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Investors' Information Processing Behavior: Management Disclosures' Fluency and Sentiment

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ABSTRACT

This study investigates the influence of management disclosures' fluency and sentiment on investors' information processing behavior (IPB), and explores how investors' attributes impact their IPB. In this regard, we use a $2 \times 2 \times 2$ between-subjects experimental design to present 201 individual investors with disclosures containing bad news about firm performance. These disclosures varied in terms of fluency and sentiment. Our findings suggest that fluency and sentiment impact investors' IPB. Moreover, expert investors respond differently to variations in fluency and sentiment than non-expert investors, and fluency has a more significant effect on IPB than sentiment. This study offers valuable insights into the impact of fluency and sentiment in management disclosures. Additionally, it underscores the significance of considering investors' characteristics when formulating effective disclosure policies.

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1. Introduction

Management reporting plays a crucial role in communication between managers and investors, offering essential insights into a company's financial performance, strategic direction, and potential risks. It helps align the interests of shareholders and stakeholders, thus reducing conflicts. Typically, financial information is communicated through qualitative, unaudited written explanations (Permatasari & Narsa, 2022; Invernizzi et al., 2022; Hao, 2020; Azizkhani et al., 2018). Management disclosures, including financial reports, earnings announcements, and regulatory filings, significantly impact investors' decision-making by influencing their interpretation and utilization of the provided information. Investor attention is often guided by the accessibility and salience of the information, with less noticeable disclosures potentially being overlooked. Moreover, cognitive biases and decision-making heuristics can affect how investors process information. The timing, context, and sentiment of data releases, such as analyst reports and media coverage, further shape investors' reactions. Disclosures with high transparency and credibility foster positive investor perceptions (Scott, 2019; Asnaashari et al., 2023; Cade, 2018).

Policymakers have long emphasized the importance of narrative disclosures in enabling investors to understand a company's financial performance and associated risks. For instance, the US Securities and Exchange Commission mandated using clear and straightforward language in financial disclosures through its Plain English Handbook (Rennekamp, 2012). Similarly, in Iran, the Stock Exchange Organization has required companies to compile management discussion and analytics reports (MD&A) since December 2016, although further improvements are needed to curb impression management.

The obfuscation hypothesis suggests that managers might use complex language and emotional tones to hide poor performance or unfavorable news (Bassyouny et al., 2022; Li et al., 2022; Tan et al., 2014). Research indicates that investors' cognitive processing is susceptible to biases, leading them away from rational decision-making (Merkl-Davies & Brennan, 2007). Investors often rely on meta-cognitive experiences, moods, and emotions when processing information. This reliance on heuristic cues, especially under low fluency, can lead to a favorable perception of a firm's future despite the underlying facts (Fanelli et al., 2009; Seufert et al., 2017). Conversely, some argue that disclosure obfuscation can improve information processing by encouraging more mental effort in analytical processing (Alter et al., 2007). The complexity may also reveal more profound insights into the communicator's cognitive processes and affective appraisals (Zhang et al., 2023; Yan et al., 2018). This raises the question of how investors' processing behavior is influenced by the fluency and sentiment of management disclosures, a topic of growing interest (McFarland et al., 2023; Li et al., 2022; Hao, 2020).

The impact of disclosure fluency and emotional tone is particularly significant for non-expert investors, who face higher cognitive processing costs. Expert investors, on the other hand, can navigate complex information more effectively and extract additional insights embedded within disclosures (Sahoo, 2022; Yan et al., 2018). This raises an important question about how expertise mediates the effect of fluency and sentiment on information-processing behavior. We want to know "Do investors' attributes contribute to predicting their behavior in information processing?" The traits of investors may be powerful in figuring out their information processing, as the type of communication and, additionally, the way of presenting financial information can affect their decision-making process.

Decision-making is a complex process influenced by various factors, including demographic characteristics, experiences, values, and emotions (Mayfield & Shapiro, 2010; Chitra & Ramya Sreedevi, 2011). For example, women and older investors tend to exhibit higher levels of loss aversion (Brooks & Zank, 2005), and personality traits play a critical role in shaping behavior (Fung & Durand, 2014). This leads to the research question of whether investors' attributes predict their behavior in processing information.

2. Literature Review and Hypotheses Development

Investors' analysis depends significantly on how information is presented; rather than on their important decisions, it depends on how they view the presentation and disclosure indicators. The style of disclosure can have direct and indirect impacts on financial and management decisions (Hasan, 2020). Several research studies show that a manager's unique disclosure style is tied to observable demographic characteristics of their background. Thus, the disclosure is related to individual attributes (Bamber et al., 2010; Bernhardt et al., 2023)

Managers can influence investors' judgments and decisions by various types of the linguistic sentiment and readability of disclosure, and this influence is moderated by investors' information processing style (El-Sayed et al., 2021; Besuglov & Crasselt, 2021; Aram & Soroushyar 2024).

Thus, qualitative information is crucial in disclosures, providing essential details and explanations about a company's performance, strategies, and future goals for investors' analysis (You & Zhang, 2009; Cazier et al. , 2020). The choice of style in disclosures significantly influences investors' IPB and decision-making (Elliott et al., 2023; Meng & Zhang, 2022; Tan et al., 2015; Widyatama & Narsa, 2023).

2.1. Management Disclosures Incentives

The literature examining strategies for narrative disclosures in corporate documents has typically assumed that these discretionary disclosure strategies provide valuable additional information or serve impression management purposes (Bassyouny et al., 2022; Saeedi et al., 2020; Merkl-Davies & Brennan, 2007).

The school of thought focused on incremental information, and grounded in agency theory, posits that managers disclose information to reduce information disparities between themselves and investors. On the other hand, the impression management perspective elucidates managerial disclosure strategies as opportunistic conduct in which the content and presentation of information are manipulated to distort readers' perceptions (Brennan et al., 2009). Baginski et al. (2011) discovered that explanations in management disclosures can enhance revisions made by financial analysts.

Impression management originates in social psychology and explores how individuals present themselves to others to be favorably perceived. When adverse outcomes within the organization result in a conflict of interest between managers and shareholders, managers are motivated to manipulate external perceptions to divert attention from poor performance (Hao, 2020). According to the obfuscation hypothesis, management makes linguistic choices to persuade or impress readers and conceal unfavorable performance. Drawing on the feelings-as-information theory, the subjective experience of ease or difficulty is a source of information in judgment and choice, influencing individuals' processing strategies (Zhang et al., 2023; Yan et al., 2018).

2.2. Fluency, Sentiment, and Information Processing Models

Aligned with the dual-process model, individuals engage in two models of information processing: One is swift, intuitive, and undemanding (System 1), while the other is deliberate, laborious, and analytical (System 2). A methodical utilization of information is more likely when processing motivation and cognitive ability are high, without the constraints of time pressure and cognitive load (Pham et al., 2001).

There are two contrasting perspectives regarding the influence of impression management on processing models. On the one hand, Alter et al. (2007) suggested that if information processing is perceived as effortless, System 1 is more likely to be activated. Conversely, Seufert et al. (2017) asserted that the effect of perceived difficulty in processing leads to heightened engagement of System 2, characterized by intensified working memory activities and a more significant cognitive load.

Fluency in text encompasses two categories: linguistic aspects (e.g., concise sentences, common vocabulary, avoidance of passive voice, avoidance of redundancy) and formatting (clear headings, well-structured layout, appropriate use of tables, and markers for headings) (Asay et al., 2017). High-fluency disclosures facilitate a better comprehension of the provided information, fostering trust and reliance among investors. This can lead investors towards effortless and intuitive processing (Alter et al., 2007) or more profound analytical scrutiny (Seufert et al., 2017). The consensus in the literature suggests that less fluent documents heighten processing difficulty (Tan et al., 2014) and lead to misleading investors (Hirshleifer & Teoh, 2003).

Moreover, linguistic cues, such as affective tone, influence the audience's mindset. Companies often employ a confident style, projecting an assertive and self-assured stance in their messages, translating into a predominantly positive tone and definitive expressions. This provides a cognitive shortcut that enables investors to reduce estimation uncertainty (Fanelli et al., 2009). Language sentiment in disclosures has been shown to exert a more substantial impact on investors' judgments, especially in cases of lower fluency (Tan et al., 2014). Previous research on financial narratives demonstrates the

communicative relevance of linguistic features, such as tone (Davis et al., 2012). Thus, the first two hypotheses are formulated as follows:

H1: The fluency of management disclosures can significantly influence the information processing behavior of investors.

H2: The sentiment of management disclosures influences the information processing behavior of investors.

The ease with which a stimulus is processed is also affected by the individual characteristics of the perceiver, ranging from their relevant knowledge (Schwarz et al., 2021) and cultural proficiency (Oyserman, 2019) to temporary or enduring disparities in the perceiver's cognitive capacity and motivation. Investors' exposure to various written materials, literary conventions, and standardized formats can shape their reading objectives, techniques, and, ultimately, their comprehension and recall (Wickens & Carswell, 2021). Expert investors, adept at interpreting qualitative information that is not easily quantifiable, are generally more accurate in their firm valuations than non-expert investors (Blau et al., 2015). In light of this, the third and fourth hypotheses are articulated as follows:

H3: Expertise mediates the relationship between the fluency of management disclosures and investors' information processing behavior.

H4: Expertise mediates the relationship between the sentiment of management disclosures and investors' information processing behavior.

2.3. Investors' Attributes and Information Processing Behavior

Investors' personality traits and risk appetite have been found to influence financial decisions (Svoboda, 2022). Personality traits are individual differences in feelings, thoughts, and action patterns that distinguish one individual from another (Baranczuk, 2019). The Big Five model, which measures personality and investment decisions, consists of five widely recognized personality traits: extraversion, agreeableness, openness, conscientiousness, and neuroticism. Various researchers have extensively studied this model (Pinjisakikool, 2017; Jalilvand et al., 2018).

Studies have shown that highly open individuals make better decisions (LePine et al., 2000) and invest in risky companies (Hunter & Kemp, 2004). On the other hand, extroverts tend to make quick decisions (Sadi et al., 2011), be better thinkers (Coplan & Bowker, 2014), and are linked to increased risk-taking behavior (Becker et al., 2012; Pinjisakikool, 2017). They are also more likely to be influenced by external stimuli (Sadiq & Amna, 2019).

Conscientious individuals tend to make careful decisions (Svoboda, 2022; Talhartit et al., 2022), accepting only the most reliable and relevant data (Heinström, 2003), exhibiting low-risk tolerance (Spohn et al., 2022; Pinjisakikool, 2017). On the other hand, agreeable individuals tend to trust others without thoroughly evaluating information (Heinström, 2010), and being risk-tolerant (Dohmen et al., 2010). Neuroticism is often driven by feelings (Zhang et al., 2014), making mistakes (De Vries et al., 2016), and being risk-averse (Becker et al., 2012).

Moreover, risk is a crucial factor in shaping investors' financial decisions. Risk tolerance refers to the level of uncertainty that an individual is willing to bear when making an economic choice (Prabhakaran & Karthika, 2011). Mayfield et al. (2008) suggest that an individual's risk perception significantly determines their investment behavior. Finally, the fifth hypothesis is as follows:

H5: Investor's attributes can predict their behavior in information processing.

3. Methodology

We employed a $2 \times 2 \times 2$ between-subjects design to manipulate the fluency and sentiment of management disclosures of Alpha company (Rennekamp, 2012). The management disclosures conveyed negative news about the company with (1) low or high fluency, and (2) positive or neutral sentiment. Additionally, the experiment considered the effect of expertise by investigating the IPB in investors with (3) non-expertise or expertise. Participants were randomly assigned to one of four groups to avoid any issues of endogeneity that can arise when using empirical data (Gao et al., 2022; Rennekamp, 2012).

The experiment was conducted in three stages. In stage 1, the participants received an envelope containing information about Alpha Company and management opinions about performance. In stage

2, the participants were asked to evaluate the company's performance. In stage 3, they received a second envelope, containing questions about personality traits and risk appetite (Bauer et al., 2022; Rennekamp, 2012).

3.1. Participants

Our study includes 201 students majoring in management and accounting at the Ph.D., Master's, and bachelor's levels in public universities in Iran. These students volunteered to participate in the study. The selection of students from different proficiency levels was intended to provide variability in expertise (Bauer et al., 2022; Tan et al., 2015; Rennekamp, 2012). According to Libby et al. (2002), the suitability of participants can be assessed based on their knowledge and skills for the given task. In our study, 8 percent of the participants were doctoral students with finance experience, 52 percent were master's students, and the remaining were bachelor's students.

3.2. Manipulations

The third and fourth paragraphs manipulated the fluency of management disclosure. In the high fluency scenario, management provided performance explanations through short sentences and simple synonyms, and utilized formatting tools, such as a clear hierarchy, tables, and titles, to enhance fluency. On the other hand, in the low fluency scenario, management disclosed performance information using long and complicated sentences without employing formatting tools (Tan et al., 2014; Emmett, 2019).

The sentiment of the management disclosure was manipulated by altering the vocabulary and phrases used by management to express its opinion regarding the current period's performance in the first two paragraphs. In the positive sentiment scenario, management compared the current performance (Q2 20x2) with the predicted performance for the same quarter (Q2 20x2) to conceal negative news and establish a positive impression, given that the actual performance exceeded the predictions. Terms such as "very satisfied," "strongly influenced," "far beyond," "in the best way," and "impressive positive performance" were employed to generate a positive impression of the company's performance for investors. In the neutral sentiment scenario, while management still compared the current performance (Q2 20x2) with the prediction for the current quarter (Q2 20x2) to conceal bad news, it used neutral language to express its opinion (Tan et al., 2014; Emmett, 2019).

3.3. Task and Procedure

In stage 1, the participants received an envelope containing background information about the company, its products, and the nature of its activities. The envelope included four paragraphs of the company's 20x2 second-quarter management disclosure. The first two paragraphs provided the management's opinion about the company's performance. The next two paragraphs presented detailed explanations of performance indicators and the management's forecast for the next quarter. In the third paragraph, the company's performance for the current period (Q2 20x2) was compared to the performance for the same period of the previous year (Q2 20x1), and the performance predicted for the current period (Q2 20x2). Management explained the reasons for any decreases or increases in the indicators. In the fourth paragraph, management forecasted positive and eye-catching performance for the next quarter (Q3 20x2). In other words, while the current performance (Q2 20x2) showed a decline compared to the performance for the same period of the previous year (Q2 20x1), management predicted an upward performance for the next quarter.

In stage 2, after reviewing the management disclosure, the participants were asked to express their agreement with the management's forecast regarding performance.

In stage 3, the participants received the second envelope, which contained questions about their risk appetite and personality traits (Bauer et al., 2022; Rennekamp, 2012).

3.4. Dependent and Mediating Variables

The dependent variable, IPB, was measured by asking how much an investor agrees with the management forecast regarding the next quarter (Q3 20x2). The responses were collected on a 10-point Likert scale, where +5 indicated "completely agree" and -5 indicated "completely disagree" (Rennekamp, 2012; Asay et al., 2017; Tan et al., 2015).

As a mediating variable, investors' expertise was measured by three criteria: the number of accounting courses taken, working years in accounting or finance, and management disclosures reviewed by simple average (Kuang et al., 2020; Tan et al., 2015).

As another mediating variable, personality traits were determined using the NEO-FFI questionnaire (Pinjisakikool, 2017; Jalilvand et al., 2018).

Investors' risk appetite was measured through nine questions with three choices. The score considered for the first choice was one, the second choice was two, and the last choice was three, respectively. A final score between 9 and 14 indicated a conservative investor, a score between 15 and 21 demonstrated a moderate investor, and a score between 16 and 27 revealed a risk-taking investor (E-Vahdati et al., 2022; Nguyen et al., 2019).

3.5. Analysis Methods

A three-way ANOVA was applied to test H1 and H2, examining the interactions between expertise, fluency, and sentiment. Additionally, H3 and H4 were tested using a two-way ANOVA to explore the interactions between fluency and sentiment separately for expert and non-expert investor groups (Tan et al., 2015). For H5, a binary categorical variable decision tree algorithm was employed. The data were randomly split into a training set (75%) and an evaluation set (25%). The classification and regression tree algorithm, along with the Gini index, as the selection algorithm, and cost function, was used to build the model.

4. Findings

4.1. Manipulation Checks

As a validation of our fluency manipulation, we asked participants to assess management disclosures using the following questions: (1) "The earnings release is difficult to read," (2) "The earnings release is difficult to understand," and (3) "The information in the earnings release is difficult to process." Participants rated these questions on a 12-point scale (Rennekamp, 2012; Tan et al., 2015). The results of this assessment are presented in Table 1.

Table 1. Fluency Manipulation Check

Items	t-value	d.f.	P-value	Diff	CI-95% level	
					lower	upper
the ease of reading	1.05	2	0.02	0.19	-0.17	0.56
comprehensibility	2.06	2	0.04	0.36	0.02	0.72
the ease of processing	3.90	2	0.00	0.70	0.35	1.06

As shown in the Table, participants in each scenario (high and low fluently) had significantly different perceptions regarding the questions (p -value < 0).

To verify the effectiveness of our sentiment manipulation, we included three questions for participants to assess management disclosures: (1) "What impression do you get from the management disclosure?" (2) "To what extent do you agree with the management perspective for the next quarter?" (3) "How would you assess the tone of the management disclosure?" The responses were collected on a 12-point Likert scale (Tan et al., 2014; Rennekamp, 2012). The results are presented in Table 2.

Table 2. Sentiment Manipulation Check

Items	t-value	d.f.	P-value	Diff	CI-95% level	
					lower	upper
communication style	7.018	2	0.00	1.12	0.81	1.44
management's perspective	10.11	2	0.00	1.77	1.43	2.12
Communication tone	5.59	2	0.00	0.97	0.63	0.97

As the Table shows, participants in each scenario experienced significantly different perceptions of sentiment (p -value < 0).

4.2. The Effect of Fluency and Sentiment on Information Processing Behavior

Based on hypotheses H1 and H2, it is predicted that the fluency and sentiment of management disclosures influence investors' IPB. According to panel A (Table 3), investors who received management disclosures with high fluency marginally disagreed with management's forecast for the next quarter (mean = -0.02). In contrast, those with low fluency in management disclosures moderately agreed with management's prediction for the next quarter (mean = 0.87). Furthermore, investors' consensus with management for the next quarter's performance was higher in the case of positive sentiment disclosures (mean = 2.23), compared to neutral sentiment disclosures (mean = 1.61).

Table 3. Descriptive Statistics and ANOVA

Panel A- Descriptive statistics of IPB (all participants)									
Sentiment	High Fluently			Low Fluently			Total		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Positive	43	-0.16	1.70	55	0.09	2.59	98	2.23	-0.02
Neutral	50	0.1	1.77	53	1.68	0.95	103	1.61	0.91
Total	93	-0.02	1.73	108	0.87	2.11	201	1.99	0.46

Panel B- Three-way ANOVA of IPB (all participants)						
Source	SS.	d.f.	MS.	f-statistics	p-value	
fluently	69.02	1	69.02	81.12	0.000	
sentiment	113.45	1	113.45	133.34	0.000	
expertise	0.000	1	0.000	0.001	0.082	
fluency × sentiment	54.31	1	54.31	63.83	0.000	
fluency × expertise	740.93	1	740.93	870.79	0.000	
sentiment × expertise	190.70	1	190.70	224.13	0.000	
fluency × sentiment × expertise	112.60	1	112.60	132.34	0.000	
Error	164.21	193	0.851			

According to Panel B, the fluency and sentiment of management disclosures significantly affect investors' IPB ($p\text{-value} < 0$), supporting H1 and H2, respectively. Moreover, the findings indicate significant interactions between fluency, sentiment, and expertise, suggesting that expertise mediates the relationship between fluency and sentiment with IPB. Figure 1 illustrates the interaction between the fluency and sentiment of management disclosures.

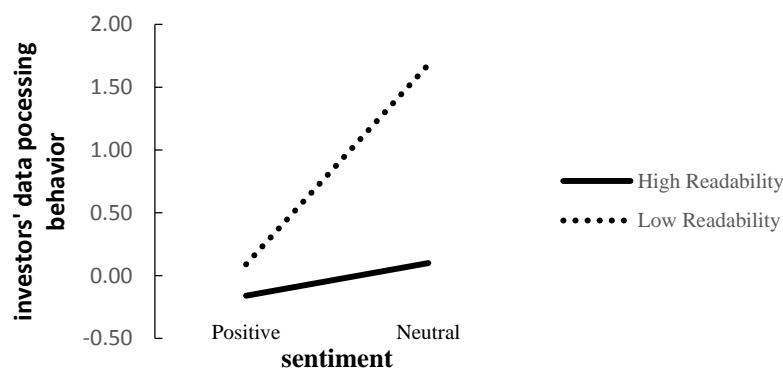


Fig. 1. The Interaction Between Fluent, Sentiment, and Investors' IPB

When bad news is disclosed, and the management disclosure is weakly written using neutral sentiment, investors tend to agree more with management's positive prediction for the upcoming performance than other scenarios. It is worth noting that the sentiment of the disclosure has less impact on investors' IPB in the case of high-fluency disclosure.

4.3. The Mediating Role of Expertise

The investors were grouped into expertise and non-expertise categories, and each group went through four scenarios (high/low fluency and positive/neutral sentiment) to test H3 and H4.

According to Panel A (Table 4), non-expertise IPB is more influenced by positive sentiment when the fluency of management disclosure is low (Mean=2.56). However, in the case of neutral sentiment, low fluency only slightly affects investors' IPB to align with management predictions (Mean=1.9). Furthermore, Panel A indicates that expert investors with positive sentiment and low fluency react negatively to management's positive forecast (Mean=-2.29), indicating their risk-averse behavior when encountering low fluency. However, expert investors tend to agree with management's prediction when management discloses bad news with positive sentiment and high fluency (Mean=1.18).

Table 4. Descriptive Statistics and ANOVA for Expertise Mediating Role

Panel A: Descriptive statistics									
non-expert participants									
Sentiment	High Fluently			Low Fluently			Total		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Positive	26	-1.04	1.216	27	2.56	0.577	53	0.79	2.041
Neutral	30	-0.93	1.285	10	1.9	0.568	40	-0.22	1.687
Total	56	-0.98	1.243	37	2.38	0.639	93	0.35	1.954
expert participants									
Sentiment	High Fluently			Low Fluently			Total		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Positive	17	1.18	1.467	28	-2.29	1.084	45	-0.98	2.094
Neutral	20	1.65	1.182	43	1.63	1.024	63	1.63	1.067
Total	37	1.43	1.324	71	0.08	2.189	108	0.55	2.034
Panel B: two-way ANOVA of IPB									
non-expert participants									
Source	SS.	d.f.	MS.	f-statistics	p-value				
fluently	10.36	1	10.36	14.54	0.000				
sentiment	8.39	1	8.39	11.22	0.001				
fluency × sentiment	8.84	1	8.84	11.82	0.001				
Error	66.55	89	0.74						
expert participants									
Source	SS.	d.f.	MS.	f-statistics	p-value				
fluently	127.20	1	127.20	135.46	0.000				
sentiment	212.79	1	212.79	226.61	0.000				
fluency × sentiment	114.99	1	114.99	122.45	0.000				
Error	97.65	104	0.93						

Note: A total of 93 non-expert participants were divided into four groups: (1) high fluency and positive sentiment with 26 participants, (2) high fluency and neutral sentiment with 30 participants, (3) low fluency and positive sentiment with 27 participants, and (4) low fluency and neutral sentiment with 10 participants.

According to Panel B (Table 4), fluency significantly impacted expert and non-expert investors' IPB (p -value < 0.01). Management disclosures with low fluency significantly shifted non-expert investors' IPB towards agreement with management predictions from marginally disagree to agree moderately (Panel A, $Mean_{low-fluently}=2.38$, and $Mean_{high-fluently}=-0.98$). However, this effect did not occur for expert investors, as they moderately agreed with management in both scenarios (Panel A, $Mean_{high-fluently}=1.43$, and $Mean_{low-fluently}=2.18$), which confirms H3.

Furthermore, sentiment significantly influenced both groups of investors (p -value < 0.01). The effects of sentiment on expert investors (Panel A, $Mean_{positive-sentiment} = 0.79$, $Mean_{neutral-sentiment} = -0.22$) were opposite to non-expert investors (Panel A, $Mean_{positive-sentiment} = -0.98$, $Mean_{neutral-sentiment} = 1.63$). In both cases, the direction of the relationship was changed, confirming H4.

4.4. The Investors' Attributes and Information Processing Behavior

According to the literature, investors may be misled when confronting management disclosure with low fluency and positive sentiment (Table 5 - Panel A, N=55). In this situation, if investors disagree with management's prediction, we call it "not deceived," and otherwise, it is categorized as "deceived" investors (Rennekamp, 2012; Asay et al., 2017). Table 7 presents the rules that can be utilized to predict the processing behavior of the investors.

Table 5. Investors' IPB Model

Panel A: Decision rules for investors' IPB			
Rules	Probability of not being deceived (Y = 0)	Probability of being deceived (Y = 1)	
Expertise	56%	44%	
expertise → Agreeableness (less)	87%	13%	
expertise → Agreeableness (moderate) → risk appetite (conservatism)	66%	34%	
expertise → Agreeableness (moderate) → risk appetite (moderate)	42%	58%	
non-expertise	24%	76%	
Panel B: Predictive performance of the model			
Model	Accuracy	Sensitivity	Specificity
training data	0.705	0.818	0.675
test data	0.705	0.780	0.733

Note: The personality traits were measured across five domains of normal personality: neuroticism, extraversion, conscientiousness, agreeableness, and openness. Risk appetite was classified into three categories: conservative (scores between 9-14), moderate (scores between 15-21), and risk-taking (scores between 16-27).

According to Panel A (Table 5), the expertise feature showed strong predictive power regarding investors' IPB. If we know that an investor is a non-expert, we can predict with a 76 percent probability that they will be deceived, which is acceptable. However, knowledge of investors' expertise alone cannot accurately predict their processing behavior.

If we have information about an expert investor showing less agreeableness in their personality, we can predict that he is not easily deceived with 87 percent accuracy. For investors who are moderately agreeable and conservative in their behavior, we will expect that they will not be deceived with 66 percent certainty. Figure 2 illustrates the decision tree for predicting investors' IPB.

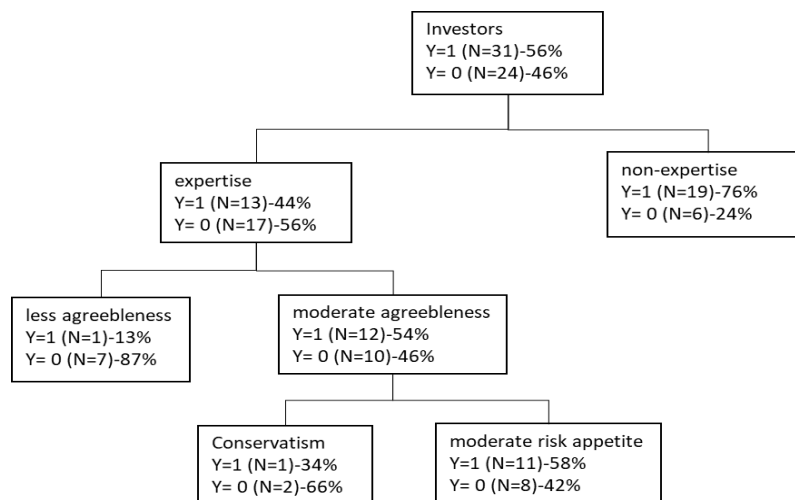


Fig. 2. The model of Investors' IPB

According to Panel B, the decision tree model achieved an overall accuracy of 0.705 on both the training and test data. This indicates that the model could predict investors' IPB based on their characteristics with relatively high accuracy. The model's sensitivity was also reasonably high, with values of 0.81 and 0.78 for the training and test data, respectively. However, the model's specificity was higher on the test data (0.733) than on the training data (0.675). These findings suggest that the decision tree model can be useful for predicting investors' IPB.

5. Discussion

This study's results unequivocally demonstrate the influence of fluency, sentiment in management disclosures, and investor expertise on information processing behavior. Through a controlled experiment, we demonstrated that management can significantly impact investor behavior by manipulating disclosure fluency. We know the influence of fluency, sentiment in management disclosures, and investor

expertise on investor decision-making behavior (IPB). The results underscore the significant role that management disclosures play in shaping investor reactions, especially under varying conditions of fluency and sentiment. The findings corroborate prior research by demonstrating that less fluent disclosures lead to weaker investor responses and an increased likelihood of being misled, particularly in the context of negative news.

Our controlled experiment revealed that management can manipulate disclosure fluency to affect investor behavior. Disclosures presented in a less fluent manner tend to confuse investors, leading to misinterpretation and less informed decisions. This is particularly pronounced when the disclosures contain negative news, which can provoke heightened emotional responses and cause investors to disengage or misinterpret the information presented. Consistent with prior research, our findings suggest that less fluent disclosures lead to weaker investor reactions and a higher likelihood of being misled, particularly in the context of negative news (You & Zhang, 2009; Rennekamp, 2012; Tan et al., 2015; Alter & Oppenheimer, 2009). The results also indicate that the sentiment expressed in disclosures is a powerful tool for influencing investor behavior. When sentiment is manipulated, investors struggle to comprehend the information, which diminishes their reliance on content. The study found that investor expertise significantly moderates the effects of disclosure fluency and sentiment on IPB. Expert investors displayed a tendency to react negatively to disclosures characterized by low fluency and positive sentiment.

In addition, our results indicate that sentiment manipulation within disclosures allows management to influence investor behavior. This aligns with existing studies showing that when the sentiment is manipulated, investors find the information more challenging to comprehend, resulting in decreased reliance on the content (Novemsky et al., 2007). Investor expertise is crucial in this context; expert investors respond negatively to low-fluency and positive sentiment disclosures, while non-expert investors are more likely to align with management's forecasts (Alter & Oppenheimer, 2009). Our study also confirms that investor expertise, agreeableness, and risk appetite are critical factors in explaining variations in IPB, supporting findings from previous research (Blau et al., 2015; E-Vahdati et al., 2022; Martin, 2019; Dohmen et al., 2010; Mayfield et al., 2008).

6. Conclusion

Our findings extend the understanding of the dual effects of fluency on IPB by highlighting how fluency can influence effortless and effortful cognitive processing, depending on the complexity and presentation of the information. According to the dual-process theory, high fluency activates System 1, leading to faster but less analytical decisions. On the other hand, low-fluency disclosures increase cognitive load, potentially triggering System 2. However, our results show that this shift does not always lead to better decision-making, particularly among non-expert investors. These individuals often find low-fluency disclosures challenging, resulting in lower agreement with management's forecasts. This supports the notion that while low fluency may encourage deeper processing, it can also confuse and mislead, especially for those with less expertise (Hirshleifer & Teoh, 2003; Tan et al., 2014). Our findings contribute to the literature on complexity and presentation of the information in decision making, especially processing and individual expertise, by proposing a conceptual framework after an extensive literature review. Additionally, the study underscores the power of sentiment manipulation for managers seeking to influence investor decisions, particularly when combined with high fluency to enhance perceived credibility. Positive sentiment in disclosures tends to elicit more favorable evaluations from investors, aligning with the affect heuristic theory, which posits that positive affective cues reduce uncertainty and lead to more optimistic assessments (Finucane et al., 2000). This manipulation is especially effective among non-expert investors, who are more susceptible to cognitive biases when processing high-fluency positive sentiment information.

In Management Strategy, organizations should be mindful of the fluency and sentiment of their disclosures. By enhancing the clarity and emotional tone of their communications, management can foster better investor understanding and engagement, particularly in uncertain or negative contexts.

Investor expertise emerged as a crucial mediating factor in the relationship between fluency, sentiment, and IPB. Due to their familiarity with financial disclosures and superior analytical skills, expert investors are better equipped to navigate low-fluency and neutral-sentiment scenarios, leading to more accurate assessments of company performance. This finding supports the idea that expertise enhances

the ability to process complex or less transparent disclosures effectively, enabling investors to extract valuable insights despite potential obstacles (Blau et al., 2015; Rennekamp, 2012). It also aligns with the dual-process model (Kahneman, 2011), where experts are more likely to engage in System 2 processing when faced with challenging information, resulting in more accurate judgments.

In contrast, non-expert investors relied more heavily on high fluency and positive sentiment to guide their decision-making, highlighting the importance of clear and reassuring communication in mitigating cognitive biases and improving judgment accuracy (Schwarz et al., 2021; Wickens & Carswell, 2021). Thus, companies should consider tailoring their communication strategies based on the investor profile. Understanding the level of expertise among their investor base can help management craft disclosures that resonate more effectively, thereby enhancing investor relations and promoting a more informed investment environment.

Lastly, our results resonate with the Big Five personality model and its application in financial decision-making research (Pinjisakikool, 2017). Consistent with the literature, personality traits, such as openness, conscientiousness, and neuroticism, significantly shaped information-processing styles and decision-making behavior (Pinjisakikool, 2017; Svoboda, 2022). However, the varying predictive power of these attributes suggests that while they are essential, other factors, such as cognitive biases and contextual influences, also play critical roles in determining IPB. This highlights the multifaceted nature of investor behavior and the need for a comprehensive approach when analyzing financial decision-making.

7. Research Limitations, Implications and Directions

Our study does have certain limitations that open avenues for future research. Initially, we provided participants with access to concise management disclosures to maintain the manageability of the task. Future research could leverage emerging technologies to investigate the impact of fluency and sentiment using actual data from management disclosure letters. Secondly, our examination was confined to a specific context and a limited set of performance indicators for short-term future prediction (next quarter). Subsequent research could explore different contexts and extend performance evaluation to longer time frames. Thirdly, in practical investing scenarios, individuals can access various information sources, impacting their decision-making process and participants' incentives to seek outside information, potentially introducing variability in our measures. Addressing these limitations could be a focus for future research, whether through more intricate experimental designs, advanced incentive structures, or engaging participants less likely to be driven by intrinsic motivations to perform well on the task.

This study illuminates the crucial role of transparent and easily understandable disclosures, especially for less experienced investors. This suggests an opportunity for regulatory bodies and standard setters to promote guidelines for more accessible reporting. Additionally, the study highlights how awareness of impression management effects can empower investors to mitigate cognitive biases through improved financial literacy.

Several possible avenues for future research exist. Firstly, studying the impact of lower fluency on accepting 'smart' risks, which can boost capital markets within management disclosure, may provide valuable insights. Secondly, the study concentrated on scenarios where management discloses information amid unfavorable corporate performance. In actual business settings, performance varies widely, influenced by factors like corporate governance (Osma & Guillamón-Saorín, 2011) and corporate visibility (Latham, 2000). This raises questions about using impression management when performance surpasses expectations and the multifaceted determinants and techniques involved in impression management across both positive and negative performance contexts, necessitating further exploration. We additionally propose that, by using AI-driven disclosure analysis, we develop machine learning-based tools to flag potential fluency and sentiment manipulation, supporting informed investor decision-making.

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