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Qualitative analysis of the influence of biases and emotions on decision-making in stock markets: the case of individual investors

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ABSTRACT

Using a qualitative experimental design underpinned by elements of experimental finance, we analyze decision-making processes on stock markets, using a student population. The various results obtained, based on the tools used (open and closed questionnaires as well as trading journals), demonstrate the presence of certain biases (representativeness bias, rank bias, presence of heuristics and "all that glitters attracts") and the influence of specific emotions (anger, fear, anxiety and sadness) in decision-making. The conclusions drawn from the analysis allow us to suggest that the development of biases and emotional pressure are strongly conditioned by the general context in which decision-making takes place, as well as by some socio-demographic characteristics of the participants (in particular, gender).

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Introduction

Unlike institutional investors, individual investor's decision-making on stock markets appeared to be deeply influenced by their emotional reality as well as by various cognitive and behavioral biases. According to Kabbaj (2015), there are two main categories of market participants with different profiles: novices and amateur managers (the main victims of emotional fields and psychological biases) and professional investors (dealing with their emotions and little subjects to the effects of psychological biases because they are using long-established procedures). While classical theories of finance build an "idealized" vision of individual investors, describing them as perfectly rational (i.e. methodically evaluating costs and benefits to maximize their level of satisfaction, Roland-Lévy and Kmiec, 2016), their limited cognitive capacities and the abundance of information would render this assumption of rationality implausible (Pak and Mahmood, 2015). In line with Mushinada (2020), we postulate that individual investor's behaviors reflect complex logics of thought, simultaneously rational and irrational.

Our research question will be as follows: to what extent do emotions and (behavioral and cognitive) biases based on some socio-demographic variables could influence decision-making on the stock markets? For this purpose, we have adopted a qualitative methodological approach, based on the specific field of experimental finance. Experimental finance relies on the use of controlled experiments (called laboratory experiments) to study decision-making behavior in a simulated or real environment. To justify our positioning, we refer to Floyd and List (2016), for whom field experimentation would provide a more precise understanding of decision-making in finance. In terms of sampling, we worked from a sample of students following a university course that included financial components. In the field of experimental finance and, more generally, in the analysis of the effect of emotional fields on decision-making (Rossignol et al., 2007; She et al., 2017), the use of student populations is widely accepted (see the study by Ackert et al., 2003) and seems to make sense (Biais et al., 2005; Bruguier et al., 2010; Widyarini, 2017). In terms of incentives and

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considering the study by Dorn and Sengmueller (2009), students not directly interested in the financial value of portfolios might tend to overplay, as the experiment would be understood like a game. We thus propose an incentive in the form of an increase in the exam mark for the three best valued financial portfolios. The introduction of incentives would ensure that the subject's choices correspond to his or her preferences (Etchart-Vincent, 2006). In the absence of an incentive mechanism, the participant might choose to minimize his or her effort, which would be detrimental to the quality and reliability of the data collected. In general, the methodologies chosen to assess the possible influence of emotions and biases on decision-making remain very much rooted in a quantitative perspective (Widyarini, 2017; Stevenson and Hicks, 2016; Bubic and Erceg, 2018; Kumalasari et al., 2022). Results from quantitative processing would tend to be limited to highlighting cause-and-effect links from large sample sizes, without necessarily controlling for the human psychological specific features. Other approaches have emphasized the use of neurophysiological measurements. For example, skin conductance has already been used in some studies to analyze the influence of emotions on the decisions of non-professional investors (Hinvest et al., 2021). However, the literature also shows a growing interest in the use of qualitative methodologies (Severin et al., 2022), which can follow different directions. The meta-analysis carried out by Pérez-Sánchez and Delgado (2022) shows that, in most qualitative studies, data relating to individual investors is collected either orally (21 out of 25 studies), on the basis of written documents (3 out of 25 studies), or through focus groups (one study).

In summary, we believe that the qualitative orientation envisaged is even relevant because, firstly, there is a chronic under-representation of approaches of this type in the field of individual investor decision-making. Secondly, we postulate that the analysis of decision-making processes requires an understanding of the influence of emotions and biases, which presupposes an in-depth knowledge of the psychological reality of individuals. Our article has a two-fold scientific added value: firstly, an analysis of individual investor behavior based on potentially observed biases and developed emotions; secondly, a qualitatively oriented methodological approach based on a general analytical framework derived from experimental finance. The results obtained from this inductive approach will be used to answer the research question and to confirm or revisit results from other methodological perspectives.

The remainder of this article will be structured as follows. The following section will review the existing literature relating to the concepts used in this research. The section dedicated to methodology will describe how the participants were selected, the general methodological context and experimental design, the methodological approach and the measuring instruments used throughout the experiment. The results section will present the elements that will enable us to answer our research question. Another section will be devoted to discussion of the study's main findings in relation to previous research. Finally, the limitations and avenues for future research are discussed.

Literature Review

The Influence of Socio-Demographic Characteristics on Decision-Making

Before the emergence of emotions and the development of biases, literature highlights that the latter would be highly dependent on certain socio-demographic variables, including the individual's level of education (Guiso et al., 2001), gender (Joshi et al., 2022), age (Rekik and Boujelbeneau, 2013) and past experiences (Mouna and Anis, 2015).

For the purposes of this study, we selected the following socio-demographic elements:

i. Gender;
ii. Age;
iii. Personal interest in financial matters (approached by more or less regular consultation of stock market websites);
iv. Educational interest in financial reality.

The Influence of Emotions on Decision-Making

For the section on the emotional framework, we first propose a definition of emotions. Secondly, we survey studies on the influence of emotions on decision-making processes. Emotions can be understood as interfaces between the cognitive evaluation of a situation, on the one hand, and human action, on the other (Van Hoorebeke, 2008). In terms of their influence on decision-making processes, Lerner and Keltner (2000) show that fear and anger have different effects on judgment. Under the influence of fear, the individual would tend to judge future events pessimistically and be less inclined to take risks (Schulreich et al., 2016), while under the influence of anger, he or she would tend to judge them optimistically. Anger would lead to risky decision-making and stock market positioning (Gambetti and Giusberti, 2012). Conversely, Habib et al. (2015) show that anger reduces risk-taking propensity, while fear has a positive influence on it. Lerner and Tiedens (2006) note that the influence of anger on the decision-maker is more complex than might have been thought: angry decision-makers would experience negative affects about past events, but they would also have optimistic expectations when it comes to predicting the probability of success in the future. Isen (2001) also demonstrated that people in a positive emotional state would be more risk averse than those in a negative or neutral mood. It also appears that a positive emotional state facilitates complex decision-making by reducing confusion and increasing the ability to assimilate information. Combining methods from psychology and economics, Lerner and Weber (2013) have suggested that sadness is not necessarily synonymous with wisdom for financial choices. This emotion would lead to financial myopia and the renunciation of future gains in favor of instant gratification. For individual stock market investors, financial decisions are said to be triggered by emotions (such as

excitement, anxiety and denial), demonstrating the key role of the inner world in understanding market dynamics (Taffler, 2014; Schunk and Betsch, 2006). Wang et al. (2014) also demonstrated that positive investor emotions would be positively correlated with returns in a bull market, and negative investor emotions would be negatively correlated with investment returns in a bear market.

For the purposes of this study, we have selected the following emotions:

i. Anger ;
ii. Disgust ;
iii. Fear ;
iv. Anxiety ;
v. Sadness ;
vi. Desire ;
vii. Happiness.

The Influence of Biases on Decision-Making

In terms of the influence of cognitive and behavioral biases in the decision-making process, they could lead to various behaviors, such as excessive reactions to market fluctuations, inadequate risk assessments, a strong focus on domestic companies (Ivkovic and Weisbenner, 2005), an intense use of heuristics (Fernandes et al., 2014), a desire to limit the level of regret they might experience in the event of a loss and to increase the feelings of pride associated with making gains (Odean et al., 2011), as well as a propensity to be subject to the influence of emotions rather than basing themselves on more rational elements (Konteos et al., 2018).

For the purposes of this study, we have identified the following biases and defined them as follows:

i. Overconfidence (behavioral bias): the tendency of individuals to overestimate their skills, underestimate risks and make poor decisions based on an over-optimistic view of their abilities and knowledge;
ii. Availability bias (behavioral bias): the tendency of individuals to be satisfied with immediately available information and not to carry out additional research;
iii. Representativeness bias (cognitive bias): the tendency of individuals to base their decisions on a very limited set of elements they believe to be representative of the population;
iv. Anchoring bias (cognitive bias): the tendency of individuals to make decisions based on past reference or information;
v. Herding effect (cognitive bias): the tendency of individuals to follow the general market trend;
vi. Heuristics (cognitive bias): the tendency of individuals to use cognitive shortcuts to make a decision;
vii. All that glitters attracts (cognitive bias): investors are said to favor headline-grabbing stocks and companies widely followed by financial newspapers and characterized by abnormally high volumes (Yaun, 2015; Gambaro and Puglisi, 2015);
viii. Rank bias (cognitive bias): the tendency of individuals to sell the most profitable and the most losing positions.

Research and Methodology

Participants

The experiment was conducted with a student population following a course in Management Sciences at the University of Mons (Belgium) on the Charleroi site (Belgium). The audience comprises a relatively small number of students (theoretically 28). The experiment was integrated into one of the courses (Introduction to Financial Reality), which facilitated scheduling and organization of the experiment. It was organized once the entire course had been taught (November 21, 2024). The experiment was developed over a relatively short time horizon (4 hours). In other words, participants had little opportunity to become familiar with the norms of market operation, and had little historical visibility of the financial products they could acquire. Markets could also develop very particular and unusual configurations depending on the announcement of certain events. As the experiment was developed within the framework of a course, this should encourage student participation, Firstly, a part of the course was specifically focused on trading activities and behavioral finance. Secondly, the incentive offered was supposed to motivate them to take part in the experiment. The students were, of course, largely unfamiliar with trading standards, given that the course was only their first educational experience in finance. We can assume that they were completely unfamiliar with the use of stock market sites, which could imply the need for a period of adaptation. In terms of standardization, a triple deficit could therefore be observed: a deficit in financial knowledge, a deficit in knowledge of the underlying financial product and a deficit in the use of online stock market platforms. Only 17 students (61% of the audience) took part in the experiment; we argue that the rewards offered were not sufficiently motivating and/or that the students were not really interested in financial subjects.

General Methodological Context and Experimental Design

Experimental finance involves reconstructing a simplified financial situation in the laboratory, with the aim of answering a specific question. Referring to Smith (1982), cited by Serra (2012), three variables need to be controlled for the construction of the experimental design: the environment, the institution and the result.

i. The environment corresponds to a set of factors describing the initial circumstances and includes the characteristics of the participants, the technologies used and incentives offered;
ii. The institution includes the tasks to be performed, the decisions to be made and the rules to be followed;
iii. The result represents the observations resulting from the decisions made by the participants during the experiment; it can be analyzed individually or in aggregate. The result is then modeled as a function of the environment and the institution.

For the environment, the experience lasted four hours (from 08:15 to 12:15) on Thursday November 21, 2024. The first hour, before the stock markets opened, was devoted to solving technical problems and demonstrations on the trading platform. Students were also asked to complete a socio-demographic questionnaire. In addition, a brief presentation of the stock market environment prevailing in the US on the day before the experiment was carried out. The stock market platform chosen was ABC Bourse; this platform enables building stock market games, collecting the orders placed and their influence on the financial value of a portfolio. The platform includes a range of macroeconomic and political information, company-specific information and the common technical analyses (moving averages and RSI, both of which having already been covered in the course). For operational purposes, a game was developed, and students were invited to take part of it. ABC Bourse makes it possible to visualize all the movements made by each participant over the period of the experiment, as well as their financial level. For each transaction, we asked students to transcribe into a trading journal the time at which it was made, its nature (purchase or sale), the name of the share concerned, the number of shares bought or sold, the price at which the transaction was carried out, and the total financial amount invested or sold. As the platform did not provide this information on a continuous basis, we also manually computed the cash in the portfolios after each transaction. It should be noted that, every hour, the platform produced a ranking of the various participants based on the value of their portfolios.

For the institution, students worked on an individual basis and had the opportunity to place orders for two hours (between 09:00 and 11:00). We limited the investments to companies included in the CAC 40 (a general presentation of the companies in the index had been planned prior to the experiment); to avoid any confusion, we also broadcast the composition of this index. The first portfolio included the total amount of cash (100,000 euros). Thereafter, students could invest all or part of their assets. No limit was set on the number of transactions they could carry out, no transaction costs were charged, and no instructions were given on the minimum number of shares to be held in the portfolio. To avoid complicating the use of the exchange platform, transactions were conducted at market price (the site also offered the possibility to set a limit price). After one hour of trading, and based on the information provided by the platform, we showed the interim ranking. At the end of the two-hour trading session, the names of the three owners of the highest portfolios were revealed. During the final hour (11:00 – 12:00), students completed questionnaires to explore potential biases developed and emotions experienced.

Regarding the results and their analysis, the data collected came from the questionnaire given prior to the experiment (gathering sociodemographic information), the trading journals (bias analysis), and the questionnaires collected at the end of the experience (bias and emotion analysis).

Selected Methodological Approach

The qualitative approach adopted could theoretically involve the use of various tools: structured questionnaires (Glaser and Weber, 2007; Tekin, 2018), online surveys (Hoffmann and Post, 2016), psychometric tests (Abdeldayem and Sedeek, 2018), as well as personality measurement scales (Hassin and Trope, 2000). Unlike the studies mentioned above, which focused on one or another of these techniques, we chose to use multiple approach angles to, first, cover the entire temporal scope of the experiment and, second, to achieve a certain convergence of the results.

Methodological Tools Used

Operationally, in the first phase, closed-ended questions were used to collect sociodemographic data. In the second phase, at the end of the experiment, bias measurement scales and transcripts of experienced emotions were used. To assess the potential presence of biases and emotions, we adopted two methodological perspectives basically drawn from the state of art.

On the one hand, the biases potentially developed by the participants were assessed through a questionnaire adapted from the version proposed by Mer and Vishwakarma (2024). In our variant, the questionnaire included statements related to availability bias, representativeness bias, overconfidence, anchoring bias, heuristics, and the rank effect. To avoid influencing participants' choices, only the statements (without mentioning the bias) were included in the questionnaire. For each statement, participants were asked to position themselves on a six-point Likert scale. We chose a six-point scale to eliminate the possibility of a neutral position while providing detailed options designed to closely align with the feelings experienced. We attempted to consolidate these results with data from the trading journals. For instance, to assess overconfidence, constructing a frequency table of holding durations should enable us to draw a classification of trading strategies according to the investment horizon. We assume that shorter holding times are indicative of overconfidence. Secondly, we focused on the degree of concentration versus diversification to assess the general orientation—prudential versus risky—of the strategy. Thirdly, analyzing the trading journals allowed us to examine the concentration on certain assets and its potential correspondence with the informational scope.

On the other hand, to capture the emotions experienced, we adapted one of the steps from the discrete emotion's questionnaire developed by Harmon-Jones et al. (2016) to the context of decision-making in trading. Participants were asked, for each emotion, to recall a specific moment during the experiment when, for example, market conditions negatively impacted the value of their portfolio. After recalling the memory, participants were asked to provide one word that best characterized the emotion felt and four additional words to describe this emotion. Once again, participants were not informed of the specific emotion assessed.

Results and Discussion

Descriptive Statistics

These statistics were derived from the socio-demographic data collected prior to the experiment. Firstly, in terms of gender, the proportion of men and women is more or less the same (Table 1). Secondly, the age of the participants was highly concentrated, we were addressing a single audience (Table 1). Thirdly, and unsurprisingly, the people who attended the course most often took part in the experiment (Table 1). Fourthly, personal interest in financial subjects appears to be very low and, if there is any interest at all, it is only to do with - very academic - motivation to pass the exam (Table 1). This last observation reinforces the hypothesis that students are not familiar with the stock market and the use of stock market platforms.

Table 1: Characteristics of Participants by Gender, Age, Course Attendance, Personal and Academic Interest.

Data	Values	Quantity	Percentage
Gender	Women	8	0,47
	Men	9	0,53
	Total	17	1
Age	18 years	2	0,12
	19 years	6	0,35
	20 years	5	0,29
	21 years	3	0,18
	22 years	1	0,06
	Total	17	1
Course attendance rate	Less than 30%	1	0,06
	Between 30% and 60%	1	0,06
	More than 60%	15	0,88
	Total	17	1
Personal interest	Yes	2	0,12
	No	15	0,88
	Total	17	1
Academic interest	Yes	7	0,41
	No	10	0,59
	Total	17	1

Source: Authors

Context at The Time of The Experiment

The stock market environment in November 2024 was strongly influenced by the results of the US elections on November 4 and the re-election of D. Trump, as well as by the geopolitical tensions caused by the war between Russia and Ukraine. The day before the experiment, we noted a degree of stability in the US stock market indices (Table 2), an appreciation of the dollar and the Swiss franc against the euro, and a rise in the price of gold. The Asian markets closed at the beginning of the morning (European time) with a fall in the TOPIX index in Japan. These factors seemed to indicate a degree of risk aversion at the opening of the European markets. The most important news for anticipating market sentiment at the opening was the announcement by US company Nvidia (made after the close of the US markets), which forecast better-than-expected results for the fourth quarter but judged insufficient by US investors. The share price fell by 2.5% in after-hours trading on the New York Stock Exchange.

Table 2: Evolution of the Main Indicators in the Days Preceding the Experiment

Indicators	18.11.2024	19.11.2024	20.11.2024	21.11.2024
DJ30	-0.13%	-0.28%	+0.32%	WO
NASDAQ100	+0.71%	+0.71%	-0.08%	WO
SP500	+0,39%	0,41%	0,00%	WO
TOPIX (Japan)	-0,73%	+0,68%	-0,43%	-0.57%
EURO/USD	+0,56%	+0,12%	-0,58%	WO
CHF/EURO	+0,03%	+0,02%	+0,39%	WO
OR	+1,6%	+0,87%	+0,65%	WO

Source: Authors

At 08:32am, information from the trading platform indicated that the Paris Bourse should follow a positive trend in early trading, although investors were not entirely convinced by Nvidia's quarterly results. At around 8.15am, the 'future' contract on the CAC 40 index - December delivery - was up 28 points at 7,242 points, suggesting a positive opening.

Among CAC 40 companies, STMicroelectronics presented its sales forecasts for the period 2027-2023 on November 20, prompting financial analysts (UBS, Deutsche Bank) to give positive opinions or to maintain their recommendations (Goldman Sachs, Jefferies, Barclays, Oddo BHF) on November 20 and 21. On November 20, Air Liquide also announced the appointment of a new industrial director to its executive team. For the day of 21 November, no major announcements were supposed to be published for CAC40 companies, so market behavior was likely to be influenced by factors not directly linked to the reality of the companies in the index.

On the charts, it is possible to identify several key moments in a general stock market configuration that developed in the shape of a W. A very short bullish period in early trading - between 09:00am and 09:10am - during which the index reached the maximum level during the experiment (and even during the day) at 7204 points, followed by a downtrend until 09:30am, when the CAC 40 was trading at 7156 points. Between 09:30am and 10:00am, the uptrend started once again (the CAC reached 7185 points at 10:00am). Between 10:00am and 10:30am, a major downtrend took place and the CAC 40 bottomed out for the duration of the experiment (and also for the day) at 7132 points. The end of the experiment was characterized by a bullish configuration that allowed the index to more or less regain at 11:00am the level it had reached at 09:30am (7180 points). During the experiment, the CAC40 ultimately lost 0.3%. The five time zones described will be used to analyze any differentiated behavior depending on the direction of the markets, to identify possible herding movements.

Discussion

For the influence of emotions, we obtained the following results:

Among the emotions recorded by the participants (Table 3), words were classified based on the Lazarus classification (1993), i.e. a category for negative emotions, a category for positive ones and a category for ambiguous ones. It is important to note that given the bearish market orientation during the experiment, we found a very high proportion of negative emotions (179 words with negative connotations out of a total of 199) in all the scenarios. Consequently, we only retained the scenarios with a negative orientation for data processing.

Table 3: Emotions Transcribed by Participants.

	Best words	**Other words**	
"Anger" scenario	• Disappointment (3) • Frustration (3) • Fear (1) • Hope (1) • Depression (1) • Reflexion (1) • Stress (1) • Misunderstanding (1)	• Loser (2) • Failure (2) • Sadness (5) • Anxiety (3) • Calm (1) • Annoyed (1) • Doubt (1) • Fear (2) • Longing (1) • Shock (2) • Despair (1) • Lost (1)	• Choppy (1) • Distress (1) • Disgust (2) • Hope (1) • Concentration (1) • Happiness (1) • Surprise (2) • Patience (1) • Angry (1) • Reflexion (1) • Disappointment (2) • Hate (1)
"Disgust" scenario	• Unhappy (1) • Sadness (2)	• Sadness (6) • Anxiety (4)	• Reconsideration (1) • Shock (3)

	• Depression (1) • Shock (1) • Frustration (2) • Surprise (1) • Disgust (2) • Regret (1) • Stress (1) • Astonishment (1)	• Fear (3) • Calm (1) • Nervous (1) • Tired (1) • Longing (1)	• Frustration (3) • Angry (2) • Disappointment (3) • Disgust (2) • Dissatisfaction (1)
"Fear" scenario	• Hesitation (1) • Sadness (1) • Disappointment (3) • Hope (1) • Angry (1) • Stress (3) • Undecided (1) • Powerless (1) • Confused (1) • Anxiety (1) • Frustration (1)	• Doubt (2) • Panic (1) • Reflexion (1) • Stress (2) • Tired (1) • Sadness (3) • Regret (1) • Anxiety (2) • Fear (2) • Longing (1)	• Reconsideration (1) • Shock (2) • Frustration (4) • Angry (1) • Disappointment (3) • Apprehension (1) • Terror (1) • Aversion (1) • Disgust (1) • Impatient (1)
"Anxiety" scenario	• Fear (2) • Sadness (2) • Doubt (1) • Hope (1) • Angry (1) • Hate (1) • Undecided (1) • Stress (1) • Perplexed (1)	• Anxiety (2) • Stress (1) • Concern (1) • Doubt (1) • Awareness (1) • Fear (1) • Hope (1) • Reconsideration (1)	• Sock (1) • Frustration (2) • Angry (1) • Sadness (1) • Disappointment (1) • Hope (1) • Desire (1)
"Sadness" scenario	• Sadness (1) • Tired (1) • Doubt (1) • Hope (1) • Angry (2) • Powerless (2) • Disappointment (1) • Indignation (1) • Panic (1)	• Disappointment (1) • Nervous (1) • Hate (3) • Unhappy (1) • Concern (1) • Doubt (1) • Awareness (1) • Fear (1) • Longing (1)	• Anxiety (1) • Reconsideration (1) • Shock (2) • Frustration (1) • Angry (1) • Sadness (2) • Contempt (1) • Aversion (1) • Disgust (1)
"Desire" scenario	• Belief (1) • Melancholy (1) • Happy (4) • Excitation (1) • Hope (1) • Stress (1)	• Impatient (1) • Attentive (1) • Confident (1) • Self-confident (1)	• Happy (3) • Surprise (1) • Happiness (1)
"Happy" scenario	• Happy (5) • Grumpy (1) • Excitation (1)	• Happy (4) • Relieved (1) • Proud (1)	• Surprise (1) • Happiness

Source: Authors

We then classified the emotions felt by each participant to determine the primary emotion (Ekman, 1992) that prevailed for each person. Table 4 shows a classification of the words proposed according to the negative nature of the basic emotion. In this way, we find that most participants (59%) felt anger during the experiment. Next came sadness, felt by 23% of participants. Fear was the emotion felt by the minority of our participants (18%).

Table 4: Classification of Words Entered by Participants According to Negative Emotions

Angry	Fear	Sadness	Happy	Disgust	Surprise
• Frustration	• Fear	• Disappointment	• Hope	• Disgust	• Surprise
• Disappointment	• Stress	• Depressed	• Calm	• Contempt	• Astonishment
• Annoyed	• Anxiety	• Lost	• Happy	• Aversion	• Perplexed
• Longing	• Longing	• Failure	• Excitation		• Indignation
• Shock	• Lost	• Sadness	• Attentive		
• Agitated	• Powerless	• Doubt	• Confident		
• Angry	• Confusion	• Longing	• Seld-confident		
• Nervous	• Panic	• Despair	• Happiness		
• Aversion	• Apprehension	• Distress	• Relieved		
• Impatient	• Terror	• Unhappy	• Proud		
• Hate	• Perplexed	• Powerless			
• Contempt	• Concern	• Tired			
• Indignation	• Undecided	• Melancholy			
• Dissatisfaction	• Hesitation	• Grumpy			

Source: Authors

The results of the analysis of the questionnaires relating to emotions show that participants who wrote words that could be assimilated to fear or anxiety would adopt significantly more cautious attitudes to decision-making and the frequency of transactions does not increase during the experiment (Table 5). This result corroborates the work of Schulreich et al. (2016), individuals dominated by fear would display chronic aversion to risk-taking. Conversely, most participants who expressed emotions associated with anger displayed either a lower-than-average holding time or a gradual increase in trading frequency (Table 5). These findings corroborate the results obtained by Gambetti and Giusberti (2012) while invalidating the conclusions of the study by Habib et al. (2015) according to which anger would lead to a reduction in the propensity to take risks. For people who mainly experienced sadness, we observed an increase in movements during the latter part of the experiment (Table 5). These results show that people who feel sad are prepared to forego possible future gains to obtain immediate results (Lerner et al., 2013, Matsumoto and Wilson, 2022).

Table 5: Summary of Predominant Emotions per Participant, Combined with Average Holding Time and Buying/Selling Trends

Participant	**Predominant emotion**	**Average holding time**	**Evolution of movements over the course of the experiment**	**Total "purchases"**	**Total « sales»**
1	Anger	00:45:40	No evolution	6	3
2	Fear	01:11:44	No evolution	9	4
3	Anger	01:00:27	More movements at the end of the experiment	9	6
4	Anger	01:21:20	No evolution	6	2
5	Anger	00:31:25	No evolution	12	9
6	Anger	01:13:06	No evolution	9	4
7	Fear	01:03:26	No evolution	16	6
8	Sadness	00:28:33	More movements at the end of the experiment	9	5
9	Fear	00:23:00	No evolution	4	5
10	Sadness	00:56:38	More movements at the end of the experiment	43	9
11	Anger	01:04:00	More movements at the end of the experiment	18	14
12	Anger	00:32:12	No evolution	14	14
13	Anger	00:53:20	More movements at the end of the experiment	22	32
14	Anger	00:57:30	No evolution	4	3
15	Anger	01:29:50	No evolution	6	0
16	Sadness	00:32:53	More movements at the end of the experiment	9	7
17	Sadness	00:53:16	More movements at the end of the experiment	11	8

Source: Authors

Regarding the biases felt by participants, the analysis of the questionnaires and the trading journals enabled us to identify some trends. To identify the possible presence of bias, we focused on participants who gave a majority of positive responses (the last three notches on the Likert scale) for each type of bias. Four biases were identified: the representativeness bias, the presence of heuristics, the rank bias and the "all that glitters attracts" bias.

i. The result obtained for the representativeness bias (10 out of 17) suggests that the students focused heavily on the past graphical behaviour of stocks to guide their investments. To reinforce this point, at the start of the trading journals, we found that 8 out of 17 participants focused their investments on Eurofins, a company for which no information had been disclosed to the markets but which had experienced a relatively large increase in its value during the experiment. The same observation could be made for AXA: 11 out of 17 students held this stock without any real justification other than that it was behaving graphically against the market;
ii. About the presence of heuristics (10 out of 17 people), this result demonstrates the significant influence of sentimental, intuitive and instinctive components in the decision-making process;
iii. For the rank bias (12 out of 17 people), the sale of extreme values demonstrates a lack of visibility on the general direction of the markets.
iv. For the "all that glitters attracts" bias, although we had clearly specified to the students that they should invest in stocks included in the CAC40, some students regularly asked us about investing in companies in the spotlight during the experiment but outside the index (for example, Soitec, which announced confirmation of its annual targets and gained more than 10% at the start of the session in very high trading volumes). To confirm the presence of this bias, the trading journals showed that 13 participants (76.5%) had oriented their investments towards Air Liquide and STMicroelectronics, the only two companies for which information had been given to the markets.

The data collected did not allow us to confirm the presence of other biases. The various elements of the analysis that led us to support this conclusion are as follows:

Firstly, we were unable to identify investment strategies that might indicate herding behavior. To do this, we compared the number of transactions with the direction of the markets at the time they took place (Table 6). On the one hand, many purchases were made during the first ten minutes of the experiment, which could be explained by the positive configuration of the index and therefore confirm the presence of herding effects. However, at the start of the experiment, the portfolios only comprised cash, so it is logical that the students placed a large number of buy orders at that time. On the other hand, over the next fifteen minutes, the students continued to buy (the proportion of purchases was the highest during the experiment), even though the market was trending downwards. Between 09:31 and 10:30, their investment strategy seemed to be more in line with the general market trend: buying movements continued between 09:31 and 10:00 and positions were liquidated between 10:01 and 10:30. Between 10:31 and 11:00, students continued to liquidate their positions as the market moved upwards.

Table 6: Breakdown of Purchases and Sales by CAC 40 Direction.

Moment	Number of purchases	Number of sales	CAC 40 configuration
09 :00am – 09 :10am	37	0	Bullish
09 :11am – 09 :30am	67	11	Bearish
09 :31am - 10 :00am	44	25	Bullish
10 :01am – 10 :30am	27	40	Bearish
10 :31am – 11 :00am	32	55	Bullish
Total	207	131	Bearish (-0,3%)

Source: Authors

Secondly, the analysis of the questionnaires did not reveal any trends that would confirm the presence of overconfidence. Based on the trading journals, our observations revealed prudent investment strategies characterized by relatively long holding times and transactions which only involved small financial amounts. Nor did we observe any inflation of movements during the experiment. Our observations reveal a three-level classification of time investment strategies (Table 7). In 75% of cases, detention times exceeded 24 minutes and only 25% of these seemed to be part of a more offensive placement strategy. Table 8 shows that the average amounts invested were relatively small, which also supports the observation that the strategies adopted were somewhat conservative. Based on the liquidity variable (Table 8), we show that the owners of the portfolios with the least liquidity were men, which would tend to indicate that men take greater risks than women. Similarly, the level of diversification tended to be greater for women than for men (Table 8). Although it is not the aim of this paper, we can therefore see that there are differences in investment orientation based on gender, although there is no evidence of overconfidence. This result is in line with the mainstream of research related to this issue (for example, Cronqvist H. et al., 2016, Lighthall N. et al., 2012).

Table 7: Average Holding Time and Frequency of Transactions during the Experiment

Average holding time	55 minutes
Average investment	8.373 euros
Student detention frequency	
Between 0 and 23 minutes	25%
Between 24 and 81 minutes	50%
Between 82 and 102 minutes	25%

Source: Authors

Table 8: Analysis of Liquidity Management and Portfolio Diversification by Gender

Available liquidity	**Quantity**	**Percentage**	**Men**	**Women**
Between 87,982 and 99,937	5	0,2941	1	4
Between 68,826 and 85,455	7	0,4117	3	4
Between 26,243 and 63,903	5	0,2941	5	0
Number of companies	Quantity	Percentage	Men	Women
Between 9 and 35	5	0,294117647	1	4
Between 6 and 8	8	0,470588235	5	3
Between 3 and 5	4	0,235294118	3	1
Total	17	1	9	8

Source: Authors

In our opinion, the relatively cautious nature of the investment strategies adopted - even if certain differences emerged when gender was considered - can be explained mainly by the perception of a bearish stock market environment during the experiment.

Finally, for the availability bias, neither the chart behavior of the CAC 40 nor that of the US and Japanese indices were decisive factors in identifying a common thread in the investment strategies. It should be noted that this absence of results tends to confirm the conclusions that we had previously formulated for the herding effects. Finally, about anchoring, the observations collected do not allow us to identify the construction of a price range or the development of a truly structured portfolio diversification strategy.

Conclusion

To sum up, we would say firstly that the participants mainly focused on very rudimentary graphical signals associated with the securities in their portfolio (representativeness bias), without going any further in gathering graphical information, particularly with regard to changes in the benchmark index. Secondly, in those cases where information seems to have been gathered, it was limited to very factual elements with a strong sense of immediacy. From this point of view, reading the trading journals showed a high degree of positioning on specific stocks that were in the news or that were following the market trend (all that glitter attracts). Thirdly, the decision-making process seems to be strongly influenced by non-rational elements coming from psychological feelings (influence of heuristics). We had the impression that the students were developing a feeling of abandonment, an impression that could be explained by the increasing number of financial disappointments and a decrease in the value of the portfolios. It should be noted that the participants focused on the evolution of the value of their portfolio without comparing it to that of the benchmark index.

Analysis of the emotions expressed by participants revealed a predominance of negative emotions, a result consistent with the bearish market trend during the experiment. Focusing on negative scenarios, anger was the predominant basic emotion, followed by sadness and finally fear. The results revealed different behavioural dynamics depending on the basic emotion experienced. Participants dominated by fear adopted cautious strategies with a low number of transactions. In contrast, those dominated by anger were characterized by a gradual increase in the frequency of transactions or a lower-than-average holding time. For participants dominated by sadness, we observed an increase in transactions at the end of the experiment, suggesting a search for immediate results to the detriment of future gains.

According to us, these results can be explained by an obvious lack of financial maturity, a lack of familiarity with the stock market and a chronic ignorance of the reality of corporate shareholding. To reinforce this point, the socio-demographic data showed that the students did not seem to be really interested in the subject being taught, and so their motivation to understand the trading in the stock markets was quite relative, if not to obtain the initially promised reward.

Based on these conclusions, we can answer the initial research question in the affirmative and confirm the presence of certain biases and specific emotions during decision-making. Their appearance is highly contingent, firstly, on the way in which the context prevailing at the time of the decisions was experienced and, secondly, on certain socio-demographic characteristics of the people making the decisions.

In terms of limitations, the experiment took place over a short timeframe and in a bearish stock market; these contextual factors prevented us from highlighting the possible influence of positive emotions on decision-making. Moreover, the small number of people who took part in the experiment made it very difficult to generalize the results obtained. To facilitate their generalization, future research could, on the one hand, involve a larger number of participants (possibly with higher levels of heterogeneity) and over a longer experimental period. On the other hand, the qualitative contributions could be strengthened using neurophysiological measurements. These complementary approaches would provide a deeper understanding of the decision-making process of individual investors, who are clearly influenced by their emotional reality as well as by various cognitive and behavioral biases. Another approach to analysis would be to study the extent to which previous decisions influence the emotional profile of individuals.

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References

Abdeldayem, M. M., & Sedeek, D. S. (2018). Managerial behavior and capital structure decisions; Do overconfidence, optimism and risk aversion matter? *Asian Economic and Financial Review, 8*(7), 925–945. https://doi.org/10.18488/journal.aefr.2018.87.925.945

Ackert, L. F., Church, B. K., Tompkins, J., & Zhang, P. (2005). What's in a name? An experimental examination of investment behavior. *Review of Finance, 9*(2), 281-304. https://doi.org/10.1007/s10679-005-7594-2

Biais, B., Hilton, D., Mazurier, K., & Pouget, S. (2005). Judgmental overconfidence, self-monitoring, and trading performance in an experimental financial market. *The Review of Economic Studies, 72*(2), 287-312. https://doi.org/10.1111/j.1467-937X.2005.00333.x

Bruguier, A. J., Quartz, S. R., & Bossaerts, P. (2010). Exploring the nature of "trader intuition." *The Journal of Finance, 65*(5), 1703-1723. https://doi.org/10.1111/j.1540-6261.2010.01591.x

Bubić, A., & Erceg, N. (2018). The role of decision making styles in explaining happiness. *Journal of Happiness Studies, 19*, 213-229. https://doi.org/10.1007/s10902-016-9816-z

Cronqvist, H., Previtero, A., Siegel, S., & White, R. E. (2016). The fetal origins hypothesis in finance: Prenatal environment, the gender gap, and investor behavior. *The Review of Financial Studies, 29*(3), 739-786. https://doi.org/10.1093/rfs/hhv065

Dorn, D., & Sengmueller, P. (2009). Trading as entertainment? *Management Science, 55*(4), 591-603. https://doi.org/10.1287/mnsc.1080.0962

Ekman, P. (1992). Are there basic emotions? *Psychological Review, 99*(3), 550-553. https://doi.org/10.1037/0033-295X.99.3.550

Etchart-Vincent, N. (2006). Expériences de laboratoire en économie et incitations monétaires. *Revue d'Économie Politique, 116*(3), 383-418. https://doi.org/10.3917/redp.163.0383

Fernandes, J., Matsumoto, A., Chagas, P., & Ferreira, I. (2014). Behavioral finance: A study of affect heuristic and anchoring in decision making of individual investors. *Journal of International Business and Economics, 14*(1), 59. https://doi.org/10.2139/ssrn.2359180

Floyd, E., & List, J. A. (2016). Using field experiments in accounting and finance. *Journal of Accounting Research, 54*(2), 437-475. https://doi.org/10.1111/1475-679X.12113

Gambaro, M., & Puglisi, R. (2015). What do ads buy? Daily coverage of listed companies on the Italian press. *European Journal of Political Economy, 39*, 41-57. https://doi.org/10.1016/j.ejpoleco.2015.03.008

Gambetti, E., & Giusberti, F. (2012). The effect of anger and anxiety traits on investment decisions. *Journal of Economic Psychology, 33*(6), 1059-1069. https://doi.org/10.1016/j.joep.2012.07.001

Glaser, M., & Weber, M. (2007). Overconfidence and trading volume. *The Geneva Risk and Insurance Review, 32*, 1-36. https://doi.org/10.1007/s10713-007-0003-3

Guiso, L., Haliassos, M., & Jappelli, T. (2001). Le profil des détenteurs d'actions en Europe. *Revue d'Économie Financière*, 169-178. https://doi.org/10.3406/ecofi.2001.4957

Habib, M., Cassotti, M., Moutier, S., Houdé, O., & Borst, G. (2015). Fear and anger have opposite effects on risk seeking in the gain frame. *Frontiers in Psychology, 6*, 253. https://doi.org/10.3389/fpsyg.2015.00253

Harmon-Jones, C., Bastian, B., & Harmon-Jones, E. (2016). The discrete emotions questionnaire: A new tool for measuring state self-reported emotions. *PloS One, 11*(8). https://doi.org/10.1371/journal.pone.0159915

Hassin, R., & Trope, Y. (2000). Facing faces: Studies on the cognitive aspects of physiognomy. *Journal of Personality and Social Psychology, 78*(5), 837. https://doi.org/10.1037/0022-3514.78.5.837

Hinvest, N. S., Alsharman, M., Roell, M., & Fairchild, R. (2021). Do emotions benefit investment decisions? Anticipatory emotion and investment decisions in non-professional investors. *Frontiers in Psychology, 12*, 705476. https://doi.org/10.3389/fpsyg.2021.705476

Hoffmann, A., & Post, T. (2016). How does investor confidence lead to trading? Theory and evidence on the links between investor return experiences, confidence, and investment beliefs. *Journal of Behavioral and Experimental Finance, 12*, 65-78. https://doi.org/10.1016/j.jbef.2016.09.003

Isen, A. M. (2001). An influence of positive affect on decision making in complex situations: Theoretical issues with practical implications. *Journal of Consumer Psychology, 11*(2), 75-85. https://doi.org/10.1207/S15327663JCP1102_01

Ivković, Z., & Weisbenner, S. (2005). Local does as local is: Information content of the geography of individual investors' common stock investments. *The Journal of Finance, 60*(1), 267-306. https://doi.org/10.1111/j.1540-6261.2005.00730.x

Joshi, C. S., Badola, S., & Chopra, G. (2022). Behavioural bias: Does it affect an investor's rationality? *SCMS Journal of Indian Management, 19*(4), 128-142.

Kabbaj, T. (2015). *L'art du trading*. Paris: Éditions Eyrolles.

Konteos, G., Konstantinidis, A., & Spinthiropoulos, K. (2018). Representativeness and investment decision making. *Journal of Business and Management, 20*(2), 5-10. https://doi.org/10.18778/2391-6478.3.31.05

Kumalasari, A. D., Karremans, J. C., & Dijksterhuis, A. (2022). Do people choose happiness? Anticipated happiness affects both intuitive and deliberative decision-making. *Current Psychology, 41*(9), 6500-6510. https://doi.org/10.1007/s12144-020-01144-x

Lazarus, R. S. (1993). From psychological stress to the emotions: A history of changing outlooks. *Annual Review of Psychology, 44*. https://doi.org/10.1146/annurev.ps.44.020193.000245

Lerner, J. S., & Keltner, D. (2000). Beyond valence: Toward a model of emotion-specific influences on judgement and choice. *Cognition & Emotion, 14*(4), 473-493. https://doi.org/10.1080/026999300402763

Lerner, J. S., & Tiedens, L. Z. (2006). Portrait of the angry decision maker: How appraisal tendencies shape anger's influence on cognition. *Journal of Behavioral Decision Making, 19*(2), 115-137. https://doi.org/10.1002/bdm.515

Lerner, J. S., Li, Y., & Weber, E. U. (2013). The financial costs of sadness. *Psychological Science, 24*(1), 72-79. https://doi.org/10.1177/0956797612450302

Lighthall, N. R., Sakaki, M., Vasunilashorn, S., Nga, L., Somayajula, S., Chen, E. Y., ... & Mather, M. (2012). Gender differences in reward-related decision processing under stress. *Social Cognitive and Affective Neuroscience, 7*(4), 476-484. https://doi.org/10.1093/scan/nsr026

Mer, P., & Vishwakarma, P. (2024). The impact of heuristics bias on investment decision: An empirical study. *Journal of Commerce and Accounting Research, 13*(3), 60-71. https://doi.org/10.2139/ssrn.4874264

Mouna, A., & Anis, J. (2015). A study on small investors' sentiment, financial literacy, and stock returns: Evidence for emerging markets. *International Journal of Accounting and Economics Studies, 3*(1), 10–19. https://doi.org/10.14419/ijaes.v3i1.4342

Mushinada, V. (2020). Are individual investors irrational or adaptive to market dynamics? *Journal of Behavioral and Experimental Finance, 25*, 100283. https://doi.org/10.1016/j.jbef.2020.100283

Odean, T., Barber, B., & Strahilevitz, M. (2011). Once burned, twice shy: How naive learning, counterfactuals, and regret affect the repurchase of stocks previously sold. *Journal of Marketing Research, 48*, 102-120. https://doi.org/10.2139/ssrn.611267

Pak, O., & Mahmood, M. (2015). Impact of personality on risk tolerance and investment decisions: A study on potential investors of Kazakhstan. *International Journal of Commerce and Management, 25*(4), 370-384. https://doi.org/10.1108/IJCoMA-01-2013-0002

Pérez-Sánchez, J., & Delgado, A. R. (2022). A metamethod study of qualitative research on emotion regulation strategies. *Papeles Del Psicólogo, 43*(2), 103-109. https://doi.org/10.23923/pap.psicol.2989

Rekik, Y., & Boujelbene, Y. (2013). Determinants of individual investors' behaviors: Evidence from the Tunisian stock market. *Journal of Business and Management, 8*(2), 109–119. https://doi.org/10.9790/487X-082109119

Roland-Lévy, C., & Kmiec, R. (2016). La crise et ses représentations: L'apport de la psychologie économique. *Idées Économiques et Sociales*(1), 23-29. https://doi.org/10.3917/idee.183.0023

Rossignol, M., Anselme, C., Vermeulen, N., Philippot, P., & Campanella, S. (2007). Categorical perception of anger and disgust facial expression is affected by non-clinical social anxiety: An ERP study. *Brain Research, 1132*, 166-176. https://doi.org/10.1016/j.brainres.2006.11.036

Schulreich, S., Gerhardt, H., & Heekeren, H. R. (2016). Incidental fear cues increase monetary loss aversion. *Emotion, 16*(3), 402. https://doi.org/10.1037/emo0000124

Schunk, D., & Betsch, C. (2006). Explaining heterogeneity in utility functions by individual differences in decision modes. *Journal of Economic Psychology, 27*(3), 386-401. https://doi.org/10.1016/j.joep.2005.08.003

Serra, D. (2012). Principes méthodologiques et pratiques de l'économie expérimentale: une vue d'ensemble. *Revue de Philosophie Économique*(1), 21-78. https://doi.org/10.3917/rpec.131.0021

Severin, M. I., Raes, F., Notebaert, E., Lambrecht, L., Everaert, G., & Buysse, A. (2022). A qualitative study on emotions experienced at the coast and their influence on well-being. *Frontiers in Psychology, 13*, 902122. https://doi.org/10.3389/fpsyg.2022.902122

She, S., Eimontaite, I., Zhang, D., & Sun, Y. (2017). Fear, anger, and risk preference reversals: An experimental study on a Chinese sample. *Frontiers in Psychology, 8*, 1371. https://doi.org/10.3389/fpsyg.2017.01371

Stevenson, S., & Hicks, R. E. (2016). Trust your instincts: The relationship between intuitive decision making and happiness. *European Scientific Journal, 12*(11), 463-483. https://doi.org/10.19044/esj.2016.v12n11p463

Taffler, R. (2014). Emotional finance: Theory and application. *Preuzeto, 12*, 2023. https://doi.org/10.1080/1351847X.2017.1369445

Tekin, B. (2018). Impact of optimism bias on firms' financing and investment decisions. *Akademik Araştırmalar ve Çalışmalar Dergisi (AKAD), 10*(18), 158-171. https://doi.org/10.20990/kilisiibfakademik.428627

Van Hoorebeke, D. (2008). L'émotion et la prise de décision. *Revue Française de Gestion, 182*, 33-44. https://doi.org/10.3166/rfg.182.33-44

Wang, H., Zhang, J., Wang, L., & Liu, S. (2014). Emotion and investment returns: Situation and personality as moderators in a stock market. *Social Behavior and Personality: An International Journal, 42*(4), 561-569. https://doi.org/10.2224/sbp.2014.42.4.561

Widyarini, I. (2017, August). The role of negative moral emotions (anger and disgust) in ethical decision making. In *8th International Conference of Asian Association of Indigenous and Cultural Psychology (ICAAIP 2017)* (pp. 244-250). Atlantis Press. https://doi.org/10.2991/icaaip-17.2018.57

Yuan, Y. (2015). Market-wide attention, trading, and stock returns. *Journal of Financial Economics, 116*(3), 548-564. https://doi.org/10.1016/j.jfineco.2015.03.006

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