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Anchoring Effect in Visual Information Processing During Financial Decisions: An Eye-Tracking Study

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When reading a financial disclosure document, subjects are faced with multiple information cues and might simplify decisional complexity by relying on heuristics. This study explores whether, in an attempt to filter information from the Payment Account Fees Information Document (FID), subjects anchor their evaluation to a specific item, leading to biased financial choices. By detecting the visual search strategy in 70 subjects through eye tracking, we observed that people exhibited systematic visual anchoring to the top of the document, which corresponds to the Liquidity section that displays the Annual Fee. Moreover, data revealed that subjects sometimes fail to recognize the most advantageous products. This mainly occurs when the Annual Fee is high, even if the other charges compensate for that amount, clarifying the link between visual search strategy and financial decisions. Data also showed the role of financial literacy in modulating attention, as poorly financially literate subjects are more prone to anchoring bias. The findings contribute to the neuroeconomics literature on anchoring effect and highlight practical implications for financial regulators and managers involved in the ergonomics of documents.

Keywords: neuroeconomics, eye tracking, attention

Humans face the problem of compromise between speed and accuracy in decision-making. Individuals' limited cognitive resources, knowledge, and time make the model of rational decision-making sometimes unsuitable to describe and explain actual human behavior. When choosing and facing multiple information cues, the brain may circumvent complex computations and rely on heuristics. Psychology and neuroscience have clarified that majority of the decision process occurs automatically and unconsciously through the reliance on intuitive, rapid heuristics rather than on controlled, deliberate reasoning processes (for a review on intuitive judgments and heuristics, see Gilovich et al., 2002). One of the most widely used heuristics in human decision-making is anchoring (Furnham & Boo, 2011), in which a subject tends to bias his/her decision toward an initially presented value (the anchor). Introduced by Tversky and Kahneman in their pioneering work (1974), it has received extensive attention, becoming one of the most meticulously studied heuristics in literature because of its effect size and robustness across different domains (Turner & Schley, 2016). The anchoring effect in human decision-making has been observed with respect to general knowledge and factual questions, legal judgments (Englich et al., 2005, 2006; Englich & Mussweiler, 2001; Englich & Soder, 2009), self-efficacy (Cervone & Peake, 1986; Oh, 2020), negotiations (Galinsky & Mussweiler, 2001), valuations and purchasing decisions (Ariely et al., 2003; Mussweiler et al., 2000; Wansink et al.,

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1998), and forecasting (Critcher & Gilovich, 2008; Givi & Galak, 2019). Anchoring is also a widespread phenomenon in the financial domain, where investors' tendency to anchor has been empirically demonstrated in several studies (DeLisle et al., 2017; Gao et al., 2019; George & Hwang, 2004; Hur & Singh, 2019). In addition to research on financial markets, the anchoring effect was studied with respect to the real estate (Genesove & Mayer, 2001; Lambson et al., 2004) and art markets (Beggs & Graddy, 2009) and was also found to be relevant in corporate finance, as revealed by studies on managers' SEO decisions (Baker & Xuan, 2016), firm dividends (Baker et al., 2016), mergers and acquisitions bid prices (Baker et al., 2012), and credit spreads (Dougal et al., 2015).

Despite a vast research on nudging has underpinned the utility of behavioral and neural insights for public policy (Johnson & Goldstein, 2003; Thaler & Sunstein, 2008), while this heuristic is widely studied in different domains and deeply explored in the economic and financial context, no studies have focused on anchoring in terms of financial consumers' protection. The first aim of this study is to investigate the existence of an anchoring effect during the reading and evaluation of a disclosure document called Payment Account Fees Information Document (FID), and if it affects financial behavior. The FID was introduced by the recent Payment Accounts Directive, whose goal is to enhance the transparency of fees and information related to payment accounts and to improve access to and switching of account providers. It is a document that payment service providers must supply to consumers before entering a contract. The Directive introduces standardized terminologies and targeted fee information presented in a consistent format, relying on the assumption that to make informed decisions, consumers must be able to understand and compare fees. Several studies have demonstrated that anchors influence the economic valuation of various products; therefore, even if the rationale behind the Directive is that this ex-ante disclosure information might support consumers in quickly comparing different financial products, we hypothesize that during the information processing phase, consumers might be prone to the anchoring effect. We argue that consumers might anchor their visual exploration to the initial part of the document, affecting product evaluation. The top part of the document is eligible to work as an anchor as suggested by a large amount of scientific literature, including research concerning Key Investor Information Document processing (KIID; Ceravolo et al., 2019). However, to our knowledge, the existence of an anchoring effect in the processing of FID has not yet been demonstrated.

In the present study, using eye movements as a window into the operation of the attention system, we applied eye-tracking technology to investigate the visual search strategy during a financial document reading aimed at increasing investor protection and to test whether the existence of an anchoring effect influences product evaluations.

Because FID reading usually occurs in a bank branch where customers are normally exposed to the buzz of other people talking or to a soft background music, we decided to analyze the influence of auditory stimuli on anchoring, as a further explanatory variable. In many contexts such as restaurants, shops, and waiting rooms, music is continuously played in the background while consumers are engaged in other activities (North et al., 2003). Previous studies have indicated that the presence of music is positively related to pleasure, satisfaction, and behavioral intentions (Roschk et al., 2017). Regarding the information processing phase, the opposite effects of music on individuals' performance have been highlighted. Studies on the Mozart effect (Rauscher et al., 1993) reported an improvement in subjects' performance in visuospatial abilities when the music had a major mode and a fast tempo (Husain et al., 2002; Schellenberg et al., 2007). In contrast, background music has been found to disturb and interfere in several situations such as during mathematic tasks (Bloor, 2009), surgeons' learning procedures (Miskovic et al., 2008), multimedia learning (Moreno & Mayer, 2000), and reading (Madsen, 1987). The contradicting results on the influence of music on performance can be explained through two different theoretical approaches. According to the "arousal and mood hypothesis" proposed by Thompson et al. (2001), music directly affects physiological arousal and emotional states, leading to a positive impact on cognitive performance. Neuroendocrinology studies have revealed that musical stimuli affect biochemical substances, such as reducing cortisol levels (Nater et al., 2006). According to the "cognitive capacity hypothesis" proposed by Kahneman (1973), music absorbs resources for the brain,

reducing its overall efficiency and leading to detrimental performance. The present research seeks to test the influence of auditory stimuli on the visual information processing of financial documents, that is, whether the increase in sensory inputs conveyed through a different sensory channel as the auditory one enhances subjects' reliance on anchoring strategy.

A growing body of studies in finance is showing that financial decision-making is affected by the subjects' financial literacy. A higher level of financial literacy has been associated to subjects' lower vulnerability in being exploited or deceived (Andreou & Philip, 2018; Balloch et al., 2015; Campbell et al., 2011; Lusardi & Mitchell, 2011), better retirement plan (Lusardi & Mitchell, 2007; van Rooij et al., 2012), less propensity to over-indebtedness (Andreou & Philip, 2018; Lusardi & Tufano, 2015), higher participation in financial markets (Balloch et al., 2015; van Rooij et al., 2011), and higher returns on savings accounts (Deuflhard et al., 2018). Given that financial behavior has largely been shown to be influenced by financial literacy (Klapper & Lusardi, 2020), we aim to deepen the knowledge on whether financial literacy affects the way information is processed by subjects and their reliance on the anchoring heuristic strategy.

Method

Participants

For the experiment, 78 participants were recruited. Data from eight participants were disregarded because the eye-tracking scores for calibration and validation were below the acceptance threshold. The final sample consisted of 70 participants (52 men; $M_{age} = 23$, $SD = 2$). As we aimed to clarify the oculomotor patterns of students who represent one of the banks' key market segment, subjects enrolled in the experiments were all students from the School of Economics without a full-time job. All participants had normal or corrected-to-normal visual acuity, had no reports of eye or neurological diseases, and were right handed. All subjects had undergone at least one hearing screening in their life and had no reports of hearing loss. The study has undergone Institutional Review Board (IRB) evaluation and has received approval. After receiving an explanation of the procedure, all subjects provided written informed consent in accordance with the Declaration of Helsinki.

Apparatus

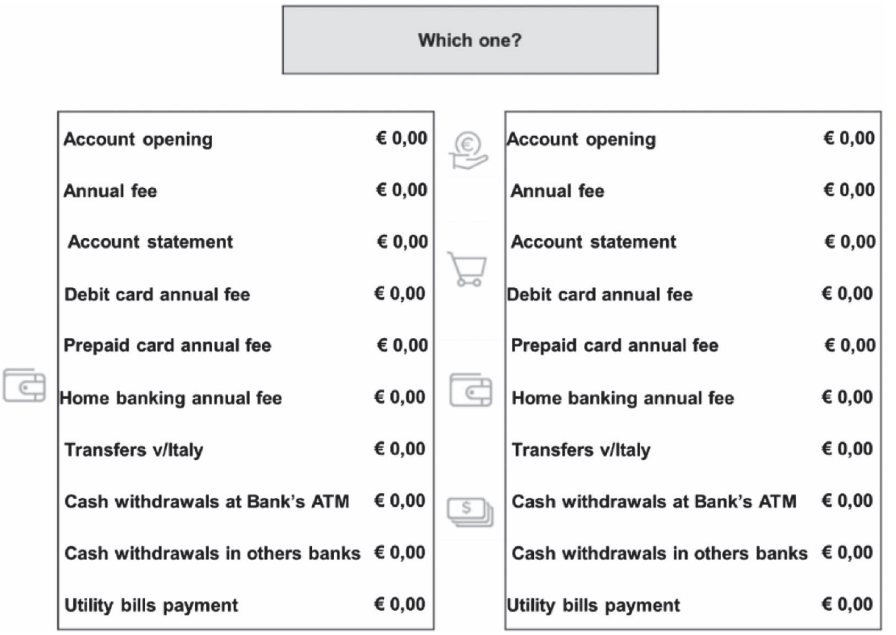
The SMI REDn Scientific System equipped with an infrared light source and cameras integrated into a 15.6-in. monitor (1,280 × 1,024 pixels) was used. The system compensated for head movements within a 50 × 30 cm (at a distance of 65 cm), allowing the participants to look at the screen naturally. The eye-tracking system has a sample rate of 60 Hz, a reported gaze position accuracy of 0.4°, and a spatial resolution of 0.05°. iMotions software controlled the presentation of stimuli, recorded eye movements, and participants' responses.

Visual and Auditory Stimuli

There were 24 visual stimuli included in the experiment. Each stimulus contained two FIDs, one next to the other, displaying a standard number and type of items, always in the same order, and identified following the Bank of Italy Directive. The template used to construct the visual stimulus is shown in Figure 1. FIDs were constructed in such a way that, for each trial, one was objectively more advantageous than the other. The advantageous FID was the one with a lower total cost compared with the other FID. The total cost referred to the sum of the liquidity items, fixed cost (FC) items, and variable cost (VC) items. Liquidity items include account opening, annual fees, and account statements. Account opening and account statement costs are kept substantially similar in each couple of FIDs, thus allowing to ascribe the influence of the AOI Liquidity to that exerted by the item Annual Fee. FC items consist of debit and prepaid cards, annual fees, and home banking annual fees. VC items include money transfers within the country, cash withdrawals at the bank's and other banks' ATM, and utility bill payments. Quantities for computing the VC component were derived from the Bank of Italy methodology for computing the bank account synthetic cost indicator.[1] In order to

[1] Bank of Italy, Attachment 5A, "*Metodologia per il calcolo dell'indicatore sintetico di costo per i conti correnti.*" Because the sample consists of university students, the quantities considered in computing the VC indicator are those associated to young people.

Figure 1
Visual Stimulus Template Displaying Two Different FIDs



Note. This figure presents two different FIDs: one on the left position and the other on the right position. FID = Fees Information Document.

test the anchoring effect, we modulated the information placed in the top part of the visual stimulus (i.e., the Annual Fee) to influence its relevance to the individual judgment of product advantageousness. To this scope, each couple of FIDs was constructed to create a consonant or dissonant condition. In the consonant condition, the Annual Fee of the advantageous FID is lower than that of the disadvantageous one; in contrast, in the dissonant condition, the Annual Fee of the advantageous FID is higher than that of the disadvantageous one. We avoided the randomization of the information cues positions as a means of testing anchoring for two reasons: first, we wanted to rely on a document with a high ecological validity for the banking industry; second, the randomization would have implied the need for displaying a higher number of visual stimuli to participants to control the several manipulated variables, with the risk of increasing boredom or fatigue and eventually affecting attention allocation, (i.e., the outcome we sought to detect). To ensure that disadvantageous products could not be attractive for some subjects, we administered a questionnaire after the experiment ascertaining that there were not considerable deviations from Bank of Italy estimations in the quantities assumed to compute the VC indicator.

Since the reading of the FID usually occurs in a bank branch where subjects are exposed to the buzz of other people talking or to a background music, during the experiment, each participant was exposed to three different background auditory conditions: silence, buzzing, and music. The buzzing condition consisted of the noises of people chatting in the background. The music genre selected was ambient music. Buzzing and ambient music were chosen to create an ecological scenario, that is, a situation in a bank branch where no music is broadcast, and subjects are exposed to the noises of other people talking or to the music that retailers generally broadcast in stores to create a pleasant atmosphere. Buzzing and ambient music were broadcast from the same laptop displaying the visual stimuli. The maximum decibel under the buzzing and music conditions was 68 dB. Each experimental condition was associated with eight FIDs defined as blocks, which were randomized across participants to avoid order effects.

Procedure

The procedure was performed in a research laboratory. Following informed consent, the participants completed a 5-point calibration in the iMotions. Participants were informed that they would view a couple of FIDs, and their task was to decide which one was more attractive. Each trial began with a fixation cross, presented in the center of the screen for 2 s to reorient attention and ensure that all scanning patterns moved from the center of the screen. The FIDs were presented for 60 s, and participants were informed that they could advance to the next slide by pressing the space bar, as soon as they felt that they had acquired all the necessary information. After each stimulus disappeared, a gray slide displaying the writings "FID 1" and "FID 2" appeared, and participants were prompted to select the most attractive FID using a mouse click. Out of the 1,680 trials, 70 were removed because those with over 25% track loss were excluded (participants' eyes turned away or blinked, or the eye-tracking system captured participants' gaze location with very low validity).

Financial Literacy Questionnaire

To measure the participants' financial literacy (categorizing subjects as highly or poorly literate), Section 2 of the questionnaire developed by the Consumer Finance Research Center (CFRC) in 2016 to measure financial literacy was used. The 50 multiple-choice questions on financial literacy are organized into 10 groups of five questions each that focus on specific topics (i.e., Interest rates, Inflation, Mortgages, Investments, Bonds, Bank accounts, Payments, Savings and Investments, Loans and Debts, and Retirement and Planning). The literature on financial literacy revealed that when different financial topics are considered, the assessment of financial literacy can vary considerably (Nicolini, 2019). Because the present study focuses on visual search strategy and anchoring behavior during FID reading, to assess financial literacy, the five questions related to the topic Bank accounts and those related to the topic Payments were extracted (Appendix 1). Following previous studies (Nicolini, 2019), the financial literacy score for each subject is equal to the sum of the number of correct answers. If the respondent chose the correct answer, the value was 1, and 0 otherwise. In this approach, to a wrong answer, a blank answer, and an eventual "do not know" option, a score of 0 is assigned. Therefore, the financial literacy index ranges from 0 to 10 and can assume only integer values.

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Eye-Tracking Parameters and Data Analysis

Eye-position data were analyzed using a standard area-of-interest (AOI) approach. Rectangular AOIs were defined over six sections of the stimulus: Liquidity, FC Payments, and VC Payments, both for left and right prospectuses. The following eye-tracking metrics were considered:

1. Time-To-First Fixation (TTFF) expresses the average interval (ms) from the presentation of the stimulus (start of the trial) to the first gaze fixation on the AOI.
2. Fixation Time (FT) refers to the time (ms) spent in an AOI, based on the total duration of all respondents' fixations.
3. Revisits refers to the number of times the subject's gaze returns to the AOI.

Eye-tracking data were preprocessed using iMotions. In the analysis, we considered eye-tracking parameters as dependent variables; for each variable, we performed a one-way analysis of variance (ANOVA) with the experimental conditions (consonance/dissonance, music/buzz/silence) as the grouping variable. A one-way ANOVA was performed to study the influence of financial literacy on FT.

Sample Size Computation

To estimate the required sample size, we conducted a power analysis (G*Power) assuming a medium effect size ($d = 0.3$) for our ANOVA analysis in relation to eye movements data. The sample size was calculated based on the hypothesis that the amount of attention allocated to the Annual Fee would have been significantly different in the dissonant condition with respect to the consonant condition to demonstrate an anchoring effect. Based from previous studies that used similar eye-tracking approaches (Ceravolo et al., 2019), we estimated that at least 65 people were needed to detect a difference of at least 1,000 ms between the mean FT for the Annual Fee (dissonant vs. consonant condition), with an α

error of 0.05 and a power of 0.80 in a one-sample experiment.

Results

Visual Search Strategy

The analysis by TTFF revealed that subjects visually scanned the documents through a left-to-right path according to the following sequence of AOIs: Liquidity (Left)–Liquidity (Right)–FC Payments (Left)–FC Payments (Right)–VC Payments (Left)–VC Payments (Right) (Table 1).

The analysis of the time spent to process each AOI carried out considering the FT demonstrated that Liquidity is the information source that grabs more attention, followed by FC and VC Payments. Subjects allocated their attention almost equally to the left and right prospectuses, as shown in Table 2.

The analysis of the Revisits parameter suggests that the highest average number of gaze returns to an AOI is associated with Liquidity, followed by FC and VC Payments. Table 3 summarizes the number of Revisits for each AOI, split for the left and right positions of the information sources on the document.

Influence of the Consonance and Subjects' Choices

Subjects failed to recognize advantageous products in approximately 15% of the cases. A chi-square test of independence was performed to examine the relationship between subjects' choices and product consonance. The relationship between these variables was significant, $\chi^2(1, N = 1{,}609) = 38.35$, $p < .0001$; subjects were more likely to provide the wrong answer, failing to recognize the advantage when products are dissonant.

Table 1
Time-to-First Fixation for Each Area of Interest According to the Prospectus Position

	Prospectus position			
	Left		Right	
AOI	*M*	*SD*	*M*	*SD*
Liquidity	656.90	1686.72	877.44	2061.94
FC Payments	7440.30	4974.15	8275.72	5512.49
VC Payments	15215.11	8699.82	15597.35	8835.63

Note. Time-to-first fixation is in ms. AOI = area of interest; FC = fixed cost; VC = variable cost.

Table 2
Fixation Time for Each Area of Interest According to the Prospectus Position

	Prospectus position			
	Left		Right	
AOI	*M*	*SD*	*M*	*SD*
Liquidity	4551.46	3086.64	4548.78	2884.41
FC Payments	3790.96	2703.84	3545.31	2423.30
VC Payments	2298.78	1986.39	2275.85	1734.95

Note. Fixation time is in ms. AOI = area of interest; FC = fixed cost; VC = variable cost.

For each AOI of the visual stimulus, a one-way ANOVA was conducted to observe the effect of consonance on FT. The AOI Liquidity Left was associated with a higher FT in the dissonant condition ($M_{\text{dissonant}} = 4715.89$, $SD = 3108.20$) than in the consonant condition ($M_{\text{consonant}} = 4386.21$, $SD = 3057.86$), $F(1, 1609) = 4.61$, $p = .032$. The same pattern was observed for the AOI Liquidity Right, with higher FT in the dissonant condition ($M_{\text{dissonant}} = 4693.83$, $SD = 2852.37$) than in the consonant condition ($M_{\text{consonant}} = 4402.83$, $SD = 2910.77$), $F(1, 1609) = 4.11$, $p = .0429$. No statistically significant differences were found in FT for the AOIs related to FC and VC Payments according to the consonance condition; neither data showed any statistically significant relationship between TTFF and the consonance condition.

Failing to recognize the most advantageous product is associated with a visual anchoring to the Annual Fee. A one-way ANOVA indicated a significantly higher FT toward the AOI Liquidity for the dissonant condition compared to that of the consonant condition when the subject chose the disadvantageous product (AOI Liquidity Left: $M_{\text{dissonant}} = 5682.23$, $SD = 3542.44$; $M_{\text{consonant}} = 4022.7$, $SD = 2835.86$), $F(1, 235) = 3.6$, $p = .0004$, (AOI Liquidity Right: $M_{\text{dissonant}} = 5379.1$, $SD = 2910.54$, $M_{\text{consonant}} = 4217.18$, $SD = 2577.12$), $F(1, 235) = 8.9$, $p = .0031$.

When wrong products were selected in the dissonant condition, a visual anchoring strategy toward the first source of information was revealed by a more pronounced pattern of Revisits to both the AOI Liquidity Left ($M_{\text{dissonant}} = 12.91$,

Table 3
Number of Revisits for Each Area of Interest According to the Prospectus Position

	Prospectus position			
	Left		Right	
AOI	*M*	*SD*	*M*	*SD*
Liquidity	10.35	5.49	10.73	5.71
FC Payments	8.74	5.05	8.33	4.93
VC Payments	5.69	3.76	5.79	3.76

Note. AOI = area of interest; FC = fixed cost; VC = variable cost.

$SD = 6.77$; $M_{consonant} = 9.57$, $SD = 5.78$), $F(1, 235) = 13.92$, $p = .0002$, and the AOI Liquidity Right ($M_{dissonant} = 12.9$, $SD = 5.82$; $M_{consonant} = 10.51$, $SD = 5.99$), $F(1, 235) = 8.64$, $p = .0036$.

Influence of Auditory Stimuli

A one-way ANOVA was performed to examine the effect of auditory stimuli on attention allocation toward the top part of the visual stimulus. Compared with silence, adding music or buzz in the background was associated with a weak effect on attention to the AOIs Liquidity Left ($M_{music} = 4666.13$, $SD = 3154.61$; $M_{buzz} = 4735.87$, $SD = 3{,}160, 62$; $M_{silence} = 4229.87$, $SD = 2907.87$) and Liquidity Right ($M_{music} = 4808.6$, $SD = 2994.64$; $M_{buzz} = 4673.26$, $SD = 2909.48$; $M_{silence} = 4131.45$, $SD = 2687.69$). The subjects' scan path was also not affected by the presence of auditory stimuli in the background.

The analysis of correlation between subjects' choices and auditory stimuli revealed that the auditory condition has no statistically significant influence in modulating the ability to recognize the advantageous product.

Financial Literacy and Visual Anchoring

Financial literacy scores varied from a minimum of 4 to a maximum of 10 ($M = 7$). We categorized subjects as poorly financially literate when the financial literacy score was under 6, medium when it was from 6 to 8, and highly financially literate when the score was 9 or 10. A one-way ANOVA on highly and poorly financially literate subjects was performed to observe the effect of financial literacy on FT when selecting disadvantageous products. Subjects with low scores on financial literacy were found to allocate more attention to the AOIs Liquidity ($M = 5876.14$, $SD = 3510.99$) than those with high scores ($M = 4794.98$, $SD = 2936.57$), $F(1, 198) = 4.6$, $p = .0333$. Logistic regression showed that financial literacy is an independent factor of the ability to recognize the advantageous financial product (Odds Ratio = 1.157, 95% CI: 1.000–1.337), $p = .0493$.

We did not find any statistically significant influence of sex in modulating attentional mechanisms and subjects' evaluations of the financial products.

Discussion

The anchoring effect is one of the most robust evidence in human judgment and decision-making, but its existence in financial information processing, as proxied by eye movements, has not been explored. Thus, we conducted an eye-tracking experiment to quantify attention allocation to the different sources of information in a financial disclosure document and the influence on financial product evaluation.

The analysis of visual search strategies during FIDs reading revealed that these financial documents were visually scanned from left to right, moving from the top to the bottom of the document. This scan path reveals that to evaluate and compare two different bank accounts, subjects do not read an entire FID to later process a second one, while they prefer to compare information by item. This visual search strategy, while probably facilitating the underlying cognitive process associated with FIDs comparison, could bias financial behavior; evidence suggests that subjects often fail to make appropriate adjustments from an initial value. If subjects evaluate FID attractiveness by comparing each cost item with the corresponding cost item of the second prospectus, they might be prone to formulating their preference by anchoring to a single cost item, disregarding or underweighting other information. This study provides ocular data that highlight the existence of a visual anchoring effect toward the top part of the financial disclosure document, which is the Liquidity section that displays the Annual Fee. Conversely, the sections related to VC and FC Payments are associated with fewer visual fixations and eye revisits. Thus, the ranking of the attention distribution follows the ranking through

which sections are displayed to the subjects in the document.

Besides proving the existence of a visual anchoring effect when processing financial information, this study aims to unveil the mechanisms underlying financial decisions. If the charge associated with the Annual Fee in one FID is higher than in the other FID and subjects tend to scan the documents in a left-to-right-top-bottom manner, they might fail to integrate other annual fees displayed in the document (debit card, prepaid card, and home banking), as well as VC, in their final personal evaluation process. To test this hypothesis, the subjects' behavioral responses were recorded. The data revealed that subjects sometimes failed to recognize the most advantageous products, and this mainly occurred when the Annual Fee charge was high, even if the other charges in the document overcompensated for that cost (dissonant condition). Eye-tracking measures revealed that there was a substantial number of visual fixations and eye revisits to the top part of the document, especially when subjects failed to recognize advantageous products in the dissonant condition. These data suggest that during information processing of the bank account financial disclosure document, subjects tend to underweight the cost components of the product that are not displayed in the initial part of the document, to which their judgment is anchored.

Previous research on anchoring mainly employed questionnaires to detect the existence of anchoring effects; only a few studies relied on neuroscientific techniques to unveil the neural mechanisms of the anchoring heuristic (Li et al., 2017; Ma et al., 2015). Using the eye-tracking technique, the present study clarifies the visual attention mechanisms during financial product comparison, detecting the existence of a visual anchor toward the initial value displayed in a disclosure document, which, in turn, biases financial behavior. Moreover, most of the studies on anchoring effect have focused on the role of irrelevant, uninformative anchors in decision-making, while this study contributes to the scarce literature (Englich & Mussweiler, 2001; Mussweiler, 2001; Northcraft & Neale, 1987) on the role of anchors that are informative and relevant to the target value. This finding on the visual search strategy differs from the one detected by other neurofinance studies for financial disclosure documents as the KIID, where subjects explored information following this pattern: top left, bottom left, top right, and bottom right. This difference could be explained by the experimental designs. In each trial of our study, subjects chose between two different products; in each trial of the other eye-tracking study, subjects had to provide a rating of the perceived attractiveness for one single financial product. The results also clarify that in this specific financial task, instead of completely evaluating an alternative before moving on to the next one, decision makers tend to compare alternatives step by step. Conversely, this study is consistent with the findings related to the role of presentational format in financial information processing, which reveal that the first source of information in the top left of a financial disclosure document is the one associated with the greatest attention (Ceravolo et al., 2019).

This study also explores the influence of background auditory stimuli on visual anchoring. When bank clients read FIDs in a bank branch, the internal environment is not completely silent because noises from other people talking or ambient music might be present. These environmental factors affect consumers' behavior even if they are unaware of their exposure; thus, retailers use subtle atmospheric stimuli to intentionally enhance consumers' impulse to buy. Among ambiance factors, music is considered very important because it can affect consumers' satisfaction, store evaluations, time spent in the shop, time perception, choice, and spending (Garlin & Owen, 2006; Hagtvedt & Brasel, 2016; Kellaris, 2008; Knöferle et al., 2012; Milliman, 1982; North et al., 1997, 2016; Spangenberg et al., 2005; Turley & Milliman, 2000). In the present study, observing for the ambient music or buzz conditions, the same proportion of subjects' correct choices but a slight increase in information processing time compared with silence reveal that the presence of auditory stimuli in the background might work as a distractor in financial decision-making. The increase in sensory inputs conveyed through a different sensory channel (auditory) from the primary channel involved in decision-making (visual) does not seem to strongly interfere with visual anchoring.

This study had some limitations. First, even if crafted following the supervisory authority's methodology and considering real data, the visual stimulus is simplified with respect to real FIDs that consist of more than half a page: several precautions have been taken to standardize visual

stimuli and rule out the influence of other variables whose interests were beyond the scope of the present study. Second, the experimental procedure did not include a choice based on the use of real financial resources, but only on the declaration of a preference. In this study, we focused on university students because they represent a specific bank target with respect to the bank accounts segment. It could be tested in future studies whether these findings differ between adults and clinical populations. A further version of this study could shed more light on the anchoring process exploiting the randomization of the information sources positions. Finally, further studies could try to elucidate the impact of auditory stimuli on attention allocation using a more robust study design with a lower number of variables.

Conclusion

This study provides evidence of a visual anchoring effect toward the information placed in the top part of financial disclosure documents that currently displays the Annual Fee. The research highlights the relevance of this cost item in driving behavior, that is, in modulating the perception of attractiveness of the financial product underlying the disclosure document. The strict transparency regulation in banking aims to protect the clients through disclosure documents that detail all financial product features and costs; the present study, through the detection of the role of visual anchor and auditory stimuli in modulating the attention allocation process toward financial information, highlights the importance of applying an interdisciplinary approach to understand the neurophysiological mechanisms of attention. Thus, these findings underpin the importance for policy makers, in general, and regulators and supervisors of the banking and financial industry, in particular, to exploit a neuroeconomic approach to improve consumers protections, studying the ergonomics of disclosure documents.

This work also contributes to the finance and neurofinance literature, where the importance of automatic and unconscious processes in driving decisions tends to be undermined. While marketing largely explores the role of environmental stimuli such as color, smell, and music on consumers' behavior (see the meta-analysis by Roschk et al., 2017), in finance there is a paucity of research on these factors and even more scant research on the neurophysiological mechanisms associated with limited human information processing capabilities. By exploring the influence of auditory stimuli on financial consumers' behaviors through eye tracking, this study fills a gap in the neurofinance literature, where, out of the three most important environmental stimuli affecting behavior, only the influence of color has been investigated (Ceravolo et al., 2019).

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