdn = 5), $U= 2.5$, $p= 0.7780$.

As can be seen in Table 8, on average, the Happy group did have a higher Risk Index compared with the other groups. Still, these differences did not reach statistical significance at the 5% of significance level when comparing the medians with the Mann-Whitney U test. Therefore, this study failed to provide evidence to not reject H2.

IV.3.2. Risk Index by categories of variables:

At this point, the reader should realise that unable to show evidence to support the hypotheses of this study, the research question *"Do anticipatory fear and happiness influence risk assessments in individual long-term investments decisions?"* also cannot receive an affirmative answer (based solely on the statistical tests performed). However, the reader will also have noticed that the sample of this study has participants from a wide age range, different languages, countries of residence and different financial and banking backgrounds. An interesting question then is whether the effect (or lack of it) of anticipatory fear and happiness on long-term evaluations varies between youths

versus elderly individuals, between individuals who prefer language is English or Spanish. Or between those residing in developed versus developing countries, or between individuals with or without banking and finance experience.

To answer these possible doubts, a series of Mann-Whitney U tests were conducted comparing groups by categories of the mentioned variables, summarised in Appendix A7. In the results obtained, none of the conducted tests showed significant differences in the level of risk taken between groups for any of the categories mentioned above. In other words, no evidence of an influence of anticipatory fear and happiness on risk preferences for long-term financial alternatives was found for any sub-aggrupation of the sample variables.

V. DISCUSSION

The experiment conducted in this study evaluated the choices of 97 participants randomly divided into three groups after receiving an attempted induction of anticipatory fear, anticipatory happiness or no emotion. Participants were faced with eleven choices where they decided between risky and riskless investment alternatives.

Following previous evidence on the influence of future-oriented emotions on human behaviour (Baumgartner et al., 2008; Carrera et al., 2012) and on the influence of externally induced emotions on decisions with monetary payoffs (Foo, 2009; Kluger et al., 2010; Nguyen and Noussair, 2014), this research aimed to find empirical evidence of a causal relationship between two anticipatory emotions, fear and happiness, on risk preferences for the acquisition of long-term financial alternatives.

In contrast to the previous studies that showed evidence of an emotional causal effect on risk preferences with immediate payoffs, the results of this experiment found no statistical significance in the influence of emotions on risk preferences when the outcome involves the future. While the results showed a success in inducing one of the emotions studied (i.e., anticipatory fear), they did not support a significant effect of anticipatory fear or happiness on risk preferences when subjects faced hypothetical

long-term financial alternatives. Therefore, none of the hypotheses posed in the experiment *H1: Induced anticipatory fear produces higher levels of risk aversion* and *H2: Induced anticipatory happiness produces lower levels of risk aversion* could be accepted under the conditions given in the experiment.

Consequently, under the conditions given in this study, the research question: *Do anticipatory fear and happiness influence risk assessments in individual long-term investment decisions?* received a negative answer (i.e., Fear and anticipatory happiness do not have an influence on individual risk assessments when individuals decide on long-term financial options).

These results can be explained by discounted utility theory, and the concept of impatience reviewed in Chapter II of this paper. As the study by McClure et al. (2004) points out, humans tend to place more emotional baggage on alternatives with immediate returns and less emotional baggage on alternatives with future returns. The latter is consistent with the average differences in Risk Index between groups. As shown in the Results chapter, the average risk indicator of the participants under the anticipatory fear condition was slightly lower than that of the other groups, and the average risk indicator of the participants under the anticipatory happiness condition was slightly higher than that of the other groups. The fact that these small differences did not reach significance may be a sign that, although it is possible that the intended causal relationship, anticipatory emotion - long-term financial decisions, does occur in reality, such effect is minimal, perhaps because when the individual knows that the reward will be received after many years, he or she gives more weight to factors other than emotional ones.

The reader should also remember that, as shown in the literature review section, multiple factors determine the demand for long-term financial alternatives such as investments and life insurance. Given the importance of further studies to analyse the emotional influence on long-term financial decision-making, as understanding this process could have a positive impact on financial security and capital market prediction models, other studies must assess the weight that future-oriented emotions may have on the decision-making process for long-term financial products in comparison to their other determinants.

Despite what has been discussed so far, it is also important that the results of this study be taken with caution, as another explanation for the results obtained may be based on the limitations of the study conducted detailed below.

V.1. Limitations and further research directions:

Several limitations restrict the validity of this experiment, which provides opportunities for further research on the topic under discussion.

First, in the experiment of this thesis, a modification of the writing task used by several authors such as Foo (2009) and Kugler et al. (2010) was performed to induce emotions externally. Unlike the authors mentioned above, who induced emotions based on the respondent's past experiences, this study attempted to elicit emotions through mental prospection by asking participants to imagine future scenarios that might elicit the desired emotion. As this adaptation has not been previously tested, there is no evidence to support its effectiveness, so it is possible that the framing or wording used did not provide sufficient incentive to elicit the desired emotions to a degree that approximates to reality and that, perhaps, influence the decisions of long-term financial alternatives. It would be valuable, therefore, for future studies to test this or other methods that effectively induce future-oriented emotions.

Second, an adaptation of the PANAS-X questionnaire created by Watson and Clark (1994) was used to validate whether anticipatory emotions were successfully induced. Although this questionnaire has been widely used in the literature for the study of emotions (e.g., Pressman and Cohen, 2005; Przybylski et al., 2013; Tsai et al., 2006), it is based on self-reporting, which could involve self-reporting bias (i.e., people report what they believe to be politically or socially correct and not always the truth). In this case, it could be that some participants answered what they thought would be more helpful to the author of this thesis, especially since the participants belonged to the personal networking. Therefore, it would be valid for other researchers to test the induction of anticipatory emotions with other emotion measurement techniques, for example, using facial expression readers, which were not used in this study due to technological limitations.

Third, the Mann-Whitney U test was chosen to validate emotion induction and its influence on risk preferences because there was not enough data to obtain trustworthy results with a parametric test. The Mann-Whitney U test is one of the most powerful non-parametric tests and can perform better than its parametric equivalent, the t-student test, when the sample is small (Landers, 1981). Although, it has a higher risk of falling into type 1 error (i.e., falsely accepting the hypothesis) than the t-student test with an adequate sample size (Robert & Casella, 2004). For the present thesis results, this could mean a possible false acceptance of the anticipatory fear induction's success. Therefore, future studies could achieve more valid results by performing parametric tests with larger sample sizes.

Fourth, measures of risk preferences were calculated with observations of participants' choices when faced with long-term financial alternatives with hypothetical payoffs. Although this made it possible to study them in this thesis, different researchers have found differences between outcomes with real versus hypothetical payoffs in the experiments. For example, Edwards (1953) found that risk-taking intention was higher when participants gambled for monetary payoffs. Additionally, Slovic (1969) found differences in strategy choices between monetary and hypothetical payoff experiments. Thus, it would be valuable for other researchers to seek to validate anticipatory emotion causality on risk preferences for long-term financial alternatives with real outcomes. For example, field research could be conducted by showing videos of fearful or happy future scenarios in the waiting rooms of financial companies (e.g., banks and insurance companies) and observing participants' choices about purchasing these financial products with long-term returns.

Finally, due to the financial constraints of the author of this thesis, no financial incentives were given for participation in the experiment. Although, since participants belong to the personal author's network of contacts, it is possible that they had altruistic incentives, such as the personal satisfaction of helping a friend. However, it is also possible that this type of incentive was not enough for respondents to put sufficient effort into completing the survey correctly and conscientiously, which could explain the high number of invalid responses (approximately one-third) that were subsequently eliminated from the study. If part of this effect also occurred in the final data studied,

then the dominance precept (i.e., the reward structure should dominate any subjective cost associated with the participation in the experiment) Smith (1982) was not satisfied, and therefore, control in this experiment may be open to doubt. Future research could address this problem with a sufficient incentive scheme.

VI. CONCLUSION

This research study aimed to provide empirical evidence of the influence of anticipatory emotions on risk preferences in the context of long-term financial product acquisition. Previous literature shows evidence of a causal effect of future-oriented emotions on human behaviour, an increase in risk-taking when emotions are of positive valence, and a reduction in risk-taking when emotions are of negative valence.

Contrary to existing literature, the results of my conducted experiment did not yield significant results that validate the effect of anticipatory emotions on the decision-making of long-term financial products. Therefore, no evidence that could provide an affirmative answer to the research question of the present thesis, "Does anticipatory fear and happiness influence risk assessments in individual long-term investment decisions?" was found.

These results could mean that the emotional influence on decision-making varies according to the timing of choice. In other words, emotions could affect financial decisions when returns are received in the short term but not when they are received in the distant future.

However, these results should be taken cautiously as they are subject to several limitations that could invalidate them.

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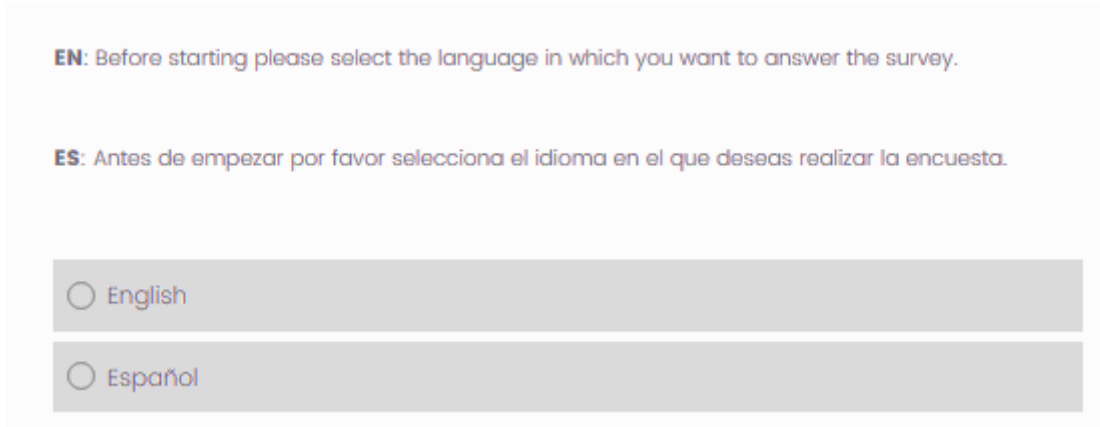
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VIII. APPENDIX

A1: Online Survey

a) Language Selection:



The screenshot shows a survey question with two lines of text in English and Spanish. Below the text are two radio button options: 'English' and 'Español'. The options are presented in a light gray background with rounded corners.

EN: Before starting please select the language in which you want to answer the survey.

ES: Antes de empezar por favor selecciona el idioma en el que deseas realizar la encuesta.

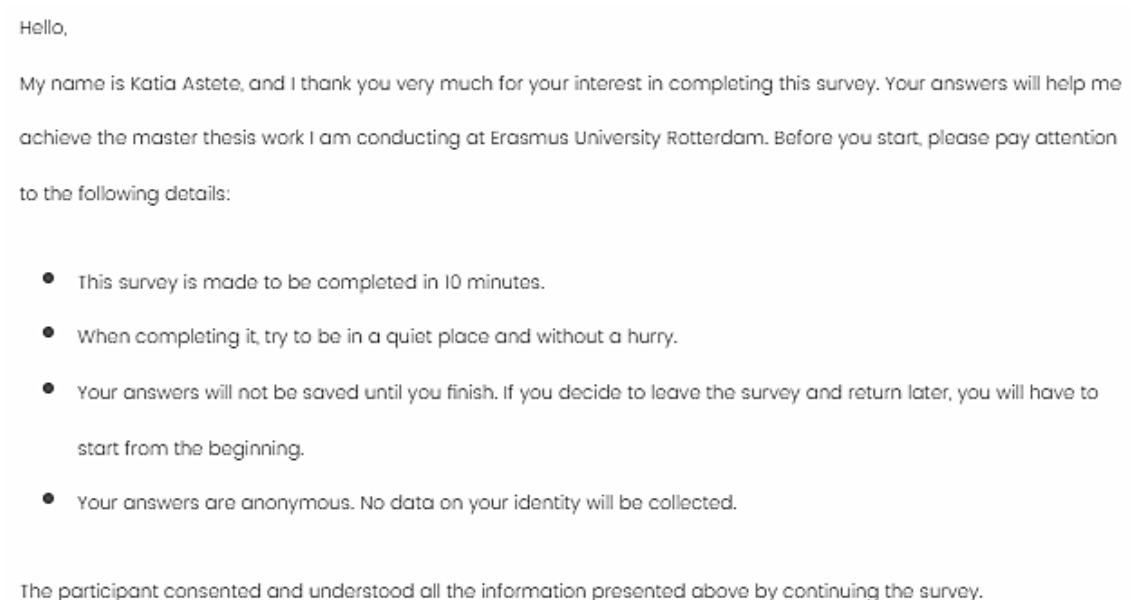
English

Español

Figure A1-a:
Language question showed in the survey

Note. It was mandatory to complete this question to continue with the survey

b) Welcome message:



The screenshot shows a welcome message with a greeting, an introduction, and a list of details. The text is in a light gray background with rounded corners.

Hello,

My name is Katia Astete, and I thank you very much for your interest in completing this survey. Your answers will help me achieve the master thesis work I am conducting at Erasmus University Rotterdam. Before you start, please pay attention to the following details:

- This survey is made to be completed in 10 minutes.
- When completing it, try to be in a quiet place and without a hurry.
- Your answers will not be saved until you finish. If you decide to leave the survey and return later, you will have to start from the beginning.
- Your answers are anonymous. No data on your identity will be collected.

The participant consented and understood all the information presented above by continuing the survey.

Figure A1-b:
Welcome message showed in the survey

Note. It was mandatory to complete this question to continue with the survey

- c) Emotion induction: Writing task indications shown to participants in the Fear-induced group

For this task, you will imagine a future scenario that scares you.

How do you fear that the future and that of your loved ones will be in ten years if everything goes wrong?

Include enough detail that a person reading the description would feel the same emotion just from reading about the scenario. When you finish, be sure you read your story before going to the next step.

Note: It should take you around 5 minutes to complete this task. You will need to write at least 200 characters.

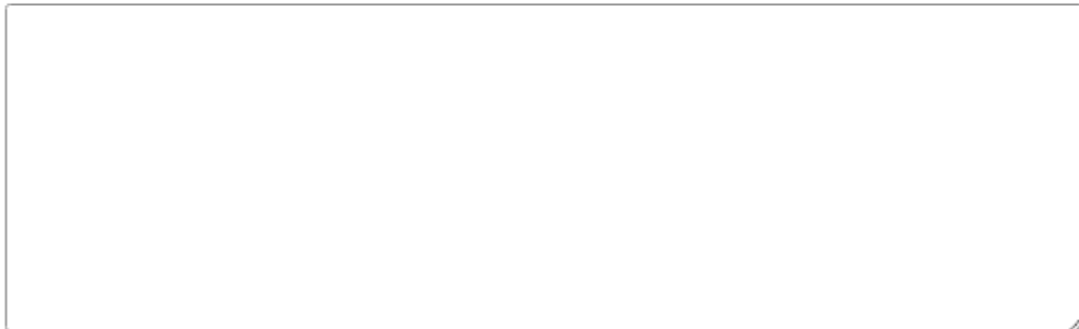


Figure A1-c:

Writing task indications showed in the survey to participants in the Fear group

Note. It was mandatory to complete this question to continue with the survey

d) Emotion induction: Writing task indications shown to participants in the Happiness-induced group

In this task, you will imagine a future scenario that gives you happiness.

How do you expect that future and that of your loved ones to be in ten years if everything goes well?

Include enough detail that a person reading the description would feel the same emotion just from reading about the scenario. When you finish, be sure you read your story before going to the next step.

Note: It should take you around 5 minutes to complete this task. You will need to write at least 200 characters.

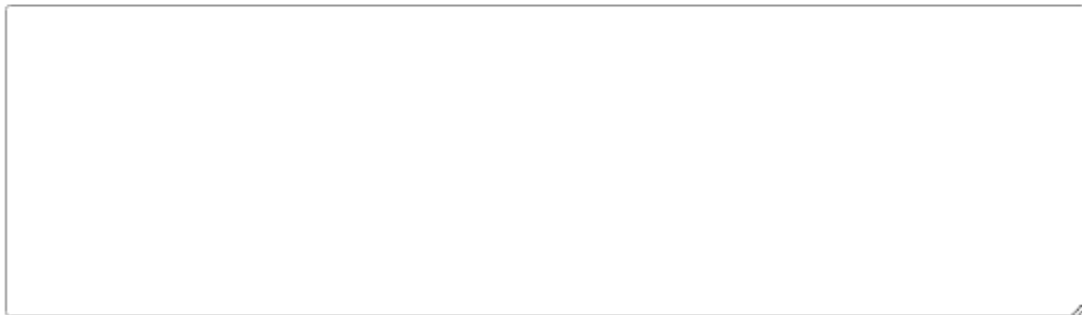


Figure A1-d:

Writing task indications showed in the survey to participants in the Happy group

Note: It was mandatory to complete this question to continue with the survey

e) Manipulation check: Showed to all participants

Read each of the following items and indicate to what extent you feel that way right now (in this exact moment).

Use the following scale to record your answers:

1: Very slightly or not at all

2: A little

3: Moderately

4: Quite a bit

5: Extremely

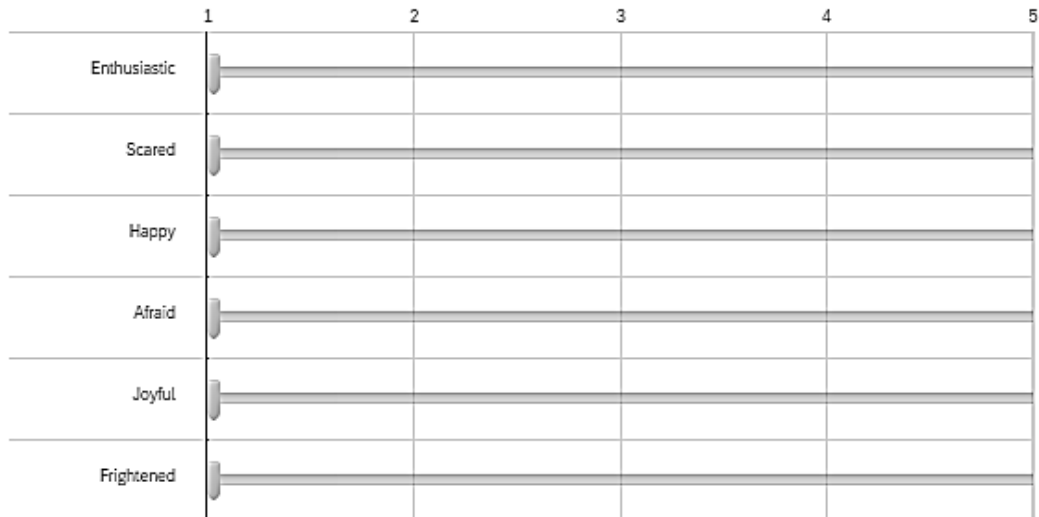


Figure A1-e:

Adaptation of PANA-X questionnaire (Watson and Clark, 1994) showed in the survey

Note: It was mandatory to complete this question to continue with the survey

f) Risk preference measure: Choice list

Imagine that you have \$100 leftover in your income after expenses every month, and you want to use it to start saving for the future and that of your loved ones. An advisor from the bank of your choice brings you two investment alternatives, which will all return you the final outcome after ten years. You can choose between investing your money in an investment portfolio (you will see these options on the left) or a riskless investment (you will see these options on the right).

The investment portfolio will either pay off \$20,000 or \$10,000 with equal probability.

The riskless investment will pay off a fixed amount. You will be presented with different choices, with the value of the riskless investment changing for every choice.

For every row, please choose your preferred option:

<input type="radio"/> Receiving \$20,000 with 50% chance or \$10,000 otherwise	<input type="radio"/> Receiving \$10,000 for sure
<input type="radio"/> Receiving \$20,000 with 50% chance or \$10,000 otherwise	<input type="radio"/> Receiving \$11,000 for sure
<input type="radio"/> Receiving \$20,000 with 50% chance or \$10,000 otherwise	<input type="radio"/> Receiving \$12,000 for sure
<input type="radio"/> Receiving \$20,000 with 50% chance or \$10,000 otherwise	<input type="radio"/> Receiving \$13,000 for sure
<input type="radio"/> Receiving \$20,000 with 50% chance or \$10,000 otherwise	<input type="radio"/> Receiving \$14,000 for sure
<input type="radio"/> Receiving \$20,000 with 50% chance or \$10,000 otherwise	<input type="radio"/> Receiving \$15,000 for sure
<input type="radio"/> Receiving \$20,000 with 50% chance or \$10,000 otherwise	<input type="radio"/> Receiving \$16,000 for sure
<input type="radio"/> Receiving \$20,000 with 50% chance or \$10,000 otherwise	<input type="radio"/> Receiving \$17,000 for sure
<input type="radio"/> Receiving \$20,000 with 50% chance or \$10,000 otherwise	<input type="radio"/> Receiving \$18,000 for sure
<input type="radio"/> Receiving \$20,000 with 50% chance or \$10,000 otherwise	<input type="radio"/> Receiving \$19,000 for sure
<input type="radio"/> Receiving \$20,000 with 50% chance or \$10,000 otherwise	<input type="radio"/> Receiving \$20,000 for sure

Figure A1-f:
Risk question and choice list showed in the survey

Note: It was mandatory to complete this question to continue with the survey

g) Demographic variables:

What is your age?

(Write your answer in numbers)

What is your current country of residence?

(Write your answer in words)

Do you have experience or studies in banking and/or finance?

Yes

No

Figure A1-g:
Demographic questions showed in the survey

h) Good bye message

Your response has been saved.

Tus respuestas han sido guardadas.



Figure A1-h:
Good bye message showed in the survey

A2: Varimax-Rotated Factor Loadings of the Fear and Joviality Scales' Items when asking the respondent to rate how they felt the past few weeks.

Watson and Clark (1994) calculated the Varimax-Rotated Factor Loadings per item to validate the representativeness of the items on the respective emotional higher scale (in this case, fear and Joviality). In their article "The PANAS-X: Manual for the positive and negative affect schedule-expanded form" Watson and Clark (1994) showed the results of this analysis when the respondent is asked to rate every item as the extent of how they felt during the past few weeks. Although this thesis work tested anticipatory emotions (i.e., how the individual felt in the moment after prospecting), the results shown in Table A2 were taken as the best proxy available for the relative importance of the item in representing the scale.

From Table A2, the top 3 items from the Fear and Joviality scale with higher Varimax-Rotated factor were used in the Manipulation check step of the experiment as explained in Chapter III.

Table A2:
Varimax-Rotated Factor Loadings of the Fear and Joviality PANAS-X Scales' items in the Past Few Weeks Solution.

Scale	Item	Varimax-Rotated Factor Loadings
Fear	Scared	0.76
	Afraid	0.71
	frightened	0.70
	Shaky	0.57
	Nervous	0.56
	Jittery	0.52
Joviality	Enthusiastic	0.74
	Happy	0.70
	Joyful	0.70
	Delighted	0.66
	Excited	0.65
	Cheerful	>.30
	Lively	>.30
	Energetic	>.30

Note. Adapted from "The PANAS-X: Manual for the positive and negative affect schedule-expanded form" by D.Watson and L.A. Clark, 1994, Psychology Publications, p. 2, 9,10. Copyright 1994 by University of Iowa. >.30 means a factor lower than 0.30.

A3: Participant recruitment message, example LinkedIn.

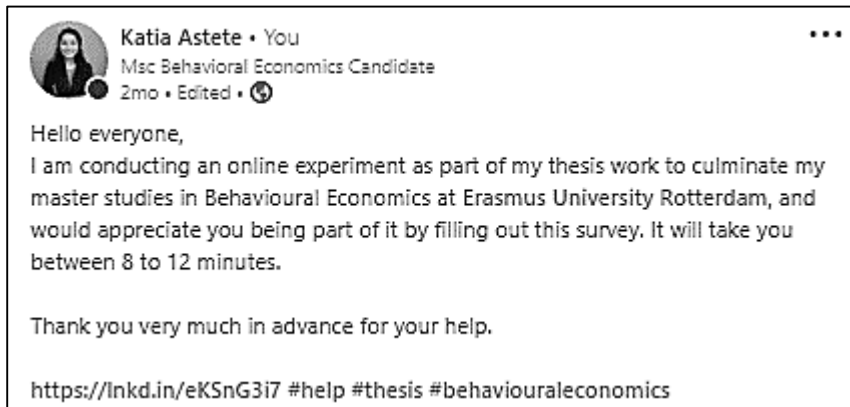


Figure A3:
Message posted in LinkedIn® to recruit participants

A4: Distribution of final sample by country of residence.

Table A4:
Countries of residence reported by participants

Development level	Country	Freq.	Percent
Developed	Australia	3	3.09
	Belgium	1	1.03
	Canada	2	2.06
	Denmark	1	1.03
	Germany	3	3.09
	Ireland	1	1.03
	Spain	1	1.03
	Switzerland	1	1.03
	The Netherlands	22	22.68
	United States	4	4.12
Developing	Peru	58	59.79
Total		97	100

Note. The classification of countries by their development level was based on "The United Nations Human Development Report 2020", UN (2020)

A5: Proportion tests results between groups by control variable Age, Language, Country of residence and Banking or Financial Experience.

Table A5:
Results of Proportion tests between groups by control variable.

	Null Hypothesis (H0)		
	prop(Fear) = prop(Control)	prop(Happy) = prop(Control)	prop(Fear) = prop(Happy)
Age			
diff	-0.1003	-0.0280	0.0723
p-value	0.4000	0.8147	0.5703
Language			
diff	-0.0087	0.0680	0.0768
p-value	0.9413	0.5648	0.5334
Country of residence			
diff	0.0453	0.0531	0.0078
p-value	0.7052	0.6631	0.9506
Experience			
diff	0.0410	0.2423	0.2013
p-value	0.7309	0.0506	0.1189

Note. Table shows the results at the 95% of confidence level. The variable Age was modified into two categories in reference to the average age in the sample of 37.2. The variable Country of residence was modified into two categories in reference to the Human Developed Index (United Nations, 2022).

A6: Proportion tests between groups by duration to complete the sample.

Table A6:
Results of Proportion test between groups by variable Duration.

	Null Hypothesis (H0)		
	prop(Fear) = prop(Control)	prop(Happy) = prop(Control)	prop(Fear) = prop(Happy)
diff	-0.4995641	-0.4016775	0.0978865
p-value	0.0000	0.0002	0.4476

Note. The table shows the results at the 95% of confidence level. The variable Duration was modified into two categories in reference to the average duration in the sample of 8.7 as above the average and below the average to conduct the proportion test between groups.

A7: Mann-Whitney U test results of Risk Index comparison between groups by categories of variable.

These test were conducted to validate the influence (or lack of it) of anticipatory fear and happiness on risk preferences when for long-term financial alternatives.

The large p-values shown in Table A7 pointed out to no emotional influence on any of the categories of the control variables Age, language, country of residence and banking of financial experience.

Table A7:

Mann-Whitney U test results of Risk Index comparison between groups by categories of variable.

Category	N	Medians by group			Null hypothesis (Ho)		
		Fear	Happy	Control	Fear = Control	Happy = Control	Fear = Happy
Age							
Below average	59.0	5.0	5.0	5.0	0.5321	0.753	0.7998
Above average	38.0	5.0	5.0	5.0	0.7463	0.9293	0.8640
Language							
English	35.0	5.0	5.0	5.0	0.1334	0.7934	0.2719
Spanish	62.0	4.5	5.0	5.0	0.7748	0.8813	0.6531
Country of residence							
Developed	39.0	4.0	5.0	5.0	0.1183	0.6455	0.2544
Developing	58.0	5.0	5.0	5.0	0.7475	0.9656	0.7632
Banking or Financial Experience							
No	45.0	5.0	5.0	5.0	0.7642	0.7821	0.8854
Yes	52.0	5.0	5.0	5.0	0.2646	0.5601	0.728

Notes: N is an abbreviator for the number of observations. The age variable was modified into two categories in reference to the average age in the sample of 37.2. The variable country of residence was modified into two categories in reference to the Human Developed Index (United Nations, 2022). The values in the last three columns indicate the p-values obtained from the Mann-Whitney U tests when testing the referent hypothesis.