Overconfidence bias among investors: A qualitative evidence from Ponzi scheme case study

OVERCONFIDENCE BIAS AMONG INVESTORS: A QUALITATIVE EVIDENCE FROM PONZI SCHEME CASE STUDY

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Abstract

This study aims to examine the prevalence of overconfidence bias in the decision-making process of Malaysian investors in Ponzi schemes. We explore a well-documented behavior that distorts the investor's judgment, leading to a future event's miscalculation — a psychological bias known as overconfidence bias (Kuranchie-Pong & Forson, 2022). Our study offers a novel viewpoint by investigating the hard-to-reach type of investor, the Ponzi scheme investors using the behavioral finance theory and qualitative method. Therefore, this investigation employed qualitative reasoning, which could also be an example of applying thematic analysis using ATLAS.ti. This study's findings indicate that Ponzi scheme investors exhibit overconfidence bias in investing in the Ponzi investment schemes. We unraveled three types of overconfidence bias that prevail in the Ponzi scheme investors' decision process. Acknowledging its limitations as a qualitative inquiry, the authors call for a joint effort to explore this field of study further. This emerging area of investor behavior research will afford valuable knowledge that could resolve the mysteries behind the never-ending issue of the Ponzi investment scheme.

Keywords: Psychological Biases, Overconfidence Bias, Ponzi Investment Scheme, Qualitative, Thematic Analysis

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1. INTRODUCTION

The behavioral finance presumption that investors are reasonable rather than rational served as the prime motivator behind this article. This study relies on the notion that the existence of psychological biases and emotions might shape, deviate, or alter decision-making behavior (Atif Sattar et al., 2020). In a supposedly straightforward decision of whether to invest in a Ponzi scheme or not, it is sensible to assume that a rational investor would not be tempted to invest in a such fraudulent scheme. Paradoxically, even highly educated investors were lured into Ponzi schemes.

Theoretically, a rational investor should incorporate all relevant information into the decision-making process and deliver an optimal financial outcome due to the absence of emotional bias. In other words, rational decision-making should produce the greatest possible returns on investment. Nonetheless, there is a discrepancy between this assumption and reality, as highly educated investors fall for the deceptive Ponzi scheme (Muda et al., 2003). The so-called rational investor committed to investing in a scheme that he or she believed would bring future monetary gains or other intangible rewards, disregarding the chance that the scheme was fraudulent. This irrational behavior of Ponzi scheme investors was caused by the existence of psychological biases and emotions that might shape, deviate, or change decision-making behavior (Egan, 2017).

We concentrate on the tendency to overestimate the likelihood of achieving desired investment results as a result of an investor's presumptive belief in their skills or traits as they may be employed to produce a certain outcome — a psychological bias known as the *overconfidence bias*. Based on this fascinating social phenomenon, we ask:

RQ: Do Ponzi scheme investors experience overconfidence bias in their decision-making process to invest in a Ponzi scheme?

To answer this question, we delve into a qualitative approach using thematic analysis. Innovatively, we advocate the presence of overconfidence bias in the context of Ponzi scheme investors rather than in the other group such as equity investors and mutual fund investors.

For this research, a face-to-face interview method was employed to collect an in depth-data from seven Ponzi scheme investors from various fraud investment schemes. This methodology was chosen due to its ability to provide more exhaustive information while maintaining a secure and anonymous atmosphere in which respondents feel more comfortable enclosing sensitive information.

We structured this paper as follows: Section 2 provides a quick summary of the relevant literature. The following Section 3 describes the research methodology and data analysis using the assistance of qualitative data analysis software (ATLAS.ti). Section 4 includes the research results followed by the discussion of the findings in Section 5. This research's conclusion and implications are offered in Section 6.

2. LITERATURE REVIEW

The *prospect theory* was first developed by Kahneman and Tversky (1979) to explain the mechanism of decision under uncertainty (as cited in Levy, 1992). As noted by Baker and Nofsinger (2002), Kahneman and Tversky's (1979) prospect theory plays an imperative role in developing the concept of psychological bias of individual investors. This theory was broadly acknowledged and utilized extensively in the banking and insurance industries (Barberis, 2013). Fundamentally, the prospect theory was developed to elucidate the behavior of rational investors in the case of the trade-off between risk and return, especially when the return is uncertain (Edwards, 1996). Similarly, investing in a Ponzi scheme is also part of a financial decision that involves the trade-off between risk and return. We presume that this group of investors might be as well susceptible to biases as the other individual investors. This condition might cause them to adopt the rules of thumb that fully rely on their beliefs and preferences.

Originally, the concept of *psychological bias* was coined by Kahneman and Tversky (1979). This concept is also referred to as "systematic errors in judgment" (Tversky & Kahneman, 1974), "heuristics (rules of thumb)" (Schwartz, 2011), and "beliefs, judgments or preferences" (Casaca et al., 2014). Some of the well-documented biases are the disposition effect (De Winne, 2021), overconfidence bias (Kuranchie-Pong & Forson, 2022), framing effect (Moreira Costa et al., 2021), anchoring bias (Bouteska & Regaieg, 2020), regret aversion (Awais & Estes, 2019), loss aversion (Kumar & Babu, 2018), mental accounting (Banerjee et al., 2019), representativeness bias (Irshad et al., 2016), and herding behaviour (Espinosa-Méndez & Arias, 2021).

2.1. Overconfidence bias

Overconfidence defines as "the tendency to overestimate the probability of achieving one's objectives as a result of a presumptuous belief in one's abilities or attributes as they may be used to bring about a particular outcome" (Fabre & François-Heude, 2009, p. 80). Meanwhile, Skala (2008) coined that overconfidence is the miscalibration in the judgment of a probability. Explicitly, Moore and Healy (2008) break down the definition of 'overconfidence bias' into three distinct ways. They segregate *overconfidence* and define it as a condition in which: 1) an investor overestimates his or her ability to make the right investment decision or the performance of an investment product (*overestimation*), 2) occurs when investors perceived that they have an investment skill, which is better than the average investor (*overplacement*), and 3) when the investor favourably perceived that they know the correct method to manage an investment portfolio (*overprecision*).

This bias is the culprit behind several befuddling anomalies in financial markets such as misevaluations, excessive trading volumes, and the disposition effect. Until now, researchers have not yet come to conclusion about the cause of overconfidence bias. What has been confirmed so far

is that investors often overestimate their abilities to complete a difficult task successfully, for instance, buying winning stocks. Investors usually believe that their knowledge is better than average, and their predictions are more precise than others. Nevertheless, in reality, they lack any formal training or education on the proper knowledge of investment.

Most of the empirical evidence regarding overconfidence was derived from experimental, quantitative studies, and financial market data, as reviewed by Skala (2008). Studies on financial market data dominate the empirical evidence on this bias (Kumar & Goyal, 2015), which contributes significantly to the progress of research on overconfidence bias. By reviewing the empirical evidence of overconfidence bias, we found that though some well-structured studies have been conducted in the context of typical investors (equity, future, mutual fund), we believe the findings that this study offers, to our knowledge are novel. We also believe that our result concerning overconfidence bias in the decision-making process of Ponzi scheme investors represents the most exciting contribution of this paper.

2.2. Overview of the Ponzi scheme

The term 'Ponzi scheme' emerged circa 1920 inspired by the renowned $15 million fraudulent investment scheme perpetrated by an Italian white-collar criminal named Charles "Carlo" Ponzi. Nowadays, the term Ponzi scheme is referred to as "an investment fraud that involves the payment of purported returns to existing investors from funds contributed by the new investor" (Thanasi & Riotto, 2017, p. 194). In other words, a Ponzi scheme is an investment fraud wherein the operator promises a return on investment that is higher than the traditional investment offers (Jory & Perry, 2011).

According to the common operational framework of a Ponzi scheme, the operator pays "dividends" using the original amount contributed by earlier investors. In practice, a Ponzi scheme simply siphons money from later participants to reward earlier participants. Based on that *modus operandi*, a Ponzi scheme will inevitability fail when insufficient new investors cannot be recruited to facilitate the continued payment of the promised "dividends". On that account, they usually encourage investors to reinvest their profits to keep the sequence going.

The Ponzi was speculated as the main catalyst for various financial collapses around the globe. Even though the issue of the Ponzi scheme investor's decision-making behavior seems to be laying on the individual level of the economics perspective, it possesses a domino effect on macroeconomics (Jarvis, 1999). The first ever recorded investment fraud was in the 18th century in France where John Law, who was an economist, articulated a scheme that triggered a financial collapse, which is called the Mississippi Bubble. Another example is the collapse of the Albanian economy in 1997 after four years of rapid growth. A massive number of Albanians were declared bankrupt and lost their life savings funds due to the Ponzi scheme investment. This condition has led the country into political and economic turmoil that took its toll on the country's stability and growth until now.

It is befuddling how the unattended issue of the Ponzi scheme investor's decision-making behavior could manifest in the macro level of an economy as coined by Bhuin (2015). Therefore, we found that there is a window of opportunity to adopt a new theory in elucidating the decision-making behavior of the Ponzi scheme investor. Prior research had taken a few theories to explain the influencing factors of their behavior, for instance, the *theory of gullibility* (Greenspan, 2009), the *principle of influences* (Kupferschmidt, 2017), and the *affinity fraud* (Perri & Brody, 2012). Nonetheless, to investigate the existence of interferences in the decision-making process of Ponzi scheme investors, we put forward the prospect theory which is one of the foundations of behavioral finance theory.

2.3. Previous literature on investment fraud

A review of previous works indicates active research into various aspects related to the functioning of the Ponzi scheme. Extensive evidence of fraud was found in the context of false financial reports and employee dishonesty (Tan et al., 2017). In another strand of literature, ample evidence was found in terms of identifying investment fraud using statistical anomalies (Drew & Drew, 2010) and the Sharpe ratio (King & van Vuuren, 2016). We were inspired by the previous studies that address the issue of Ponzi schemes in various contexts, such as Mohammed (2021) and Ullah et al. (2022).

Nevertheless, the analysis of the literature review indicates that there are limited studies concerning the anomalies in the decision-making process of Ponzi scheme investors, especially in Malaysia. Moreover, the previous evidence gathered by the researcher in Malaysia such as Muda et al. (2003), Mohd Sulaiman et al. (2015), and Kasim et al. (2020) did not address the issue of the Ponzi scheme investor's decision-making behavior. Therefore, this study intended to bridge the contextual gap by examining the psychological bias in the decision-making process of the Ponzi scheme investor in Malaysia.

3. RESEARCH METHODOLOGY

This study investigates the overconfidence bias in the decision-making process of Malaysian investors in Ponzi schemes. The participants in this study were investors in local Ponzi schemes from various provinces. To determine the prevalence of overconfidence bias in their decision-making process, we must employ a research methodology that is capable of acquiring rich and realistic data. Therefore, qualitative design is suitable for this investigation. The qualitative design entails analyzing in-depth data derived from an empirical data-gathering method, the semi-structured interview in this research. Alternatively, the investigation of overconfidence bias could be conducted using the quantitative methodology, if a sufficient research sample could be recruited to perform the statistical analysis.

This type of data will provide vital insight and knowledge regarding the actual perspectives and

experiences of investors in natural settings. There are several potential study designs for addressing such difficulties. According to Sekaran and Bougie (2016), the choice of an appropriate research method can also be influenced by the current state of knowledge in a particular study field of study. As highlighted above, Ponzi schemes are a reoccurring concern in Malaysia that must receive sufficient academic attention. As a result, definitive conclusions could not be drawn.

Previous studies such as Abdul Ghani et al. (2020) and Muda et al. (2003) demonstrated that the qualitative research method is compatible with investigating the unique type of investors such as the Ponzi scheme investors. Moreover, Baghdadabad et al. (2011) and Al-Hajieh et al. (2011) successfully uncover the decision-making process of Malaysian retail investors using a qualitative case study method. The traditional quantitative method is favorable in finance and banking research compared to the qualitative investigation. We resort to this method because it is bounded to comprehensively unravel a specific phenomenon rather than seeking generalization beyond that phenomenon (Dupagne & Garrison, 2006).

This study targets hard-to-reach respondents and collects sensitive information that could compromise the respondent's privacy. To answer the research questions, we combined an in-depth, face-to-face interview with a semi-structured questionnaire. Respondents were able to share their views and feelings and elaborate on their experiences in a safe and professional environment. It has been argued that in-depth interviews are one of the most effective data-gathering methods in qualitative research because they allow the interviewer to immerse themselves in the informant's thinking and experience their reality from their point of view (Bryman et al., 1990).

3.1. Data collection procedure and selection of respondents

The face-to-face interview was conducted between October 2018 and March 2019 using semi-structured questionnaires. A semi-structured interview was chosen because of its adaptability in collecting data and giving a comprehensive data set for the study (Dawson, 2010). In addition, the face-to-face interview method might collect nonverbal information from respondents, such as their gestures, facial expressions, and voice intonation. The semi-structured interview methodology was developed using the questionnaire adopted by Ali and Haibing (2014) to explore the purchasing behavior of stock market participants. A specialist analyzed the questionnaire and made a few adjustments to accommodate the purpose of the research. In addition, the questionnaire was evaluated in a pilot study before the fieldwork investigation. The following are the questionnaire's specifics (Table 1):

Table 1. Interview questions

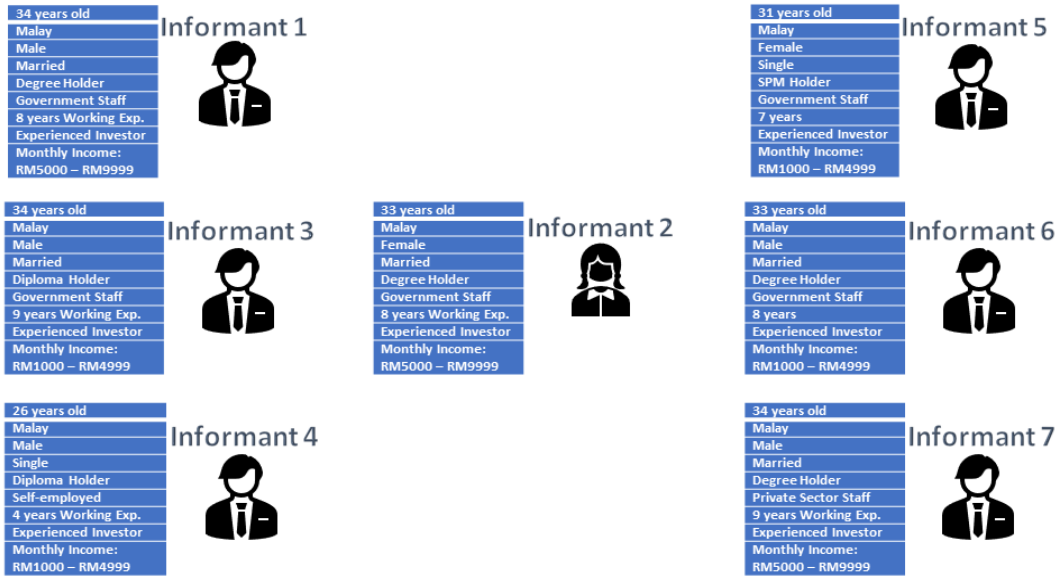
Questions
1. Do you have relatively adequate information before you make investment decisions? Does that information make you feel confident in your decision? (Prompt: *Type of information, Source of information, Search of information*)
2. How do you analyze the available information before you decide to invest? (Prompt*: Based on offered returns, Based on people who recommended the scheme*)
3. How do you expect the outcome of this/previous investment? How confident are you that it will be successful? (Prompt: *Feelings, Hope, Expectation*)
4. Will you invest in another investment scheme? Why? (Prompt: *Other schemes that offer returns that can cover the previous losses*)
5. If the return on investment fulfills your expectation, will you invest more in this particular investment scheme? Why? (Prompt: *Given that already received a certain amount of return*)
6. Why do you think that you have made the right investment decision? (Prompt: *Investment knowledge, Networking, Educational level, Investment experience, Financial condition*)

Source: Authors' elaboration.

Ponzi scheme investors have been identified and selected based on the purpose of providing rich and relevant information. Seven respondents from the three Ponzi schemes were selected using homogenous purposive sampling. The purposive or purposeful sample (also known as the non-probability sample) is the standard sampling technique for qualitative design. In addition, we select a research sample with a high degree of homogeneity so that we may concentrate on the precise similarities and how they relate to the understudied topic as recommended by (Patton, 2002). Following the qualitative principles, we selected the respondents to obtain comprehensive information about the phenomenon of interest, not to construct a statistically representative sample of the total population.

Even though the sample size of qualitative research is often less than that of quantitative research, the in-depth qualitative data could provide a plethora of information from the informant's remarks, feedback, and descriptions (Maxwell, 1996). Such detailed information provides insight into the context and significance of the events or phenomena under investigation. According to Braun and Clarke (2013), a sample size of fifteen to thirty individual interviews is usual for research that seeks to discover trends across data. Previous research, such as that by Crossley (2009), indicates that studying a single participant is sufficient to accomplish the research purpose. As a result, we utilized the notion of saturation to determine the required sample size for the qualitative investigation. Saturation occurs when additional data cannot produce new information (Braun & Clarke, 2021). We illustrate the profile of all informants in Figure 1.

Figure 1. Profile of informants



Source: Authors' elaboration.

Before commencing the fieldwork data collection, we completed a preliminary study to gain valuable insight to improve our methodological and technical issues. Kim (2011) posits that conducting the pilot study has outstanding benefits in preparing the research instruments, handling the technical challenges, and improving our respondent's recruitment strategy. The in-depth interviews took place from April to August 2018. All interviews were conducted on the site chosen by the respondents at their convenience. Each interview averaged around 45 minutes and was audiotaped with the expressed permission of the respondents.

3.2. Conducting thematic analysis

Fundamentally, there are a variety of qualitative data analysis techniques. The "thematic coding" procedure is the most prevalent and widely utilised technique for qualitative analysis in social science research. This process is more commonly known as thematic analysis. Gerald Holton pioneered this technique, which evolved into "thematic coding" (Patton, 1990). Coding was defined as the conceptualization and reduction of qualitative data into sensible categories (Corbin & Strauss, 2012). Eventually, qualitative researchers accepted it as "thematic analysis". Thematic analysis (TA) is defined as a qualitative analysis technique that focuses on coding-identified themes. The thematic analysis consists of seven steps, beginning with transcription and ending with report writing. Table 2 below shows these steps.

All seven interviews were meticulously transcribed to prevent data loss by remaining as close to the actual interview conversation as possible. For instance, pauses were transcribed as three full-stops (...), (informed by symbols of conversation analysis), and non-semantic sounds (such as "umm" and "uh-huh") were noted because the researcher was uncertain whether these aspects of the interview would contribute to the analysis or prove irrelevant. The primary documents will be analyzed using ATLAS.ti software is the verbatim. Based on Braun and Clarke's (2013) seven stages of thematic analysis, the author established seven steps for using the ATLAS.ti software to conduct thematic analysis (see Table 3). This is a general guideline for qualitative researchers unfamiliar with the software to follow. According to the authors' experience, ATLAS.ti software is very useful for identifying patterns of meaning across a dataset, which leads to robust qualitative reasoning when drawing inferences, developing models, or generating theories. It has also been demonstrated to reveal the hidden connection between concepts and the relationship between seemingly unrelated ideas.

Table 2. Braun and Clarke's (2013) seven stages of thematic analysis

Stage	*Descriptions*
1	Transcription.
2	Reading and familiarisation; taking note of items of potential interest.
3	Coding-complete; across the entire dataset.
4	Searching for themes .
5	Reviewing themes (producing a map of the provisional themes. and subthemes, and relationships between them — aka 'thematic map').
6	Defining and naming themes.
7	Writing-finalizing analysis.

Table 3. Thematic analysis procedure in ATLAS.ti

Step	*Descriptions*
1	Uploading verbatim, video, or photograph as the primary document.
2	First-level coding: to identify the main construct or concept across the primary documents.
3	Second level coding: to review code names and re-code constructs or concepts as emerging themes and subthemes.
4	Naming themes and subthemes.
5	Identifying the association between themes and subthemes using the Network diagram.
6	Preparing the quotation report and importing the network diagram.
7	Writing-finalizing analysis.

Source: Authors' elaboration.

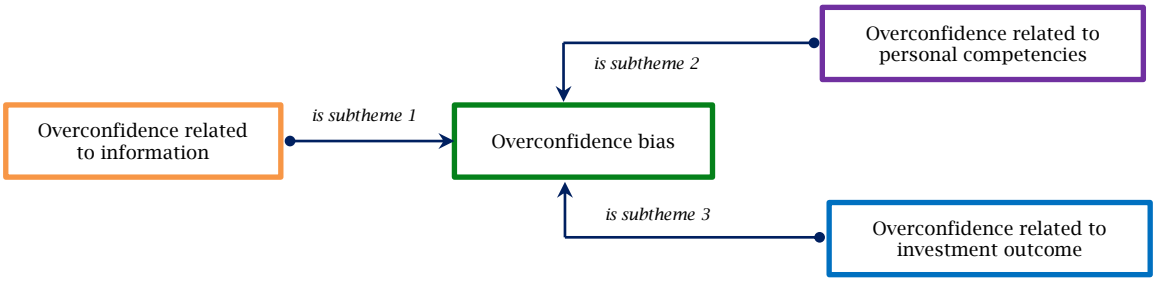
3.3. Data analysis procedure

This section will present the thematic analysis procedure conducted using ATLAS.ti software. Only one construct was investigated in this study, namely, the 'overconfidence bias'. Therefore, we expect that the primary theme of the study that will emerge from the thematic analysis will be named *overconfidence bias*.

3.3.1. First-level coding

Based on the procedure depicted in Table 3, we conducted the first-level analysis, which revealed three emerging subthemes of the study. The following Figure 2 and Table 4 will depict the visualization of the first-level coding and the description of emerging subthemes.

Figure 2. Emerging subthemes for the first-level coding



Source: Authors' elaboration (developed using ATLAS.ti).

Table 4. Description of emerging subthemes from the first-level coding

Subtheme	***Descriptions***
Overconfidence related to information	The presence of overconfidence bias relates to the investor's perceptions of having sufficient information about the scheme that they intend to invest into.
Overconfidence related to investment outcome	The presence of overconfidence bias relates to the investor's perceptions of gaining a positive investment outcome.
Overconfidence related to personal competencies	The presence of overconfidence bias relates to the investor's perceptions of their personal competencies.

Source: Authors' elaboration

3.3.2. Second-level coding

Afterward, the authors conducted the second level of coding to identify emerging categories for all subthemes. As a result, three new categories were derived from the coding process, as illustrated in Figure A.1 (see Appendix). We uncovered one negative evidence of *overconfidence related to information* (assigned as number 1 in Figure 3). Moreover, we found two categories of *overconfidence related to personal competencies* subtheme: personal competency related to *financial aspects* (assigned as number 2) and personal competency related to *psychological aspects* (assigned as number 3).

Sequentially, using the "Memos" function in ATLAS.ti software, the authors assigned a new interpretation to the non-homogeneous quotation by informant seven, as illustrated in Figure A.2 (in Appendix). Then, this quotation was coded as a new node based on the new interpretation and emerged as a new subtheme for theme 1 ("*overconfidence related to information*"). The process of assigning new code was conducted using one of the network diagram functions ("New Code").

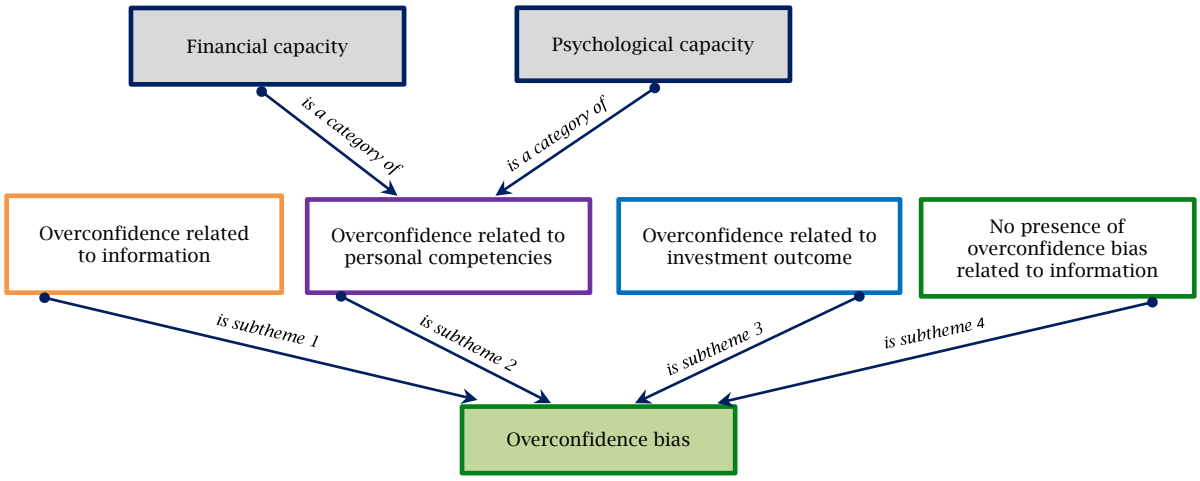
Likewise, two categories of *overconfidence related to personal competencies* subtheme were assigned a new code that accurately presented the concepts as depicted in Figure A.3 and A.4 (in Appendix). The new subtheme derived from the second-level coding was named "*No presence of overconfidence bias related to information*". Meanwhile, two new categories were named "*Psychological capacity*" and "*Financial capacity*", as demonstrated in Figure A.5 (in Appendix).

Eventually, we connected all the emergent subthemes and categories in a new network diagram. As observed in Figure 3, the central theme of *overconfidence bias* comprises four subthemes:

- overconfidence related to information;
- overconfidence related to personal competencies;
- overconfidence related to investment outcome;
- no presence of overconfidence bias related to information.

As for the subtheme of *overconfidence related to personal competencies,* two categories emerged from the thematic analysis: *financial* and *psychological capacity*. The following section will summarize the evidence for all subthemes and categories.

Figure 3. Emergent subthemes and categories of the study



Source: Authors' elaboration (developed using ATLAS.ti).

4. RESULTS

4.1. Evidence of subtheme 1: Overconfidence related to information

The evidence for subtheme 1, which pertains to overconfidence related to information, is presented in Table 5. This table displays six quotations that were derived from the coding process utilizing ATLAS.ti software.

Table 5. List of quotations for subtheme 1

Subtheme 1	*Quotations*
Overconfidence related to information	**1:2 ¶ 10 in Informant 1** Through Facebook. Um, because, um, a lot of people joined. Uh-huh, so many people shared, that time, when I joined, I am also active with Facebook.
	2:1 ¶ 10 in Informant 2 Um, when I saw the newsfeed, I felt confident. I want to join immediately.
	3:1 ¶ 10 in Informant 3 When I studied — it is very clear, logical, and achievable by his team and his community. That's why I joined.
	4:1 ¶ 10 in Informant 4 From the perspective of the company — I consider it as strong. I studied the company…
	5:1 ¶ 10 in Informant 5 For KB (*Khazanah Bangsa* Gold Investment Scheme), yes, I did have (enough information).
	6:1 ¶ 10 in Informant 6 I already understood. Uh-huh, I will study first. Before I want to do (invest) it.

Source: Authors' elaboration (compiled from ATLAS.ti quotation report).

4.2. Evidence of subtheme 2: Overconfidence related to personal competencies

Table 6 presents the evidence for subtheme 2, which focuses on the phenomenon of overconfidence related to personal competencies. Our analysis revealed two categories within this subtheme, namely psychological capacity and financial capacity. The table displays seven quotations that are related to this subtheme.

Table 6. List of quotations for subtheme 2

Subtheme 2	*Category*	*Quotations*
Overconfidence related to personal competencies	Psychological capacity	**2:3 ¶ 23 in Informant 2** I always won 'the quick shot'.
		3:3 ¶ 23 in Informant 3 My friend always says that I am bold. I am bold because when I made up my mind, I will not step back.
	Financial capacity	**1:4 ¶ 23 in Informant 1** Make sure financially strong. It depends on the financial.
		4:3 ¶ 23 in Informant 4 Maybe because I am financially stable. So, I have a disposable income.
		5:3 ¶ 23 in Informant 5 Because it is easy for me to get personal financing, that's it.
		6:3 ¶ 23 in Informant 6 Uh-huh, because I have the capital. I know, firstly because I have savings.
		7:3 ¶ 23 in Informant 7 I have savings at that time.

Source: Authors' elaboration (compiled from ATLAS.ti quotation report).

4.3. Evidence of subtheme 3: Overconfidence related to investment outcome

Table 7 presents the findings related to subtheme 3, which examines the phenomenon of overconfidence related to investment outcome. The analysis of the data led to the identification of seven quotations that are relevant to this subtheme.

Table 7. List of quotations for subtheme 3

Subtheme 3	*Quotations*
Overconfidence related to investment outcome	**1:3 ¶ 17 in Informant 1** Insha'Allah will get the returns. Because the scheme is still new. Insha'Allah will get the returns.
	2:2 ¶ 17 in Informant 2 It felt like it was destined because I really need some extra cash and suddenly, I found that offer–It felt like it was, it was an opportunity of a life time.
	3:2 ¶ 17 in Informant 3 It is a good investment opportunity ((pause)) um, I am confident with all of it.
	4:2 ¶ 17 in Informant 4 I was hoping it'll be successful.
	5:2 ¶ 17 in Informant 5 Indeed. I will re-invest the money.
	6:2 ¶ 17 in Informant 6 Uh-huh confident. If I am not — confident because I can buy another real estate using that returns.
	7:2 ¶ 17 in Informant 7 I am damn confident at that time.

Source: Authors' elaboration (compiled from ATLAS.ti quotation report).

4.4. Evidence of subtheme 4: No presence of overconfidence bias

The study's final piece of evidence is the negative presence of overconfidence bias among Ponzi scheme investors. The data analysis yielded only one quotation, which is presented in Table 8.

Table 8. List of quotations for subtheme 3

Subtheme 3	*Quotations*
No presence of overconfidence bias	**7:1 ¶ 10 in Informant 7** I don't have enough information (about the investment scheme).

Source: Authors' elaboration (compiled from ATLAS.ti quotation report).

4.5. Word cloud analysis

The word cloud query is used to provide a better visual representation of the most used words. To have a clear understanding of what is occurring within the data. Thus, it assists the authors in comprehending the arguments for which they are advocating. A word cloud is formed by using the maximum font size rendered from most occurrences of the same term in coding node references. These words are subject to deletion if any specific word is not desired, given that the word tree, word cloud, and word frequency are based on a word count that leads to the correct understanding of the definition.

Figure A.6 (in Appendix) is a visual representation of the word cloud. This visualization provides us with a straightforward manner by demonstrating key themes. Evidently, the word "*confident*" is the most frequently used term among all seven interviewees. In the meantime, other words with intermediate frequency, such as "*will"* and "*investment*", will give the word "*confident*" a broader meaning. We could understand more deeply by deciphering the message beneath these phrases. The term "*confident*" indicates a feeling of conviction over something. In the context of this investigation, the informants express their emotions or demonstrate confidence in their abilities or attributes. The verb "*will"* expresses the probability or expectation of something occurring in the future. In this situation, the likelihood of investing in another Ponzi scam in the future. The term "*investment"* refers to the Ponzi scheme in which the investor has previously participated or will invest in the future.

5. DISCUSSION OF THE FINDINGS

Overall, the evidence derived from the thematic analysis pointed out that all seven investors exhibited the presence of overconfidence bias in their decision to invest in the Ponzi scheme. The Sankey diagram (please refer to Figure A.7 in the Appendix) illustrates three sub-elements of *overconfidence bias* among Ponzi scheme investors, namely: 1) overconfidence related to information; 2) overconfidence related to investment outcome; and 3) overconfidence related to personal competencies. In addition, Figure A.7 depicts only informant seven does not exhibit the presence of "*overconfidence bias related to information*". In the following subsections, the findings of this study will be described in further detail.

5.1. Overconfidence related to information

This subtheme of *overconfidence bias* could be proposed as the first element of this psychological bias. For this element, investors exhibit the condition of *overprecision* of judgment towards possessing the relevant information about the investment scheme. Ponzi scheme investors in this study favourably perceived that they had sufficient information that could assist them in

making the best investment decision upon deciding to invest in the Ponzi scheme. This miscalibration of judgment created an illusion of control in which they think what they know is enough to make the right investment decision.

This first element of *overconfidence bias* could be described as the *overprecision* of judgment towards possessing the relevant information about the scheme. Investors believed they had enough knowledge to make the best investment selection. Six of seven informants claimed that they only acquired pertinent information from public sources like social media without verifying it with specialists or established sources. Four of the investors explained that they utilized public information conveniently available online such as social media, to do due diligence on the Ponzi scheme. Investor 1 explained:

"*Through Facebook. Um, because um, a lot of people joined. Uh-huh, so many people shared, that time, when I joined, I am also active with Facebook*".

Based on this response, Informant 1 mentioned that he uses the social media platform, Facebook, to look for relevant information about the scheme he intended to invest in. This behavior is similar to Informant 2, in which she claimed that she also uses the newsfeed, a web function for the social media platform Facebook. Investor 2 explained:

"*Um, when I saw the newsfeed, I felt confident. I want to join immediately*".

On the other hand, two investors stated that they use public information to acquire relevant information regarding the scheme. Explicitly, Informant 3 explained that he investigated the background of the scheme founder and his teams before he invested in that scheme. He stated:

"*When I studied, it is very clear, logical, and achievable by his team and his community. That's why I joined*".

Informant 4 also claimed that he had sufficient information about the company behind the scheme before he invested in that scheme. He asserted:

"*From the perspective of the company — I consider it as strong. I studied the company…*"

At this junction, it is reasonable to propose that Ponzi scheme investors deem highly of their judgment, making them despise alternative views from others. Deliberately, they look for information that could validate their decision to invest in that scheme. It seems that they are feeling strongly satisfied that they have made the best investment decision based on the obtained information. This psychological anomaly was also confirmed in previous works such as Ayudiastuti (2021). Due to their possession of "adequate" information, the investors believed they oversaw their investment decisions. Thus, we postulate that the availability of information creates the illusion of control over the limitations of their existing knowledge. The illusion of control causes investors to have confidence in their abilities, which can result in investing outcomes. Nevertheless, one investor did not feel confident about the information he acquired upon deciding to invest in a Ponzi scheme. Even so, he still proceeds to invest in that Ponzi scheme. Informant 7 remarked:

"*I don't have enough information (about the investment scheme)*".

5.2. Overconfidence related to investment outcome

The second element of *overconfidence bias* is derived from the second subtheme: *"overconfidence related to investment outcome"*. This element of *overconfidence bias* could be defined as investors' susceptibility to overestimate the probability of achieving desired investment outcomes, which is positive monetary gains. In other words, investors believe their investment will yield favourable returns without considering other aspects that may affect the investment outcome. We found that all seven investors expressed that they felt confident about having the desired investment outcome. Two informants specifically mentioned "*returns*" in their responses to the interviewer's question. Informant 1 asserted that he was very confident that he gained a return from the scheme he invested in because the scheme was relatively new at that time. He stated:

"*Insha'Allah will get the returns. Because the scheme is still new. Insha'Allah will get the returns*".

Informant 6 exhibits confidence about the desirable investment outcome by explaining his plan for the investment returns he will receive. He said:

"Uh-huh, confident. If I am not, confident because I can buy another real estate using that returns".

Meanwhile, two informants exhibited *overconfidence bias* toward the investment outcome by associating the Ponzi investment scheme as an opportunity that arises infrequently or rarely. Informant 3 expressed his confidence in the outcome of the investment, stating that the scheme represents a good investment opportunity. Interestingly, he was also confident with every scheme he invested in, even though it turned out to be the opposite. He responded:

"*It is a good investment opportunity* (pause) *um, I am confident with all of it*".

Informant 2 explained that the investment opportunity she encountered was a once-in-a-lifetime opportunity and was destined for her to invest in that scheme. She stated:

"*It felt like it was destined because I really need some extra cash and suddenly, I found that offer. It felt like it was, it was an opportunity of a lifetime*".

On the other hand, Informant 4 expressed his confidence in the investment outcomes by betting on with possibility that the investment will be turned out to be successful. He said:

"*I was hoping it'll be successful*".

Informant 5 did not directly state that he was confident with the investment outcome. He stated that he would re-invest the returns on investment and receive the same scheme. The author interpreted this behavior as the manifestation of his confidence in future earnings from the scheme he invested in. He said:

"*Indeed. I will re-invest the money*".

Furthermore, Informant 7 was the only one who specifically confessed that he was very confident with the investment outcome when he invested in the Ponzi scheme. He confessed:

"*I am damn confident at that time*".

Investing in a Ponzi scheme involves a perilous risk. Surprisingly, regardless of the risk, those investors are extremely positive about its outcome. It could be because investors tend to assign

a positive framing to the investment outcome. The lucrative returns guaranteed by the scheme's perpetrator clouded their judgment and rationality. We argue that investors with unreasonable financial objectives may pursue unrealistic investment strategies. Unrealistic financial goals might alter risk preferences in repeated risky decisions in a systematic manner (Marbacher et al., 2021). Given that predicted losses are undetermined, therefore, investors' risk preferences may shift from risk-averse to risk-seeking, as demonstrated by (Okder, 2012). However, we lack the necessary evidence to concur with this argument.

5.3. Overconfidence related to personal competencies

The final subtheme of *overconfidence bias* is related to investors' tendency to miscalculate their ability to make a prudent investment decision. This miscalculation produced an illusion of control in which investors perceived they possessed the proper tools, skills, and knowledge to manage their investment portfolio. The data analysis revealed two sub-elements of *overconfidence related to personal competencies*: financial and psychological capacity. The financial capacity sub-element was deductively derived from five informants who specifically mentioned that their financial condition (the possession of monetary savings) caused them to underestimate the risk.

Nevertheless, no evidence suggests that an investor's risk propensity could be associated with saving behavior. We cautiously presumed that investors resorted to their financial capacity as the focal point to justify their decision or coordinate their actions (investing in a Ponzi scheme). From our point of view, possessing monetary savings institutes a fallacy that leads investors to believe that using their savings as investment capital will serve as a "security net" that absorbs undesired financial outcomes while maintaining their current lifestyle or existing buying power. This fallacy distorts investors' rational decision-making and could be the culprit behind their stimulus to invest in the Ponzi scheme.

Accordingly, when asked about the justification of investing in such a high-risk investment, five informants mentioned that saving could be associated with that risky decision. Informant 1 asserted that an investor must possess a reliable financial capacity before venturing into a Ponzi scheme investment. He remarked:

"*Make sure financially strong. It depends on the financial*".

Meanwhile, three informants mentioned that having a disposable income or savings could influence them to become assured in their decision process. Informant 4 claimed:

"*Maybe because I am financially stable. So, I have a disposable income*".

Informant 6 replied:

"*Uh-huh, because I have the capital. I know, firstly because I have savings*".

Informant 7 commented:

"*I have savings at that time*".

Allegedly, Informant 5 explained that the accessibility to personal financing might play an essential role in shaping his investment decision. Based on the informant profile in Figure 1, Informant 5 works with the government sector, which is the preferable client for financing products by local banking and financial institutions. By that, Informant 5 possesses a certain amount of saving that he acquired from personal financing. He coined:

"*Because it is easy for me to get personal financing, that's it*".

As for the personal capacity sub-element, two informants tend to rely on psychological attributes to decide to invest in the Ponzi scheme. The psychological attribute domain related to this finding is social and personality. This sub-element of *overconfidence bias related to personal competencies* could be defined as the *overplacement* of psychological attributes that leads to the assumptive belief in their social and personality ability. Investors exhibiting this sub-element could perceive that they possess the suitable social and personality ability to produce a positive investment outcome. Informant 3 could be the best example of this overplacement of the psychological attribute. He framed his risk preference in investment decisions to his assertive personality. He noted:

"*My friend always says that I am bold. I am bold because when I made up my mind, I will not step back*".

Additionally, Informant 2 framed her decision to invest in the Ponzi scheme based on luck-related concepts. During the interview, she described that the Ponzi scheme she invested in had a regular competition. This competition is called the "*quick shot*". Using the social media platform, the perpetrator posted the "quick shot" competition and rewarded the winner with cash prizes. She was one of the frequent winners of the "quick shot" competition. She claimed:

"*I always won 'the quick shot'*."

Those winning streaks amplified her confidence in the scheme which leads to unrealistic optimism. Unrealistic optimism, also known as 'positive illusion' Jefferson et al. (2017), could be traced back to the belief in luck, as explained by (Day & Maltby, 2005). We argue that unrealistic optimism may lead investors to miscalculate the possibility of future events and develop a false or exaggerated sense of their ability, eventually encouraging them to adopt unrealistic risks. Our evidence proposes that unrealistic optimism could be associated with the investor's belief states.

We convince that this belief state is founded on investors' cognitive ability and financial capacity, particularly when making a risky decision. At this point, it is satisfactory to propose that investors in this study could be regarded as highly optimistic investors. And investors with high optimism might be susceptible to investing in a risky investment such as a Ponzi scheme. We accord with Zhao et al. (2015), who argue that any form of exaggerated optimism could modify the processing of information related to making decisions under uncertainty. Optimism may stimulate investors to believe that a favorable event is more likely on their side and unfortunate events are not likely to occur. Investors believe their chances of achieving investment success are higher than the "average" person's or higher than the actual probability. This perception will overcome any reasonable doubt raised by external or internal thoughts.

6. CONCLUSION

This article examined whether investors in Ponzi schemes exhibit overconfidence bias when considering investing in a Ponzi scheme. We explored this specific psychological bias by interviewing seven investors in Ponzi schemes. We acknowledged the limitations of exploratory research. This constraint suggests we should proceed with caution when drawing conclusions from this study's findings. Consequently, we concluded that investors in Ponzi schemes are susceptible to overconfidence bias. This intriguing psychological bias may explain the mechanism driving investors' chronic optimism in Ponzi scheme investments. Our findings contribute to the emerging research avenue in investigating Ponzi scheme investors using the behavioral finance theory and contribute to a more in-depth understanding of psychological bias, particularly *overconfidence bias*.

Even though homogeneous purposive sampling enables us to look at the issue in-depth, one problem with this study is that this finding cannot be applied to all Malaysians who have invested in Ponzi schemes. Therefore, in the future, it will be intriguing to explore overconfident bias in the various population of Ponzi scheme investors. Further, to support the present finding, a quantitative study on a large scale could be administered on a large population of Ponzi scheme investors in Malaysia. Future research should explore other psychological biases that could be rooted in the behavior of Ponzi scheme investors. This effort will spearhead interesting cross-discipline research by integrating existing behavioral finance theories and social phenomena.

As new Ponzi schemes continue to flourish, we opine that depending simply on laws and policies to curb the constant flood of new Ponzi schemes proved insufficient. Hence, policymakers should address this issue using a bottom-up approach, in which, the Ponzi scheme issue must be observed through the lens of investor behavior and cognitive psychology. We hope that these current findings served as a wake-up call for all stakeholders. Ponzi scheme investors should not be regarded as mere victims of a fraudulent investment scheme. Evidently, they possess similar behavior with other financial instruments investors. Rational investors with well-equipped investment skills and financial savvy would mitigate the detrimental effect of the Ponzi scheme on micro and macroeconomics.

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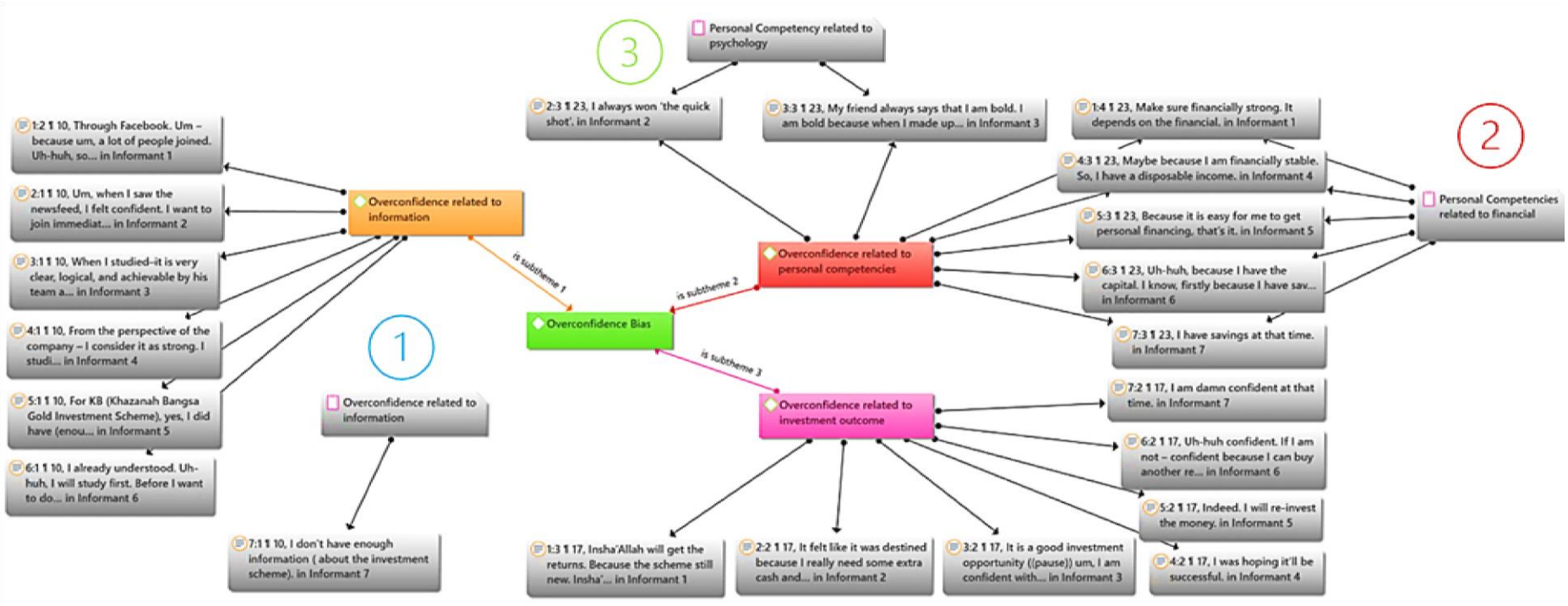
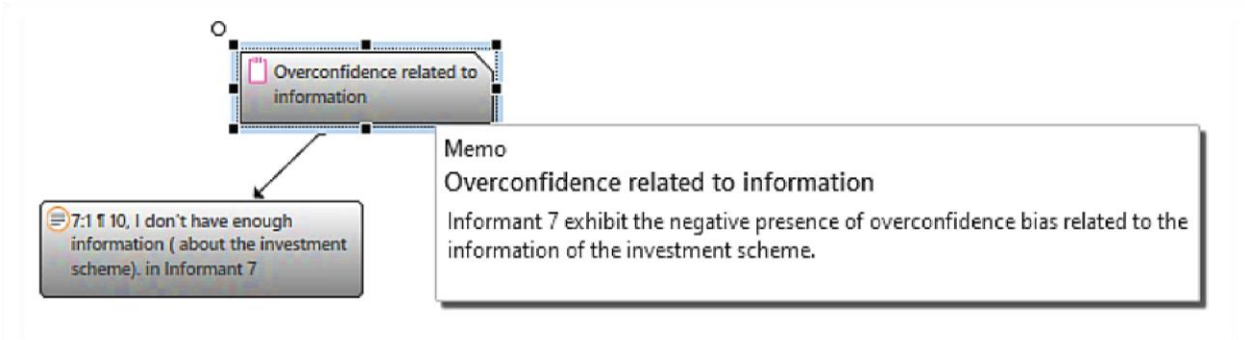
APPENDIX

Figure A.1. The second-level coding using memos function



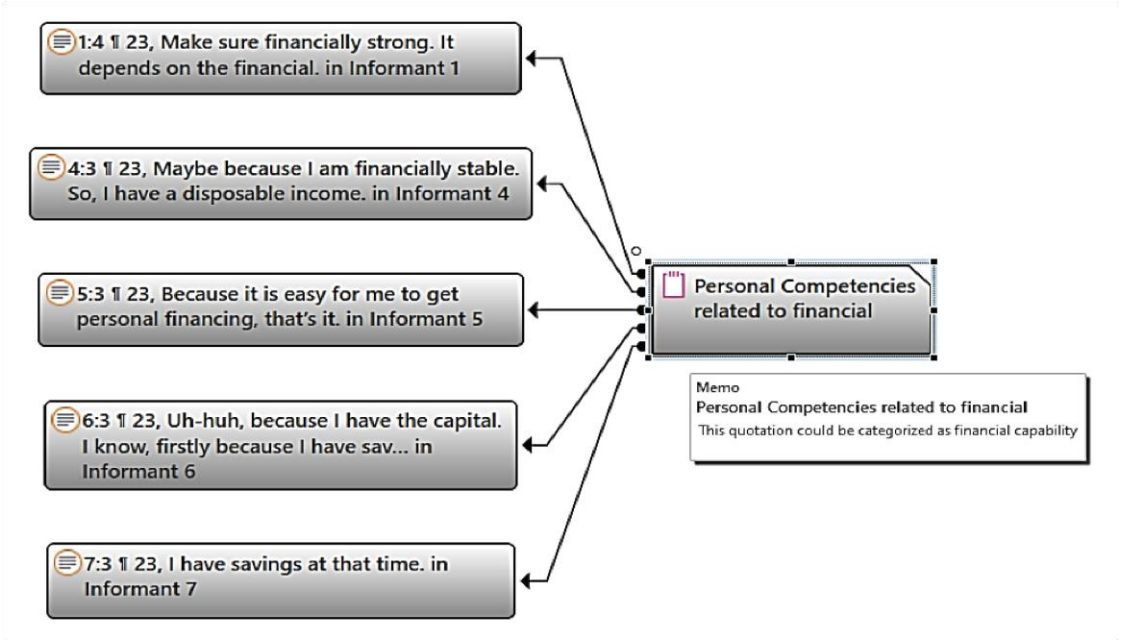
Source: Authors' elaboration (developed using ATLAS.ti).

Figure A.2. The second-level coding using memos function — Emergence of new subtheme



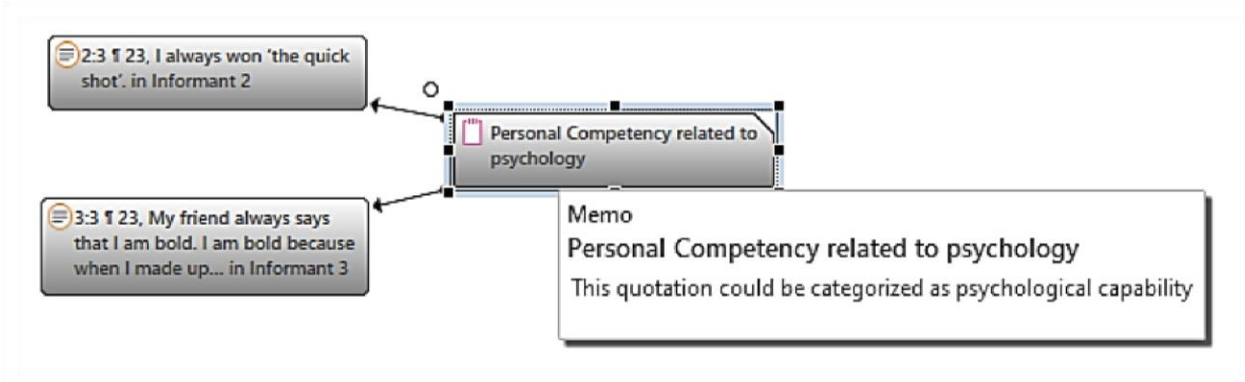
Source: Authors' elaboration (developed using ATLAS.ti).

Figure A.3. The second-level coding using memos function — Emergence of category 1



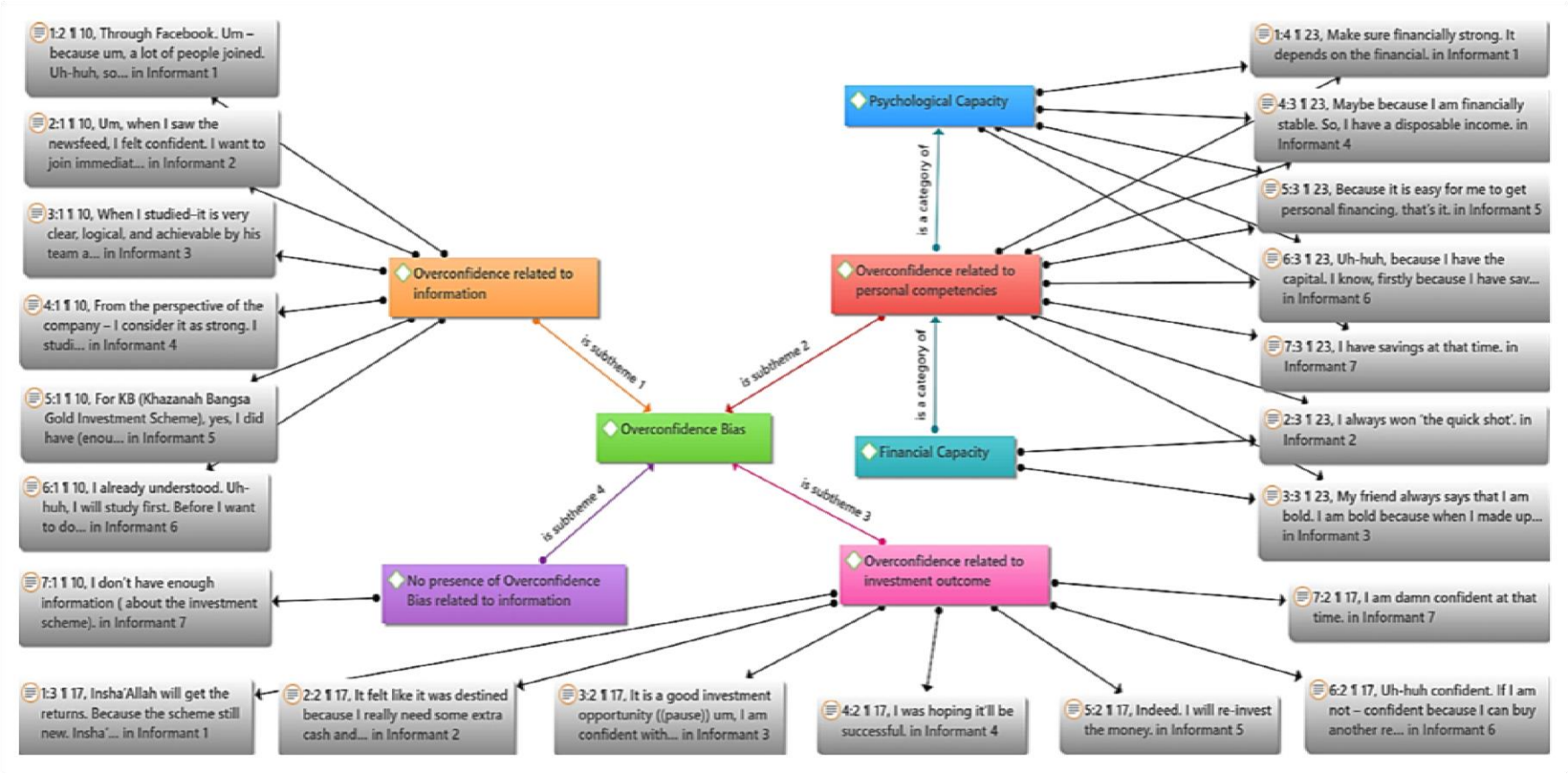
Source: Authors' elaboration (developed using ATLAS.ti).

Figure A.4. The second-level coding using memos function — Emergence of category 2



Source: Authors' elaboration (developed using ATLAS.ti).

Figure A.5. Emerging of the new subtheme and categories

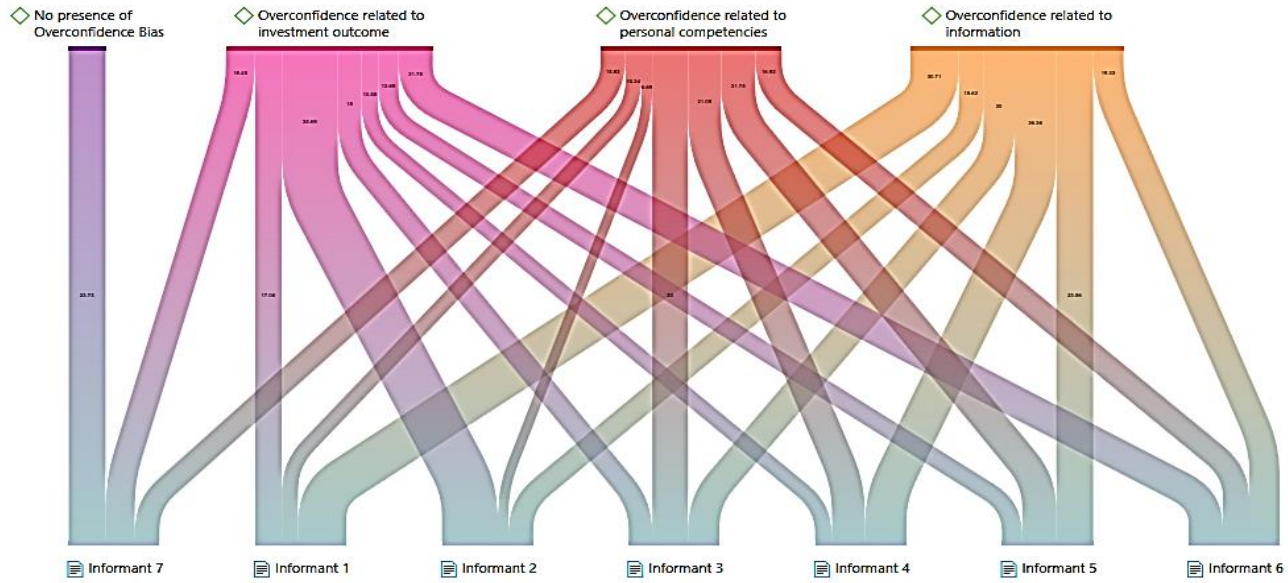


Source: Authors' elaboration (developed using ATLAS.ti).

Figure A.6. Word cloud

Source: Authors' elaboration (developed using ATLAS.ti).

Figure A.7. Sankey diagram for subthemes



Source: Authors' elaboration (developed using ATLAS.ti).