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RESEARCH ARTICLE

FINANCIAL LITERACY WORKING AS AN EMOTION REGULATION TOOL IN FINANCIAL DECISION MAKING

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Abstract: **Objective:** This paper tests financial literacy as an influence moderator of incidental anxiety on financial risk tolerance, improving individuals' reappraisal potential. **Methods:** Two experiments were conducted to investigate the role of financial literacy potentially contributing to reappraisal (i.e. emotion regulation strategy) and moderating the influence of incidental anxiety on financial risk tolerance. One-way ANOVA and ANCOVA were used to analyze data. **Results:** Individuals influenced by incidental anxiety chose more risk-averse options in the risk assessment than those not influenced, but financially literate individuals were less influenced than the financially illiterate respondents. The findings support the moderating impact of financial literacy on the influences of incidental emotions in financial decisions. **Conclusion**: Results contribute to the research on emotions and decision making, showing that there are variables (i.e., skills such as financial literacy) that can help mitigate the harmful influences of incidental emotions on financial decision making.

Keywords: *Financial literacy, Decision making, Emotion regulation, Behavioral economy, Incidental emotions.*

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INTRODUCTION

It is well established in decision making research that the influence of emotions is sometimes unwanted and can be regulated. There are circumstances in which naturally occurring emotional responses must be inhibited, so that a deliberate and potentially wiser decision can be made [1].

In the last two decades, research on emotion regulation strategies to control (or minimize) influence of unwanted emotions has emerged with Gross [2] and followed by many others. Authors suggest that less effortful strategies, particularly those involving choice architecture (changing the framing and structure of choices), provide the most promising avenues to better regulate emotions [3].

However, the defined strategies are at the most only theoretically exposed and do not provide an empirical objective guidance for people to practice the regulation of unwanted emotions in real life situations. In other words, it lacks a tool for orienting common people on how to regulate emotions for making smarter decisions. One specific example where such a tool is important is on the changing global environment regarding households´ financials. It is known that individuals are increasingly responsible for saving and investing not only their personal financial wealth but also their pension wealth [4].

Governments around the globe have started advocating a new and responsible approach to personal finance to encourage households to be more in charge of their own financial wellbeing [5].

Thus, being aware of such increasing needs, the understanding of the influence of unwanted emotions on financial decisions gains importance. Actually, even more important are both the strategies and tools to be applied in order to avoid being emotionally trapped.

The objective of this study is to empirically test if financial literacy (FL) can mitigate the influence of incidental emotions (i.e., incidental anxiety) on financial risk tolerance (FRT), improving individuals´ reappraisal potential and contributing to an emotion regulation strategy.

Theoretical Background

The boom in decision research associated with the emergence of behavioral decision theory in the late 1960s largely ignored the role played by emotions in decision making [6]. But currently it is widely accepted that emotions affect judgment and decision making. Emotions are a major factor in the interaction between environmental conditions and human decision processes [7].

Emotions constitute potent, pervasive, predictable, sometimes harmful and sometimes beneficial drivers of decision making [8]. Yet, it is common sense among researchers that incidental emotions (those not related to the decision at hand) influence perception of risk in the decision process [8-15]. As an example, Yang et al. [15], using a simple gambling task, found that incidental emotions (elicited by recalling personal experiences) influence risk preference and outcome evaluation of future choices.

In everyday life, we are very likely to constantly encounter emotional stimuli that are not directly related to the next decision (i.e., incidental emotions). This means, understanding how dealing with such emotions can impact the next, apparently unrelated decision process is of utmost importance [16].

Emotion Regulation

In general, emotional responses facilitate an individual's functional adaptation to stressful or adverse circumstances. However, some people experience emotional difficulties that affect the efficacy of this regulation mechanism [17]. Gross [18] says that emotions do not force us to respond in certain ways, they only make it more likely we will do so. This malleability permits us to regulate our emotions.

Emotion regulation refers to shaping which emotions one has, when one has them, and how one experiences or expresses these emotions [2].

It encompasses a set of competences that allow the person to supervise, appraise, and modify the processes involved in the genesis of emotion and modulate its manifestation [3]. Emotion regulatory processes may be automatic or controlled, conscious or unconscious. Emotion regulation may dampen, intensify, or simply maintain emotion, depending on and individual´s goals [19].

Emotion regulation strategies cluster into three broad categories – those that aim (a) reducing the intensity of emotion (time delay, reappraisal, suppression); (b) reducing the use of emotion as an input to decisions (e.g., real financial incentives) or (c) counteracting an emotion-based bias with a bias in the opposite direction [8].

Authors suggest that less effortful strategies, particularly those involving choice architecture (changing the framing and structure of choices), provide the most promising avenues. Despite the difficulties of categorization in the absence of knowledge about the context in which individuals regulate their emotional behavior, strategies such as rumination, avoidance or suppression have been considered "less adaptive", and strategies such as positive reappraisal or acceptance have been deemed "adaptive" [3].

More in depth studies investigated the results of emotion regulation strategies. In comparison to expressive suppression, cognitive reappraisal reduces the susceptibility to the framing effect [20]. Panno and colleagues [21] found that the reappraisal strategy may have operated mainly via decreasing the attention given to negative aspects of the risky choices.

Heilman *et. al.* [22] showed that cognitive reappraisal increases risk-taking levels by effectively reducing the experience of negative emotions. In contrast, Morawetz et al. [16] found decreased risk-taking and concluded that emotion regulation (i.e. reappraisal) can alter risk-related decision-making even if the emotional stimulus is incidental.

The results of the research on cognitive emotion regulation strategies reveal that emotional disorders (e.g., anxiety and

depression) and emotional traits (e.g., trait anxiety, proneness to depression) are related to types of strategies in unequal fashion. That is, strategies referred to as less adaptive, including rumination and catastrophizing, are directly related to symptoms of depression and anxiety or to emotional traits. On the other hand, the so-called adaptive strategies, such as positive reappraisal or putting into perspective, are inversely related to such symptoms or traits [3].

Risk Tolerance and the Role of Financial Literacy in Financial Risky Decision Making

Conventional theory often assumes that financial risk is objective and measured by the volatility of yields and that individuals trade-off this risk with investment return in deciding whether to purchase the product [23]. However, with the maturity of behavioral theory, it is now widely accepted the influence of behavior on risk tolerance. Risk and uncertainty are not only mathematical and statistical concepts but also psychological constructs [24].

Because financial risk plays a role in almost every important economic decision, understanding individuals' tolerance toward risk links to the goal of understanding economic behavior [25]. The critical point for behavioral finance is not how the risk is measured, but how it is perceived and tolerated. This subjective assessment of risk is important [26].

In parallel to the research on emotions and decision making, a changing global environment regarding households´ financial decisions has raised concerns. It is known that individuals are increasingly responsible for saving and investing not only their personal financial wealth but also their pension wealth [4].

Governments around the globe have started advocating a new and responsible approach to personal finance to encourage households to be more in charge of their own financial wellbeing [5]. Thus, being aware of such increasing needs, the understanding of the influence of emotions on financial risky decisions gains even greater importance.

There are several studies investigating risk tolerance and financial planning and savings behavior [4, 5, 23, 25, 27]. Studies found that financial knowledge and experience (i.e., financial literacy) is related to better planning and saving money for retirement [27, 28] and greater risk tolerance [5, 23, 25, 27]. Financial literacy (FL) can be defined as an individual's ability to use knowledge to manage financial resources effectively [27].

An essential indicator of people's ability to make financial decisions is their level of financial literacy [29]. According to literature, FL is associated with better planning and savings as well as more risk seeking [27, 28]. Substantial evidence avers that financially literate individuals exhibit a more risk-tolerant behavior and invest in risky assets to a larger extent than individuals with lower FL [25].

Research on FL and risk tolerance has suggested that FL should be incentivized among households to improve savings for retirement. The association between FL on financial risk tolerance (FRT) has received considerable attention from researchers and policymakers [25]. The traditional response to the finding that experts and non-experts have different perceptions and understandings about risk is to institute risk communication programs which were designed to "re-educate" consumers in order to bring their erroneous perceptions into line.

It might be sensible to include a discussion of individual risk perceptions and behavioral finance in the training provided to financial experts (financial advisers, financial regulators) so that they can better understand actual consumer behavior [23].

Given the current understanding of the benefits of FL to the quality of financial decisions and the efforts to find strategies for emotion regulation, it raises the curiosity to investigate the potential moderation impact that financial literacy may exert on the unwanted influences of emotions on risky decisions. It is then hypothesized that financial literacy acts as an emotion regulation tool and moderates (mitigating) the influence of incidental anxiety on financial risk tolerance. Then: H1: Financial literacy moderates the incidental anxiety on financial risk tolerance

Fig. 1 illustrates constructs for the hypothesis. Once data analysis confirms the

hypothesis, an important managerial contribution will be in place. Decision makers in both public and private sectors will be able to work towards the need for financial education improvement for households making better decisions regarding their financials. Still, a theoretical contribution will be also reached, given that providing an objective guidance for regulating unwanted emotions adds value to the emotion and decision-making research.

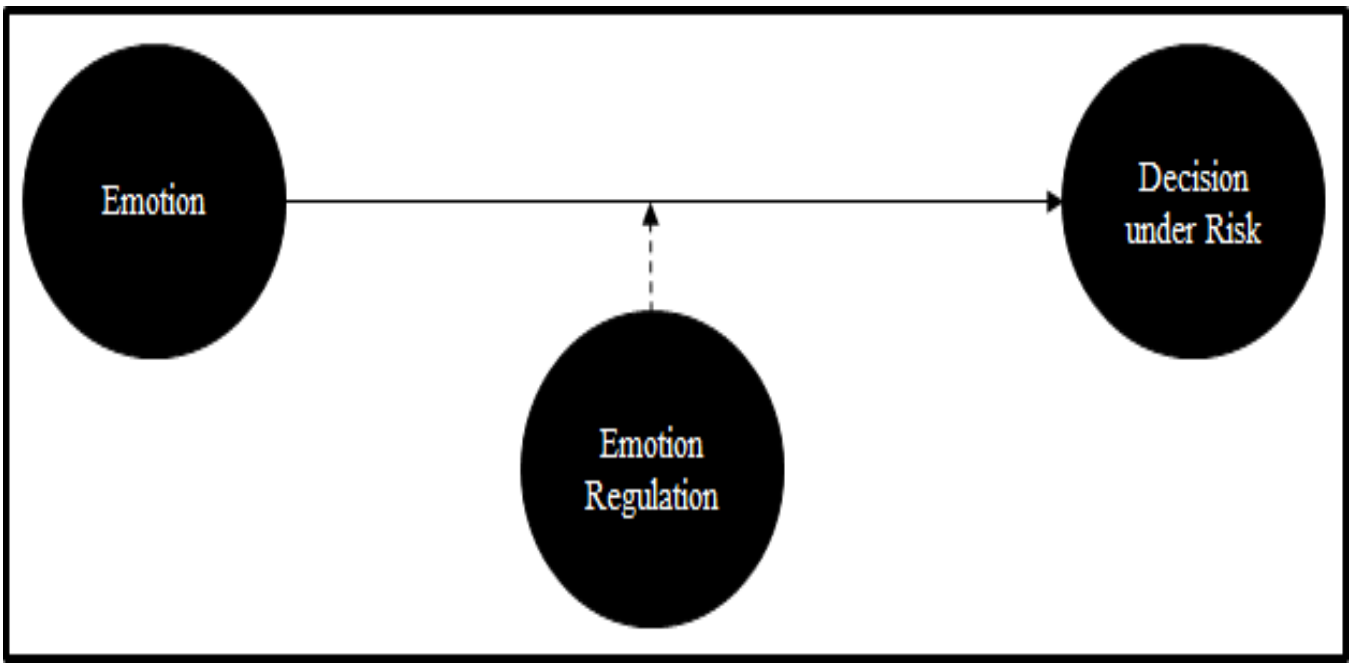

Figure 1: Constructs illustrating the hypothesis of the moderating impact of financial literacy (emotion regulation) on the influences of incidental anxiety (emotion) on financial risk tolerance (decision under risk)

MATERIALS AND METHODS

Two experiments were conducted to investigate the role of FL potentially contributing to reappraisal (i.e. emotion regulation strategy) and moderating the influence of incidental anxiety on financial risk tolerance. It firstly tested the impact of financial literacy on financial risk tolerance in individuals not influenced by any stimuli (Experiment 1). It is expected that financially literate individuals present higher financial risk tolerance than those illiterates, according to the financial literacy research [5, 23, 25, 27].

Then, in Experiment 2 - part 1, it tested the effects of incidental anxiety on FRT relative to a neutral control condition. It was expected that incidental anxiety influenced individuals by increasing preference toward risk aversion, in line with previous studies about the effects of anxiety on risky decision making developed by Raghunathan & Pham [30], Maner et al. [31] and Gambetti & Giusberti [32]. Finally, in Experiment 2- part 2, it tested the hypothesis of this study, it is, the moderating impact of FL to minimize the influence of incidental emotions on FRT. It was expected that financially literate individuals maintain their characteristic of being more risk tolerant than those illiterate despites are influenced by incidental anxiety, confirming the potential utilization of financial literacy as an emotion regulation tool for financial decisions.

In order to assess financial risk tolerance of respondents, it used an adapted version of Grable and Lytton's [33] risk tolerance scale (GL-RTS). The scale used to measure financial literacy of respondents (FL questionnaire) is an adapted version of the questionnaire built by Rooij, Lusardi and Alessie [34].

The influence of incidental anxiety on participants was made through a 4-minutes priming video. Priming power was pre-tested and confirmed. Once the scales were defined, it was then determined the data analysis techniques used to evaluate each of the hypotheses. Based on the study of Mazzon [35], a matrix was created for linking research objectives, hypothesis, variables and data analysis techniques.

Table 1: Methodological linking matrix

Methodological linking matrix			
Research objectives	**Research hypothesis**	**Research variables**	**Data analysis technique**
Investigate the moderating impact of financial literacy (supporting reappraisal) on the influences of incidental emotions on FRT	H1: financial literacy moderates the influence of incidental anxiety on FRT	Financial literacy = IV (exp. 1) FRT assessment = DV (exp. 1 & 2) Financial literacy = CO (exp 2) Emotions = IV (exp 2)	One-way ANOVA ANCOVA

FRT: Financial Risk Tolerance
DV: dependent variable; IV: independent variable; CO: covariate.
Source: Adapted from Mazzon [35]

Experiment 1 - Procedure

Twenty-eight participants (22 male) were randomly selected among students from the Business School of the University of São Paulo. They first resolved the FL questionnaire. Fifteen minutes were given to participants to complete the task. After that, participants were oriented to respond to the risk tolerance assessment. Fifteen additional minutes were given to participants to complete the second task. A One-Way ANOVA was applied to evaluate responses.

Experiment 2 (Part 1) - Procedure

Fifty-three students (31 male, 6 preferred not to respond) from the Business School of the University of São Paulo participated in the experiment. Participants were randomly split into 2 groups. Both groups were initially requested to complete the FL questionnaire. It was given participants 15 minutes to complete the task. After testing financial literacy, the first group (N=26) received the request to fulfill the financial risk tolerance assessment (GL-RTS) without any prior stimuli (*control group*).

The second group (N=27) was called the *anxiety group* and watched a video to influence participants with incidental anxiety prior to the fulfillment of the financial risk tolerance assessment.

It was given participants another 15 minutes to complete the risk assessment. 4 missing data were found in each of two registers of the *anxiety group*, so they were eliminated from analysis. One outlier of the *control group* was also eliminated, with the remaining 50 valid registers being N=25 for both the *control group* and the *anxiety group*. It employed a One-way ANOVA to analyze results.

Experiment 2 (Part 2) - Procedure

It investigated if financial literacy may act as a potential moderator of the influence of emotions on financial risk tolerance. A One-way ANOVA was firstly employed to compare financial risk tolerance (dependent variable) between literate and illiterate individuals influenced by incidental anxiety (independent variable).

Then, ANCOVA was used to analyze to what extent financial literacy (covariate) moderated the influence of anxiety (independent variable) on financial risk tolerance (dependent variable).

RESULTS

Experiment 1

A Shapiro-Wilk test was applied and evidenced normality of distribution. Additionally, linearity was also tested, comparing the independent variable (literacy) and dependent variable (risk tolerance). Linearity was evidenced.

As expected, financially literate participants presented greater risk tolerance in the total risk assessment (M=19.08) than financially illiterate individuals (M=16.44; F=10.681; $p<0.01$). Fig. 2 illustrates mean differences between financially literate and illiterate respondents.

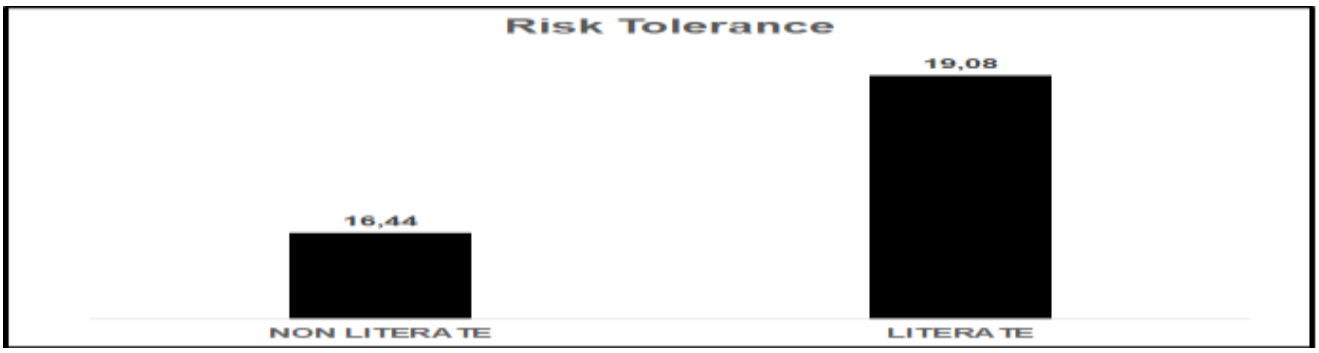

Fig. 2: Risk assessment, Mean results for financially literate and illiterate respondents.

Experiment 2 (Part 1)

Individuals influenced by incidental anxiety chose more risk-averse options in the total risk assessment results (M=18.08) than those not influenced (M=19.82; F=4.621; p<0.05).

Fig. 3 illustrates mean results for the risk tolerance assessment. A Shapiro-Wilk normality test was applied and evidenced normality of distribution. Additionally, a Levene Statistics evidenced homogeneity of variances.

Fig. 3: Risk assessment comparing anxiety group and control group. Anxious participants preferred more risk-averse options.

Experiment 2 (Part 2)

ANOVA confirmed the influence of financial literacy on financial risk tolerance within the *anxiety group*. Financially literate individuals were less influenced by incidental anxiety (N=11; M=20.27) than the financially illiterate respondents (N=14; M=16.36; F=19.5; p<0.01). This analysis used the anxiety group only. Fig. 4 illustrates results.

Then, ANCOVA showed significant influence of both anxiety (F=10.061; p<0.01) and financial literacy (F=14.545; p<0.001) on financial risk tolerance and provided support to the moderating impact of financial literacy. It is associated with 24% of total variance with observed power of 96.2%. Anxiety is associated with 17.9% of variance and power of 87.4% (see TABLE 2).

Figure 4: Risk assessment scores - financially illiterate individuals chose more risk-averse options than those financially literate.

Table 2: ANCOVA showing the influence of financial literacy as a covariate in the total risk tolerance assessment

Between Subjects effect test Dependable variable: Risk Tolerance				
Origin	**F**	**Significance**	**Squared ETA**	**Power**
Adjusted model	7,893	0,000	0,340	0,984
Intercept	1524,203	0,000	0,971	1
Emotion	10,061	0,003	0,179	0,874
Literacy (dummy)	14,545	0,000	0,240	0,962

DISCUSSION

Research on emotion and emotion regulation have been evolving and evidencing how important it is to be aware of the unwanted impacts on decision making. Understanding how dealing with such (incidental) emotions is of utmost importance [16]. This study aimed to propose an objective tool for helping mitigate such unwanted influences. Following current research, authors suggest that strategies involving choice architecture provide the most promising avenues for regulating emotions [3].

Experiments 1 and 2 found that financial literacy not only influences financial risk tolerance but also moderates the influence of emotions on financial risk tolerance. Financially literate individuals could shield themselves from the influence of incidental anxiety while financial illiterate individuals were clearly influenced. In other words, financially literate individuals are capable of changing the framing and structure of choices and better evaluate risk even when influenced by incidental emotions that cause risk aversion.

These are interesting findings that deserve special attention, since policies regarding retirement have been changing worldwide. Saving and preparing for retirement have been increasing in importance. Governments have started encouraging households to be more in charge of their own financial wellbeing [5]. Therefore, investing has gained increased importance. But most people are not ready for this profound change. World's current financial literacy levels are not motivating.

The lack of financial literacy, even in some of the world's most well-developed financial markets, is of acute concern and needs immediate attention [29]. Research on financial literacy and risk tolerance has suggested that financial literacy should be incentivized among households to improve savings for retirement [25]. Then it seems clear that financial literacy can be used as a robust tool for meeting public policies goals, improving decision making on both technical and behavioral sides.

Together with the change in the rules for retirement, policy makers must create means for lay people to improve their financial literacy. Actually, the culture of savings during the lifetime should be part of formal education from childhood. It looks like a poor decision-making process from governments worldwide to change (tighten) retirement policies not followed by a robust social program to support people on how to maintain a reasonable standard of life after retirement through saving and investing during their working years. In truth, future issues with economies can be mitigated if people are able to live supported by themselves, free of governments' aid programs.

Conclusively, financial education can not only help individuals to choose better investment options, but as found in this research, it can also avoid individuals to be influenced by unwanted emotions which may drive investors towards wrong investment choices. Not only in the financial field, but this research's findings are interesting for other dimensions as well. People have to make financial decisions. There are emotions influencing them and there is financial literacy helping people change (for better) their future. It is time to financially educate people and let them change their worlds.

CONCLUSION

It was evidenced that individuals with higher FL are capable of mitigating the influence of emotions on decision making under risk.

Experiment results show that financially literate individuals were less influenced by incidental anxiety than the financially illiterate respondents. Research on FL and risk tolerance has suggested that FL should be incentivized among households to improve savings for retirement [25].

Results contribute to research on emotions and decision making, showing that there are variables (i.e., skills such as financial literacy) that can help mitigate the harmful influences of incidental emotions on financial decision making. More specifically, findings support the role of financial literacy in contributing to emotion regulation strategies as reappraisal to mitigate unwanted influences of incidental emotions on financial risky decisions.

Findings also leave practical contributions, given that the recent changes in public policies worldwide regarding retirement brings additional responsibility for households. Formal financial education programs provided by governments helping households to make improved financial decisions during working years can support them to maintain reasonable life standards after retirement. Therefore, financial education can avoid individuals being influenced by unwanted emotions which may drive households towards non optimal investment choices.

A concern to be carefully investigated in future research when using financial literacy as a moderator for the influence of emotions in financial risky decisions is the potential development of familiarity bias. Since financial literacy increases familiarity with risky assets or fund managers, according to the affect heuristics [36], the perception of risk for those products may reduce and the individual may take a biased decision, taking too much risk.

It is suggested that future research carry on investigating financial literacy as a tool to improve reappraisal as an emotion regulation strategy for financial decisions given the growing importance of savings and financial planning in our lives. It is also suggested the addition of personal profiles (personality traits) as an additional variable in the model, together with financial literacy. It could help explain how distinct individual behavioral characteristics are influenced by incidental emotions and the power of financial literacy in moderating their influence in each group of profiles.

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