

Impact of Behavioral Finance/Economics on Investment Decisions

Vidur Relan^a

Abstract

This paper investigates the impact of certain behavioral and psychological factors on financial investment decisions. The study of behavioral finance underlines the impact of psychological elements on financial markets progression. This paper will further explain how certain cognitive and emotional factors influence irrational decision making by people. Generally financial investors have very limited number of deviations from rational behavior. They lay emphasis on taking rational decisions which are focused on achieving the maximum amount of returns from their investments with a certain degree of bearable risk involvement. The behavioral finance paradigm suggests that financial decisions are largely influenced by emotional and cognitive factors.

JEL Classification: **G40, G41**

Keywords: Behavioral Finance, Overconfidence bias, Investor Rationality

1. Introduction

In today's world, finance-related decisions are an everyday occurrence. It is of vital importance for young individuals to learn to make rational decisions. These decisions irrespective of its relevance involve an element of risk. From an investor's perspective, the parallel decision should result in a positive return with a minimum level of risk. Every investor acknowledges the idea that a higher risk will result in a greater return, given that there will be a tradeoff between the two. In simple terms, an investor needs to evaluate the various investment opportunities before making assertive decisions.

Behavioral finance is a field of study that explains how decision making by individuals is dependent on various cognitive and personality factors which influences irrational decision making by individual's (Durand, Newby, and Sanghani 2006; Murgea 2010; Thomas and Rajendran 2012; Venter, Michayluk, and Davey 2007). This paper is an attempt to understand why at times individuals deviate from rational decision making because they overlook a number of behavioral and emotional factors, which actually are the primary reason for this deviation.

It is extremely essential for individuals to assess the possibility of experiencing psychological biases while making investment related decisions. Two factors affect this decision: the financial risk tolerance and risk taking ability. Conventional finance defines that individuals prefer numerical data and an analysis of it before arriving at investment decisions. This paper further explains how certain (behavioral finances) that are a relatively new occurrence are presenting a greater challenge under this rapidly changing world of investments. Moreover, financial investing is performed at a younger age, from making the appropriate decisions that involve educational loans, mortgage or lease plans, and many more. Once again, each of these decisions involve an assessment of the risk to avoid potential losses in the future.

Lack of knowledge or experience often results in these behavioral factors having a negative effect on the decision making process (Leppinen,2013). Financial risk tolerance which varies from individual to individual also plays a huge role. Every individual needs to be able to cope with the level of uncertainty and volatility in the financial world in order to be able avoid being risk averse in the future.

Age plays an important role in determining one's financial tolerance, and has contradictory effects on individuals. As per a research conducted by Yao et al. (2011, p. 883), financial risk tolerance decreases with age. In simple terms, a young individual is likely to be more risk tolerant than an older one. On the other hand, a contradictory research conducted by Wang and Hanna (1997, p.30) asserts that older individuals are likely to be more risk tolerant than young ones. This paper also takes into account the effect psychological biases have on decisions involving risk and finance at an undergraduate level. To better understand these theories, a survey was conducted among a hundred of Bryant University students in order to recognize the different risk taking abilities of individuals associated with different age groups and the variations in their thought process. Overall, the survey better explained the impact of specific biases such as overconfidence and risk aversion in the decision making process experienced by undergraduate students.

2. Literature Review

Park, Konana, Gu, Kumar and Raghu Nathan completed a study to show the relation between confirmation bias and investment performance. The study carried out an analysis of 502 investor responses in South Korea to support this. It inferred that investors with stronger confirmation bias exhibit a greater level of overconfidence. They have higher expectations of their performance, trade more frequently, yet obtain lower realized returns

A study conducted by Verma (2006) evaluated and identified the various behavioral biases involved in decision making, especially in investment and the subsequent impact of behavioral biases involved in decision making. The study also investigated common biases that include confirmation bias, overconfident bias, representatives' biases, familiarity biases, loss aversion and disposition effect. Overall, it helped developed strategies to overcome such type of

biases.

In one of the studies conducted by Birau (2012), the influence of psychological factors on the evolution of financial markets is discussed. It refutes the contention of classical finance where investors are rational and focused to select the most efficient portfolio – a portfolio with the most optimal combination of risk and return. According to this article, psychological and emotional factors have a critical role in determining investment decisions and therefore, how investors are not always rational in their approach.

It highlights the fact that Behavioral finance is a revolution in financial theory and it is the combination of financial theory with social sciences that has surfaced the way for behavioral finance. It emphasizes the fact that even though the same information may be available to all investors, certain psychological factors can limit their ability to arrive at the same rational investment decision.

Another study done by Coffie (2013) was conducted to understand the impact of behavioral finance theories on investment decisions. The objective is to understand the correlation between investment strategies and behavioral finance theories. The study has been conducted from the perspective of an uneducated investor in order to provide knowledge for future investment decisions. It is an attempt to see how psychological factors play a role in making the investors make the choices that they do. By doing that the uneducated investors can understand the issues that affect their decisions and how with that knowledge they can be better off in the future

The study relied on both, qualitative and quantitative methods to arrive at its conclusion. It also explained how an uneducated investor with lack of knowledge and awareness is influenced by psychological facts, and this results in making irrational investment decisions. The study also reinforced the position of the behavioral finance theories as a resource to explain the anomalies in money markets that cannot be explained by the efficient market hypothesis.

3. Empirical Methodology

As aforementioned, a survey was conducted among Bryant University undergraduates to understand the impact of certain biases, like overconfidence and risk aversion, have on their ability to make investment decisions. The survey was approved by the Institutional Review Board (IRB) and distributed online through Qualtrics. The responses were anonymous and students were selected on a random basis for the accuracy of results. Moreover, the main objective of this study was to understand the ability of risk taking and level of confidence associated with millennials at an undergraduate level.

The questionnaire in the survey was designed to assess the student's ability to take risks and to evaluate their confidence levels. By including close ended questions, the survey served the purpose of assessing risk levels and confidence levels of all undergraduate students from all class standings. The questionnaire included two segments: first background of the students (demographics) such as their class standing, gender and their international status. Second segment was about the student's prior experience with such financial investments (to conduct a risk analysis). Additional situation based questions were also included to assess their confidence levels (to conduct an overconfidence bias analysis). In terms of methodology, random sampling was performed to accurately represent the entire population of the university. It was as important to survey a wide variety of students to receive a varied/unbiased response rate.

3.1 Linear Regression

$$INS = \beta_0 + \beta_1(PR) + \beta_2(RB) + \beta_3(RP) + \beta_4(G) + \mu \quad (1)$$

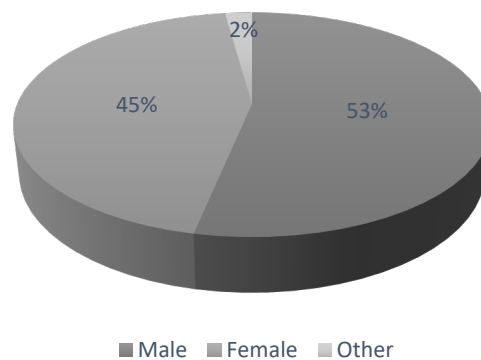
$$IC = \beta_0 + \beta_1(PR) + \beta_2(RB) + \beta_3(RP) + \beta_4(G) + \mu \quad (2)$$

For the purpose of this empirical study we ran simple linear regression using two regression models. This first model included *INS* which stands for *Investment into a new stock/company* as the dependent variable and *PR* (*Prior risk experience*), *RB* (*Risky behavior*), *RP* (*Risk preference*) and *G* (*Gender*) as the subsequent independent variables. The second model includes

IC (*investment into cryptocurrency*) as the dependent variable in order to verify the correlation between the dependent variables and the independent variables from the first model. The two models help us understand the correlation between each independent variable and the dependent variable. The functional forms of the regression models can be seen above.

3.2 Demographics

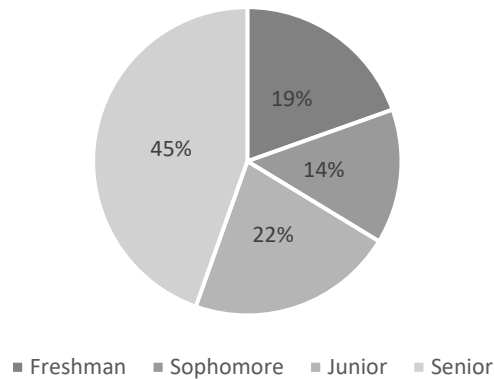
Figure 1: Gender Breakdown



Source: Authors Compilation

Gender was included as one of the main demographic variables in this study. As can be seen in figure 1, 47% of the respondents were females and 53% were males, which is a fair representation of the population at Bryant University. In other words, the percentage of females and males in this sample corresponds to the actual population. Other than gender, undergraduate class standing was the other demographic variable included in this study. As can be seen in figure 2 the survey represents a reasonable distribution of class standings between Freshmen (19%), Sophomores (14%), Juniors (22%) and Seniors (45%).

Figure 2: Undergraduate Class Standing



Source: Authors Compilation

3.3 Demographic analysis

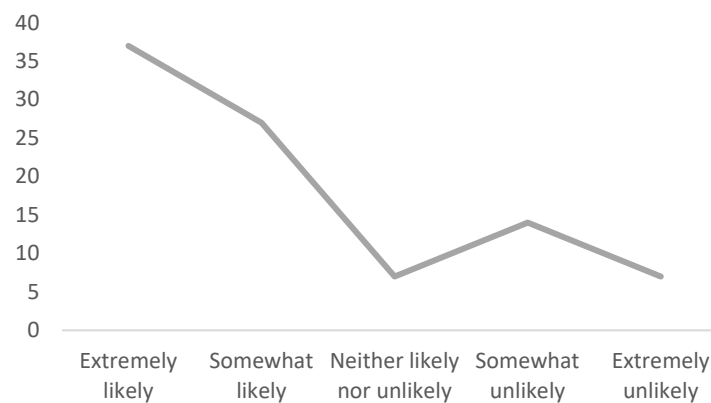
The results achieved from this survey indicate that females are less resistant towards taking risks in comparison with males whom are more risk tolerant. Prior research conducted by (Cooper et al., 2014, p. 279; Faff et al., 2008, p. 21; Grable, 2000, p. 628; Grable & Lytton, 1998, p. 68; Hallahan et al, 2004, p. 67; Hawley & Fujii, 1993) asserts my analysis of females, despite of different approaches, are significantly less financially tolerant. The study by (Hallahan et al., 2004, p.75) also suggests that the biological characteristics of genders play a role in explaining the differences in financial risk tolerance among females and males.

3.4 Risk analysis

Economists state that individuals prefer to avoid risky situations, which exhibit a common perception of individuals being classified as risk-averse (Snyder & Nicholson, 2011, p. 194). According to Dyer & Sarin, (1982, p.882) a risk averse person responds conventionally in risky situations. According to Weber and Milliman (1997, p.123), individuals are considered risk averse if they would choose a definite amount of money over a lottery or gambling with predicted value returns. However, an individual is considered a risk-taker if he or she would choose the lottery over a guaranteed return on investment. Moreover, an individual would also be considered as risk

neutral if he or she is indifferent towards choosing between the two options. According to Perloff, (2012, p. 605) such individuals are likely to choose the option with the highest expected value in order to maximize utility.

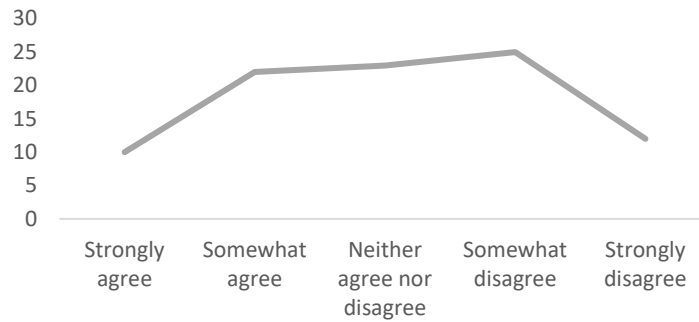
Figure 3: Individuals likelihood of indulging into Risky Behavior



Source: Authors Compilation

In order to conduct a risk analysis, a few hypothetical questions were included to evaluate an individual's risk taking ability. In regards to the purpose behind this research, the likelihood of undergraduates willing to indulge into risky behavior such as trying out adventurous sports, better defined their ability to taking risks in general. As Figure 3 indicates, majority of the students seemed to indulge in risky behaviors (adventurous sports or over speeding), which further established a correlation with their risk taking ability. However, an interesting observation with undergraduate students to consider is that their risk factor while budgeting is low; many students are less likely to take risks with investing their own finances, hence making them more risk averse.

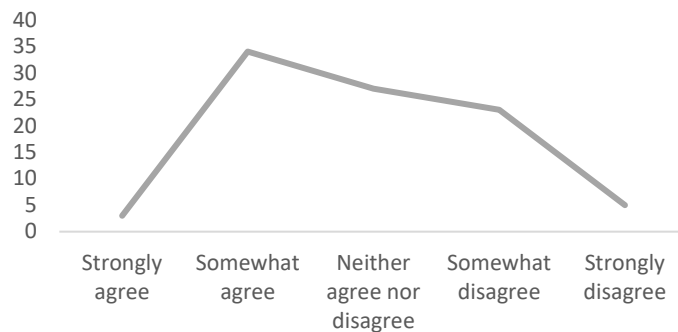
Figure 4: Financial Investments with college allowances



Source: Authors Compilation

Figure 4 indicates that even if a large percentage of students are less likely to invest their own funds while being in college, there were still a number of students with limited financial resources who were willing to take financial risks to an extent.

Figure 5: Individual's likelihood of Future Investment in the Stock Market



Source: Authors Compilation

Figure 5 indicates a response trend from the survey which implies that as individuals would grow older and would be in a better financial position, they were more likely to make financial investments and be less risk averse.

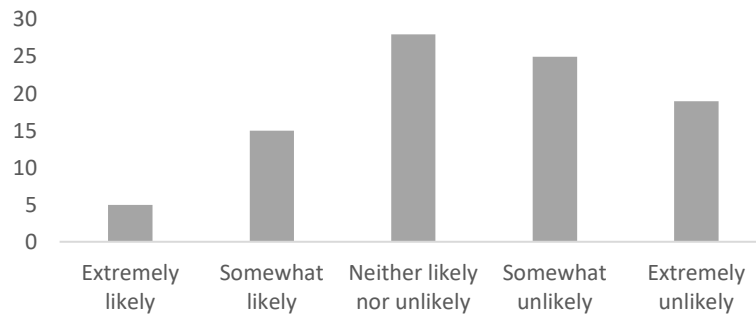
3.5 Confidence level analysis

One of the most well recognized behavioral biases is overconfidence. People tend to act with overconfidence given their knowledge, expertise, and prospects for the future (Barber & Odean, 2001, p.261). Research conducted within the psychological field illustrate findings that point to the fact that both, men and women express overconfidence, although men are generally more inclined to demonstrate it. (e.g. Lundeberg et al., 1994). Similarly, Barber and Odean (2001, p.262) argue that this is related to the fact that men have higher level of stock market experience than women. Moreover, in Lundeberg et al.'s (1994, p.115) research, males in particular among all the students exhibited the highest degree of overconfidence. The authors also noted that male students showed overconfidence even when they were incorrect, and to a larger extent than female students.

While this research will try to investigate self-perception and overconfidence, this will contribute as a potential bias to better explain certain behavior and choices while analyzing the participants' response behaviors. As aforementioned, overconfidence plays an influential role in behavioral biases and it is important to acknowledge as an important theory in this research.

In order to understand the impact of overconfidence bias on decision making by young individuals in this study, the survey responses from specific questions was observed to understand their confidence level both in general circumstances as well while making financial investments.

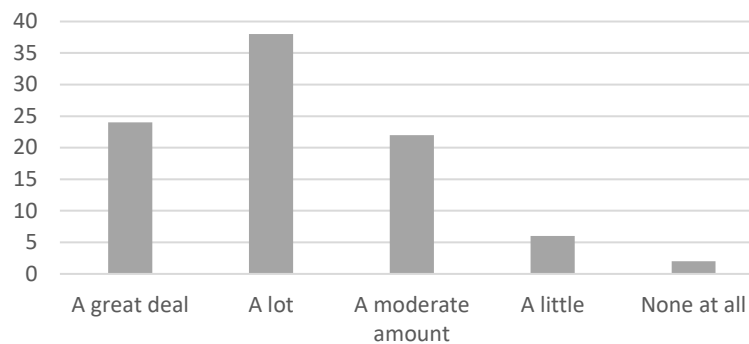
Figure 6: Financial Investment loss



Source: Authors Compilation

Students were questioned about their likelihood in investing into a company/stock given their previous experience with a loss. As seen in Figure 6, although majority of the responses were neutral in this case, 48% of the individuals seemed less confident and were unlikely to take the same risk once again. This was perceived as higher than expected, especially in comparison to individuals willing to make the same investments again.

Figure 7: Individual's reliance on self confidence



Source: Authors Compilation

On the contrary, an individual's self-assessment of their reliance on self confidence in general circumstances (not financial) was observed through another question. As seen in figure 7, most students tend to be extremely confident in risky situations that do not involve financial risk.

However, their reliance on self-confidence was significantly lower when it came to taking risks associated with their finances.

3.6 Correlation Analysis

The performed correlation relation analysis as seen in Table 1 measures the strength of the relationship between both the dependent and independent variables, two at a time. The correlation as mentioned before can take a value between -1 and +1, where -1 represents a negative correlation implying that an increase in the value of one variable leads to a decrease in the value of the other and vice versa. A positive correlation on the other hand implies that an increase in the value of one variable leads to a similar directional change in the value of the other one. This means that an increase in the value of one variable would lead to an increase in the value of the other and vice versa. Also, when two variables do not show any correlation, the numerical value of the correlation is 0.

The performed correlation analysis in Table 1 helped us analyze the strength of association between investment in a new company/stock (dependent variable) and the independent variables. From the mentioned variables in the table, we observed a positive correlation of 0.3481 between people's participation in risky behavior such as over speeding or trying adventure sports and their likelihood to take risks with their financial investments in the form of investment into a new stock/company. Further a positive correlation of 0.3638 was observed between individuals choosing to be risk takers when asked about their risk preferences and their risk taking ability with financial investments. Also through the models we are able to observe a positive correlation of 0.1580 between gender and risk taking ability of individuals in the form of investment into a new company/stock.

The other mentioned significant variable that was included was found to have a negative correlation of -0.0617 indicating that as an individual's risk experience increases, he/she is less likely to take risk with financial investments.

Table 1: Correlation Analysis

	(1)	(2)	(3)	(4)	(5)	(6)
(1) IC	1.0000					
(2) INC	0.5427	1.0000				
(3) Riskpreference	0.3638	0.4605	1.0000			
(4) RiskyBehavior	0.3481	0.3821	0.5346	1.000		
(5) RiskExperience	-0.0617	-0.0300	-0.0716	-0.0394	1.000	
(6)Gender	0.1189	0.1580	0.1019	-0.0146	-0.1222	1.000

3.7 Linear Regression analysis

This empirical study adopted the repression models from a study done by Gustafsson and Omark (2015). In addition to the correlation analysis performed in table 1, we also performed a regression analysis. This was done to understand the relationship between the two independent and the subsequent dependent variables. The results of the regression analysis can be seen in table 2 and 3 for the two dependent variables respectively. From the analysis we got a result of 7.40 for the F-test. Further for the R adjusted squared gave a result of 0.2197 in table 2 which tells us about that efficiency of this data. It also tells us that the lower value is punishing us for probable omitted variables. We observed a similar analysis in table 3 for our other dependent variable.

As can be observed in table 2, In case of INC as our first dependent variable Risky behavior (RB) was found to be significant at .170($\alpha < 10\%$) and Risk preference (RP) was found to be significant at 0.3027 ($\alpha < 10\%$). Whereas in table 3, case of our second dependent variable IC, Risky behavior (RB) was found to be significant at 0.1950 ($\alpha < 10\%$) and risk preference (RP) was found to be significant at 0.2141($\alpha < 10\%$).

Table 2: Investment into a new stock/company (INC)

	Coefficient	Std. Error	T-statistic	P Value
Risk Experience	-.0201942	.1047317	0.19	0.848
Risky Behavior	.1700773	.0922614	.1.84	0.069
Risk preference	.3027155	.0983794	3.08	0.003
Gender	.2839985	.5013058	2.42	0.0176
R ²	0.2540			
F- Statistic	7.40			

Table 3: Investment into a new cryptocurrency (IC)

	Coefficient	Std. Error	T-statistic	P Value
Risk Experience	-.0285234	.1141131	-0.25	0.803
Risky Behavior	.1950341	.1005258	1.94	0.056
Risk preference	.2141795	.1071918	2.00	0.049
Gender	.2187641	.2265923	0.97	0.337
R ²	0.1754			
F- Statistic	4.63			

4. Limitations

The limited availability of the numeric data on a topic like behavioral finance was one of the biggest challenges of this study. The focus of this study was limited to 95 Bryant university students and the survey was only able to cover limited psychological and behavioral biases. Due to the limited sample size, a bias in the data may also observed.

Furthermore, some contradicting views of the same correlation posed another challenge from a research perspective. For instance, the study by Yao et al. (2011, p. 883) suggested that financial risk tolerance of persons decreases as he/she grows older. However, a contrary study by Wang and Hanna (1997, p. 30) suggested that older individuals are found to be risk tolerant in

comparison to young ones. Another limitation of this study was the restricted financial position of undergraduate students at their current stage which made them more risk averse when it came to financial investments. A more varied response base and maybe inclusion of alumni in our demographics who have a better financial position and who are more likely to take risks with investments could help us further improve upon the accuracy of this study.

5. Conclusion

This paper was an attempt to establish the impact of psychological factors on decisions made by individuals making financial investments. The objective was to prove that because of the presence of these factors, financial investors are not able to make rational decisions. The focus of this study was assessing the risk-taking ability and confidence levels of millennials at an undergraduate level. From the empirical research, we were able to conclude that individuals, as they grow older and gain more market experience/knowledge, were less likely to risks associated with financial investments.

From the research, it was also concluded that individuals who were more likely to indulge into risky behavior such as trying adventure sports or over speeding were more likely to take risks with financial investments. A difference in choices between females and males was also observed in terms of their ability and willingness to take financial risks. It was found that females are less likely to take these kind of risks in comparison to males.

Overall from the paper, we were able to understand that young undergraduates are more risk averse when it comes to making financial investments taking into consideration their limited financial position. The confidence level analysis helped us understand that individuals were fairly confident when it came to facing risk in general circumstances. However, they seemed to less confident when it came to investing their personal finances. In order to be effective investors, individual's need to take into account psychological factors such as overconfidence bias and risk aversion and ensure that these biases do not become a hindrance to their rational decision making.

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Appendix:

Questionnaire

Impact of Behavioral Finance/Economics on Investment decisions

Start of Block: Consent

You are invited to participate in a study of risk behavior among young undergraduates. Through this survey, we hope to learn more about the impact of Behavioral Finance and Economics on investment decisions at an undergraduate level. You were selected as a possible participant in this study because of your facilitation with Bryant University and because you fall into the category of undergraduates which is the primary focus of this study. If you decide to participate, we will conduct an experiment involving you answering a few questions which help us observe different risk-taking behavior by students. The survey is anonymous and should take about 2 minutes to finish. You would only be required to participate once. Any information obtained in connection with this study will remain confidential and will not be disclosed to the general public in a way that can be traced to you. In any written reports or publications, no participant other than the researchers will be identified, and only anonymous data will be presented. You have the right to discontinue your participation in the survey at any time. Closing the survey window will erase all your answers without submitting them. You will be given a choice of submitting or discarding your responses at the end of the survey. Thank you for your

participation.

By reading the above information you agree to your participation in the survey.

- ☐ I Consent
- ☐ I do not consent

End of Block: Consent

Start of Block: Survey

Q1 Gender

- ☐ Male
 - ☐ Female
 - ☐ Other
-

Q2 What is your current class standing?

- ☐ Freshman
 - ☐ Sophomore
 - ☐ Junior
 - ☐ Senior
-

Q3 Are you an international student?

- ☐ Yes
 - ☐ No
-

Q4 Do you have any prior experience in making financial investments? (stocks, funds or cryptocurrencies)

- ☐ Yes
- ☐ No
- ☐ No but likely to in the future

Q5 How scared are you of failure?

	Very scared	Somewhat scared	Neutral	Not scared	Not scared at all
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q6 To what extent do you rely on prior experience when facing a risky situation?

	Far too much	Moderately too much	Slightly too much	Neither too much nor too little	Slightly too little
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7 To what extent do you rely on your current knowledge when facing a risky situation?

	A great deal	A lot	A moderate amount	A little	None at all
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7 Would you invest your college allowances in the stock market?

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q8 How likely are you to try adventure sports? (Ex: Bungee jumping, skydiving, deep sea diving etc)

	Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q9 To what extent do you rely on your self-confidence when facing a risky situation?

	A great deal	A lot	A moderate amount	A little	None at all
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q10 Do you consider investing in the stock market too risky?

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q11 Would you consider yourself as someone who is risk-averse or risk-neutral or a risk taker?
(Risk preference)

	Risk Taker		Risk Neutral		Risk Averse (Reluctant to take risks)
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q12 How Likely are you to invest your finances in a new company/stock/investment fund?

	Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q13 Consider a hypothetical situation in which you lost some money in a financial investment (For instance in Cryptocurrency). How likely are you to invest in the same currency again?

	Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q14 While driving, how likely are you to speed right after getting a ticket?

	Extremely likely	Somewhat likely	Neither likely nor unlikely	Somewhat unlikely	Extremely unlikely
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>