

# The Impact of Future Thinking on Financial Risk Taking

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## **Abstract**

Financial risk is involved in many of the decisions that we make daily. These decisions may be influenced by our previous memories and experiences that involved financial risk (Graham, Megginson, & Smart, 2010). Our ability to project ourselves into an imagined future event is known as episodic future thinking (EFT; Schacter, Benoit, & Szpunar, 2017). In this experiment, we examined how imagining a positive or negative future financial decision can influence a subsequent task that measures financial risk taking. Seventy-nine participants from Yeshiva University were randomly assigned to one of three conditions. Participants were asked to imagine a positive financial decision (positive condition), a negative financial decision (negative condition), or to experience a neutral event (control condition). All groups were then asked to complete the Balloon Analogue Risk Task (BART) which has been shown to measure an individual's level of financial risk taking (Lejuez et. al, 2002). We predicted that engaging in both positive and negative self-projection would significantly influence the levels of risk taking with those in the positive condition showing significantly higher levels of risk taking relative to the negative and control conditions and those in the negative condition showing the lowest levels of risk taking. Results yielded a lack of statistically significant changes in level of risk taking based on condition. Explanations for this absence of effects are discussed.

## **The Impact of Future Thinking on Financial Risk Taking**

Would thinking about winning a lottery make you more likely to buy a ticket than if you imagined yourself losing? Understanding potential causes for risky financial behavior is important since it can help counsel those who may have difficulty with financial risk. Risk is also a key element for investing money, which has become much more prevalent during the COVID-19 lockdowns (Miao, Li, & Xie, 2020). For example, Miao and colleagues showed that people began trading stocks largely out of boredom due to the lockdowns. All investments carry risk, and usually the reward is correlated with the risk taken. People who want a higher return will often take more risk, while those with a lower risk-tolerance will choose less risky investments (Graham et. al., 2010, pg. 161). Although many financial advisors will choose financial risk based on age and their dependence on the invested capital, people may still be pushed to be risky based on their psychological disposition. In one interesting study by Reniers (2016), different aged adults were asked to do the Balloon Analogue Risk Task (BART) unobserved and observed by peers. The findings showed that young adults were strongly influenced by mere observation and encouragement of peers to take more financial risk. However, older adults were much less influenced by peer observation and some even decreased the level of risk taken.

A second study by Grable and Rabbani (2017) used meta-data to analyze men and women's risk tolerance in the stock market. They found that men and women acted very differently when investing stocks. Men in general had the highest risk tendencies, while women who owned equities had similar risk tolerances to men without equities, and women with no equities had the lowest risk tolerances. Both studies showed that risk is not simply derived from mathematical calculations but is often a derivative of personal psychology.

Recently, there has been new research in the area of episodic future thinking (EFT) to determine the level it affects daily life. EFT is the ability to pre-experience a future event that could possibly occur in one's life (Atance & O'Neill, 2001). This is different than semantic future thinking, which is more general and not about a specific potential personal event. EFT is important since it plays a large role in providing insight into the future and deciding based on outcomes of previous events (Atance & O'Neill, 2001). It is interesting to note, memories that are farther in the past and negative in nature take longer to be retrieved. This is because the mind prefers calling on positive memories and those that happened more recently, and it takes more effort to recall those that are negative and farther in the past (D'Argembeau & Van der Linden, 2004).

Based on our search through major journal databases, the intersection between the two areas of financial risk and EFT has not been examined, but we found a few related studies. One study by Thorstad and Wolff (2018) measured participants' future sightedness – defined as “how far into the future people's thoughts about the future extend” – by using their twitter tweets and conducted several experiments related to risk tolerance. Although this experiment did not use EFT, future sightedness is closely related and could help create predictions about EFT's impact on financial risk. One of the tasks used to assess the participants' financial risk, was the BART. They found that people who have short future sightedness took more risk than those with a longer future sightedness. Additionally, those participants also took more less investment opportunities and preferred immediate payouts and took more financial risks.

Other studies have analyzed the way EFT influences risk in other areas. One inconclusive study attempted to examine if EFT would influence traveler's perception of risk of terrorism and alter their travel plans (Bø & Wolff, 2019). One of the issues mentioned in the discussion of the article was that potentially terrorism was a difficult item to use for EFT since most people have

not experienced it firsthand and imagining it may not have felt real enough to influence choices. We felt that financial risk would be much easier to use for EFT since most people have made a form of bad investment over the course of their life, ranging from a bad loan to a friend or choosing the wrong stocks.

### **Current Study**

This experiment is aimed at measuring the effect of episodic future thinking on financial risk tolerance. However, based on D'Argembeau's study (2004) that positive and negative memories are channeled in the brain, it is important to compare the effects of both positive and negative EFT. Our independent variable involved participants participating in either positive (thinking of financial gains) or negative (thinking of financial losses) future thoughts, and the dependent variable was the measure of risk they show when partaking in a financial risk task. The control condition had participants partake in a task that distracted them from either positive or negative EFT. Our hypothesis was that participants who partake in positive EFT will show a higher level of risk in the subsequent financial risk task compared to the control group, while participants who partake in negative EFT will show lower risk taking behavior relative to the control group. Additionally, we predicted a stronger effect from the positive EFT group than the negative EFT group given that D'Argembeau and Van der Linden (2004) showed that it takes longer for negative memories to be recalled than positive memories and negative memories tend to contain less detail than positive memories. This led us to predict that the lower level of re-experiencing the memory will lead to a less powerful effect of EFT. Given that participants vary in their baseline level of risk tolerance, we screened for this variable prior to the experiment.

## Methods

### *Participants*

Seventy-nine students were recruited from Yeshiva University's men's campus psychology student body. All participants received research participation credit towards their class requirements.

### *Materials*

***Balloon Analogue Risk Task.*** To measure financial risk, the Balloon Analogue Risk Task (BART) test was used (Lejuez et al., 2002). This task involves having participants inflate a balloon on a computer and determine when they want to stop inflating it. Each additional pump adds 25-cents to their potential win for that balloon. The larger they inflate it, the larger the reward, but also a higher chance of it popping and not receiving anything. Each balloon has a random number of pumps (between 1 and 32) that will cause it to burst. Each participant had 20 balloon trials to complete and increase their score. Additionally, this test has been shown to have test-retest stability which allows it to be done multiple times to find a more exact financial risk undertaken by the participant (White et al., 2008).

The probability that the balloon will explode on each pump is  $1/N$ , where  $N$  is 32 minus the number of pumps already done. So, on the first pump the probability is  $1/32$ , on the second  $1/31$ , on the third  $1/31$ , and so on. If it has not popped by the 32<sup>nd</sup> pump, then the odds of exploding are  $1/1$ , or 100%.

The measurements used for the BART were Pumps, Exploded, and Wins. Pumps measures the number of pumps participants did in each balloon trial. Exploded measures if the balloon popped during that trial or not. Values can only be 0 (not popped) or 1 (popped). Finally, Wins

calculates the amount participants won during each trial. Wins is a measurement that combines both Pumps and Exploded since participants that pump more only earn more when the balloon does not explode.

Perhaps the most convenient element of the BART is that participants do not associate inflating a balloon with financial risk which means that there is no need for a cover story in this experiment. Participants are unlikely to understand what the BART is measuring and are therefore unlikely to adjust their risk based on their perceptions of the experiment. Additionally, the BART is no more stressful as a standard game.

**Attention Score.** participants were assessed for their level of engagement with the experiment. Those with low engagement were assumed to have a lower chance for a successful EFT manipulation, while those that scored higher were assumed to have a higher chance of successful manipulation. The scoring for all participants were based on the following rules: receive 0.5 for EFT description that demonstrated understanding (0 if obviously not paying attention) and 0.5 for paying attention (based on observation notes). Total possible score is 1 and least possible score is 0.

**Risk Propensity Scale.** Since people take different levels of risk, it is important to screen participants for their natural risk tolerance. The Risk Propensity Scale (RPS) is a fast questionnaire with 7-items that are on a 9-point scale, ranging from 1 equaling “totally disagree” to 9 equaling “totally agree”. The items rated are, “Safety first”, “I do not take risks with my health”, “I prefer to avoid risks”, “I take risks regularly”, “I really dislike not knowing what is going to happen”, and “I usually view risks as a challenge”. The final question is “I see myself as a ...” and the 9-point scale is rated as 1 equals “risk avoider” and 9 equals “risk taker”. In general, men tend to score around 4.9 and women around 4.4, with a higher number meaning

that the person has more propensity towards risk (Meertens & Lion, 2008). The scoring rules grades question 4,6, and 7 normally, and questions 1,2,3, and 5 with reverse scoring. All questions are scored between 1 – 9. If participants did not touch the sliding button, then it was assumed to be 5 since that was default number the slider was set to.

***Financial Risk Assessment.*** After the BART and RPS have been administered, participants will be asked to answer a short questionnaire created by the experimenters to fine-tune the level of financial risk the participants are willing to take and provide some background information of each subject. The background questions include questions such as, “What level income to your parents collectively earn?” For full list of questions please reference Appendix I.

### ***Procedure***

Students were randomly assigned a number 1 – 3 when entering the laboratory. Participants were seated at a computer apart from each other with a dividing screen to prevent them from taking additional risk that might be caused by being watched by others. All trials involved groups of 3 – 6 students.

Participants assigned to Group 1 were asked to count backwards by 3s, starting from 3458. For example, the next digits they would need to type would be 3458, 3455, 3452, and so on. The goal of this task was to distract participants and prevent them from doing either positive or negative EFT. They were given 2 minutes to type as many numbers as they could so that the time was the same as the other two groups.

Participants assigned to Group 2 were the negative EFT group and were told to think of a potential negative financial event that happened to them personally. They were given examples such as making a bad purchase that lost value or choosing a bad stock to invest in, to help them



remember such an event. Participants were then asked to press the space bar when they had a memory in mind and given two-minutes to re-experience it with as much detail as possible.

Participants assigned to Group 3 were the positive EFT group and were told to think of a personal positive financial event that happened to them personally. They were also given examples such as making a good purchase that increased in value or choosing a good stock to invest in. Participants pressed the space bar when they had a memory in mind and were given two-minutes to re-experience it with as much detail as possible.

After the initial counting task or EFT task, all participants were given instructions in a short demonstration video about how the BART task works. Participants then completed 20 balloon trials. After all the balloons were played, all groups completed the Risk Propensity Scale questionnaire to determine their baseline risk tolerance, and questions to identify gender and if they actively trade in the stock market. After completion of the screening questions, participants were given credit for participating and fully debriefed.

### ***Covid Procedures***

To ensure the highest standard of safety for the participants, we decided to enforce strict COVID guidelines. All participants had to have an active university ID to enter the testing facility. This requirement relied on the Yeshiva University standard that in order to keep an ID active, students are required to be vaccinated and tested for Covid twice a week. Additionally, masks and social distancing were enforced by in the testing center. All surfaces were disinfected between participants.

### ***Procedural Mishaps***

Due to software failures, many of the participants only had 10 trials in the BART which meant that we could only use the first 10 trials for all participants in the experiment.<sup>1</sup>

## Results

Seventy-nine participants took part in the study (26 Positive EFT, 27 Negative EFT, and 26 Control). We conducted a one-way ANOVA on the risk propensity score as a function of condition (control, positive EFT, negative EFT) and the results failed to reach significance ( $p = 0.85$ ) showing that the baseline risk tolerance for participants in each condition did not significantly differ from each other.

For the BART task, we conducted a number of one-way ANOVAs as a function of condition (control, positive EFT, negative EFT) on the average number of balloon “pumps” per trial, exploded balloons, and wins. Results revealed no significant effects (all  $ps > .71$ ). In terms of participants’ level of attention during the EFT manipulation, an independent sample t-test was conducted but there was no statistical significance,  $t(51) = 2.261$ ,  $p = 0.139$  between the positive ( $M = 0.827$ ,  $SD = 0.314$ ) and the negative group ( $M = 0.741$ ,  $SD = 0.376$ ). Note that the control

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<sup>1</sup> During the data collection, the software used to collect data crashed and required a few days to be reprogrammed. In this process, the BART task was accidentally shifted to 10 balloon trials per participant. While this was rectified within a few days, 39 of the participants only did the BART with 10 balloon trials. Additionally, while the program was first discovered to be malfunctioning, 15 participants participated. While those trials were not included in the data, these participants were invited to partake again, for extra class credit, after the program was fixed. Only 5 participants took part in the experiment a second time (only one set of data was used for each experiment). We did not feel this was a problem since the experiment mask was good enough to prevent participants from discovering the goal of the experiment. Additionally, the results of the experiment did not change when these participants were removed. Due to this error, we decided to calculate the data using the first 10 trials for all the participants. However, even when using all the available data, the results were not become significant.

condition was not included in the attention measure since there was no EFT manipulation for this group. The descriptive statistics for each of these measurements can be found in Table 1.

**Table 1**

*Descriptive Statistics*

Condition	N	Mean	Std. Deviation
<b>Full Data</b>			
RPS	79	4.012	0.962
Attention	79	0.854	0.301
Pumps	79	10.259	3.872
Exploded	79	0.429	0.181
Wins	79	13.680	5.055
<b>Control</b>			
RPS	26	4.016	0.859
Attention	26	1.000	0.000
Pumps	26	10.511	3.953
Exploded	26	0.423	0.170
Wins	26	14.077	4.374
<b>Negative</b>			
RPS	27	3.936	1.011
Attention	27	0.741	0.376
Pumps	27	10.325	3.821
Exploded	27	0.451	0.184
Wins	27	13.259	5.036
<b>Positive</b>			
RPS	26	4.087	1.038
Attention	26	0.827	0.314
Pumps	26	9.938	3.973
Exploded	26	0.411	0.192
Wins	26	13.721	5.821

## Discussion

Results revealed that episodic future thinking had no statistically significant effect on financial risk taking as measured by the BART. Specifically, since performance on the BART for all three groups was very close, we concluded that the BART may have not been sensitive to the effects of episodic future thinking. In general, it can be challenging to get participants to adopt a specific mindset within an experimental setting that is sufficiently vivid to influence performance which may have influenced our results.

Another important point is that we did not offer monetary compensation in the BART portion of the experiment. It is worth noting that normally this procedure involves providing monetary compensation based on performance in this task. All participants received participation-credit for their participation and were merely asked to try to win as much money as possible through their performance in this task. This may have led participants to play it as merely a game given that they didn't have the goal of actual financial gain.

In a follow up study, it would be worth investigating other methods of determining engagement in the EFT requirement. In this experiment, the level of engagement was determined by the experimenter's own observations based on the description the subject wrote and observation notes taken by experimenters. However, it may have been more informative to ask participants to self-assess the level to which they felt engaged with the EFT rather than rely on experimenters' observations. This may have been more informative and led to a better understanding of whether participants took the EFT manipulation seriously, and whether some did not engage at all. That said, even with this experiment modification, participants may not be truthful about their level of engagement to avoid negative judgement.

## **Conclusions**

This experiment attempted to fill a gap in the literature by focusing on the intersection between episodic future thinking and financial risk. This issue of financial risk is relevant to all individuals and may help to provide support for ways to help mitigate financial risk thereby helping people prevent major monetary losses that can take years to recover. While we did not manage to find statistically significant results, follow-up studies including our suggested changes may yield results that could help to further this field of study.

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## Appendix I

### Financial Risk Assessment

1. What gender are you?
  - a. Male
  - b. Female
  - c. Prefer not to answer
  - d. Undefined
  
2. What level income do your parents collectively earn?
  - a. \$45,000 or less
  - b. \$45,000 - \$75,000
  - c. \$75,000 – \$125,000
  - d. More than \$125,000
  - e. Unsure
  
3. How many of your parents/legal guardians have higher education (attended university)?
  - a. Neither
  - b. One
  - c. Both
  - d. Unsure
  
4. A friend approaches you with a new business idea that seems risky but could provide high returns. He tells you he is looking for investors, but they can only contribute up to \$100. How much of \$100 would you be willing to invest in his idea?

Answer is shown by sliding a scale between \$0 to \$100.



5. You found a new magazine that looks very interesting but you have never read it before. You have a choice to (A) subscribe at the standard price, or (B) save 20% but be locked in for 2 years. Which would you choose?
- a. Subscribe at the standard price
  - b. Save 20% but be locked in for 2 years