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# Affective and cognitive factors that hinder the banking relationships of economically vulnerable consumers


## Abstract

Financial decisions are not rational and can be biased by affective and cognitive factors. Behavioural finance has focused very little on analysing how consumer biases influence relationships with banking institutions. Additionally, these relationships are affected by the digitalization and transformation of banking business. Thus, in the case of economically vulnerable consumers, who are not profitable for the increasingly competitive banking industry and lack financial abilities, their risk of financial exclusion is increasing.

The aim of this paper is to explore the affective and cognitive factors that condition banking relationships for economically vulnerable consumers and how these factors contribute to increasing financial difficulties and exclusion. This research, performed on a set of focus groups, bases its findings on a combination of experimental and discourse analysis methods.

The results show that distrust and shame lead to financial difficulties in economically vulnerable consumers. Distrust generates problems of access and self-exclusion, while shame generates difficulties of use. This lack of trust makes them more rational when dealing with machines than with people, showing greater banking difficulties for consumers with a “person-suspicious” profile. This finding can help regulators establish limits on banking behaviour, require banks to incorporate affective and cognitive factors in their convenience tests and detect new variables that can help them improve their insolvency ratios and reputations.


## 1. Introduction

Financial decisions entail financial knowledge and literacy (Gathergood, 2012), which are not always available and can affect consumer well-being, as well as the financial and social exclusion of economically vulnerable consumers. The behavioural aspects of banking consumers’ decisions or preferences and the factors influencing them are relevant in terms of personal finance and market behaviour (Anand and Lea, 2011).

For the average consumer, psychological factors more largely define financial behaviour than financial knowledge (De Meza et al, 2008). Previous studies have studied a large variety of these psychological factors: intelligence and cognitive ability, specifically numeracy (Banks et al, 2010; Smith et al, 2010); impulsivity, which mediates the impact of financial literacy on debt (Ottaviani and Vandone, 2017); and personality factors, such as responsibility**,** planification or perseverance, in addition to other kinds of factors, such as stable income and a higher level of education (Almlund et al, 2011; Borghans et al, 2008; Roa et al, 2018). Nevertheless, the literature focusing on the affective and cognitive factors of financial decision making is relatively recent and scarce (see Kusev et al, 2017, for a review).

Affective and cognitive factors affect the way in which people search for and process information, which can lead to bad financial decisions (Capuano and Ramsay, 2011), referring to, for example, self-exclusion or overindebtedness. Negative emotions can influence cognitive biases such as risk-taking behaviour (Kusey et al, 2017). As Roa-Garcia (2013) suggested, the available information, as well as information coming from trusted but not expert people, can be most relevant for consumers. Loss aversion leads people to value what they own more than what they do not own. However, consumers prefer risk rather than ambiguity or uncertainty. Additionally, emotional well-being is also affected by a consumer's relationship with a banking institution (Bustamante and Amaya, 2020).

The transformation and restructuring of the banking sector as a result of the 2008 financial crisis and the 2020 COVID-19 pandemic and the advancement of banking digitization have reduced personalized attention throughout the branch network, increasing the difficulties faced by lower-income users (Bowman et al, 2014; De la Cuesta et al, 2021; Servon and Kaestner, 2008). The banking sector tends to abandon the relational model based on risk management through a close relationship between bank agents and clients, in favour of a transactional and direct model based on big data, ATMs and online platforms (Dandapani et al, 2018; Filotto et al, 2019). In this environment, a significant burden of responsibility tends to be transferred to consumers: the use of new technologies and the acquisition of sufficient financial literacy are encouraged so that consumers can operate in the retail banking market (Balasubramnian and Sargent, 2020; Gathergood, 2012; Hogg et al, 2007).

This increased burden on consumers is especially difficult for those who are economically vulnerable, who in many cases lack financial experience and skills and are not profitable for the increasingly competitive banking industry (Anand and Lea, 2011). This consumer vulnerability can be aggravated if unfavourable socioeconomic conditions are accompanied by negative emotions that affect their well-being and decrease the perceived value of their banking transactions, increasing their risk of facing financial difficulties in terms of both access and use. Bustamante and Amaya (2020) considered that close interaction with a financial institution can help a consumer improve his or her trust in the bank, as well as the emotional well-being of the consumer: if less profitable profiles are pushed to a depersonalized banking service, then we can argue that the emotions and well-being of consumers will be affected.

The aim of this paper is to explore what affective and cognitive factors are involved in the banking relationships of economically vulnerable consumers and how these factors contribute to enhancing the financial difficulties and exclusion faced by consumers. Particularly, this research addresses the affective and cognitive factors of customers when operating with banks and how they affect their financial decisions, generating access difficulties (ADs) and use difficulties (UDs). Moreover, this empirical study focuses on vulnerable consumers, considering that the digitalization process and competitive pressure in retail banking primarily affect them. In this context of digitalization and online banking, we analyse whether the decisions of economically vulnerable consumers are more rational when they interact with machines (ATMs) than with people and whether a machine-based context, as opposed to a personalized service at a physical bank branch, can affect consumers' economic decision making.

The findings are interpreted using behavioural finance as a theoretical lens, as it holds that financial decisions are not rational and can be modulated by affective and cognitive factors (Barberis and Thaler, 2003). Behavioural finance has focused on analysing how investor psychology influences asset valuation and portfolio formation. However, little attention has been given to analysing how affective and cognitive factors influence decision making regarding the consumption of financial services in retail banking. In fact, most studies in the literature focus on the emotions, such as trust, which hinder the use of online banking (Chauhan et al, 2022; Punyatoya, 2019; Shahid et al, 2022) and the emotions (e.g., satisfaction, attachment) that increase bank loyalty (Levy and Hino, 2016; Rodrigues and Pinto Borges, 2021). Furthermore, very few studies have focused on analysing how this affects vulnerable consumer groups with little or no savings capacity: generally, they are associated with other circumstances, such as having a different cultural background (Thrassou et al, 2020), processes of territorial exclusion (Mende et al, 2020), or are studies coming from the psychology of poverty, studying indebtedness (Lea et al, 1995) and, from a broader perspective, emotions in the daily lives of low-income consumers (Walker, 2014).

Behavioural finance has mainly been developed through experimental psychological research. Other methods, such as focus groups or interviews, have been underused because they are more expensive and do not allow for a clear causal interpretation (Muradoglu and Harvey, 2012). This paper proposes a combination of experimental research and qualitative analysis methods to complete the information and analyse the facts and their coherence with subjects' reasoning. Discourse analysis is a qualitative and inductive way to address social problems and a starting point for advancing the development of a theory (Guillemette, 2006). Ibrahim et al. (2021) argue that qualitative analysis provides rich insights into participants' perspectives regarding using financial services, and several authors highlight the need for further development in the study of financial inclusion, particularly when analysing financial behaviour and decision making (Lyons, 2005; Rowley et al., 2012; Loomis, 2018).

The results of this paper contribute to expanding the literature regarding the affective and cognitive factors of financial decision making and can be useful for policy makers and retail banks in terms of consumer protection and social responsibility (Kusev et al, 2017), as well as for customer relationship management, especially in today's digital-focused environment.

The remainder of this paper is structured as follows. In the second section, we review the literature on the affective and cognitive factors involved in economic and finance decisions and their relationship with financial exclusion. The third section presents the methodology, and the empirical results are detailed in the fourth section. We conclude with a discussion and some suggestions for future research.

## 2. Literature review

Consumer vulnerability can be defined by structural restrictions and individual characteristics that constitute barriers—real or perceived—to obtain adequate value in consumer transactions (Baker and Mason, 2012). Individual characteristics include cognitive, affective, and socioeconomic factors (Baker et al, 2005). The addition of different personal factors could exacerbate consumers' vulnerability. For example, a person with a precarious job and a tendency to feel anxiety may consider his or her ability to make rational decisions in his or her consumer transactions as being especially affected (Hill and Kozup, 2007).

In the financial market, consumer vulnerability may imply a lack of rationality and a search for information (Roa-Garcia, 2013) and difficulties in seeking to redress and solve disputes with banks (Sourdin and Atherton, 2019), inducing overindebtedness or making it more difficult to avoid bad commercial practices (Bowman et al, 2014). In fact, low-income people face barriers to accessing complex banking services and greater difficulties when consuming these products (Carbó et al, 2005, Nieri, 2007). In terms of financial exclusion, the first example corresponds to access difficulties (ADs) (Anderloni and Carluccio, 2007), implying the impossibility of contracting services that could generate value added for the user. The second example refers to difficulties of use (UDs), that is, negative consequences due to highly expensive or unsuitable services or inappropriate use (Gloukoviezoff, 2007). Other examples of UDs identified by one study among populations at risk of social exclusion (Spanish Red Cross, 2016) were excessive waiting times at bank branches or the obligation to operate through electronic channels. A perceived low level of value and well-being obtained from financial services – perception difficulties (PDs) – (O'Connor et al, 2019) can also affect the level of financial exclusion (ADs and UDs) faced by vulnerable consumers (Devlin, 2005). For example, previous bad experiences may lead consumers to think that their money will be safer in their own hands than in a bank or to do not appreciate the benefits of savings (Anderloni and Carluccio, 2007) and reject the use of financial services, increasing their situation of economic vulnerability. Additionally, the perception of insufficient information provided by the bank can be considered poor service (Smith, 1989) and prevent the use of financial services by these vulnerable consumers, especially when these services and products entail innovation and complexity (Davis, 1989; Te'eni, 1989; Rogers, 1995).

However, which affective and cognitive factors are behind these difficulties and can potentially provoke irrational financial decisions of vulnerable consumers?

### 2.1. The role of affective and cognitive factors in economic decisions

For a long time, the literature on the relational model considered economic decisions to be rational. However, it is currently well known that affective and cognitive factors are the causes of irrational economic decisions (McGuire, 1969). This hypothesis led the psychologist Daniel Kahneman to win the Nobel Prize for Economics in 2002 (and the economist Richard Thaler in 2017) for his prospect theory, which claims that decision making depends on the frame or context of a situation or problem. For example, let us imagine the following situation (Tversky and Kahneman, 1981):

*We are in a serious financial crisis. Without any action, the company you manage will lose 600,000 euros. To save this money, there are two possible types of action:*

*Gain version:*

*- If you choose Action A, then you will save 200,000 euros.*

*- If you choose Action B, then there is a 33.3% chance that you will save 600,000 euros and a 66.6% chance that you will not save any money.*

*Which action do you choose?*

*<u>Loss version:</u>*

*- If you choose Action C, then you will lose 400,000 euros.*

*- If you choose Action D, then there is a 33.3% chance that no money will be lost and a 66.6% chance that 600,000 euros will be lost.*

*Which action do you choose?*

Both versions are similar in terms of economic benefits. However, approximately 72% of people chose action A in the gain version, while approximately 78% chose action D in the loss version. This finding indicates that people exhibit a safe attitude (or loss aversion) in gain contexts, while they show a risky attitude in loss contexts (Tversky and Kahneman, 1981). In general, people tend to exhibit loss aversion (see Kahneman, 2011; Sunstein and Thaler, 2008 for a review); therefore, they frequently make decisions with less gain but more safety, which is explained by the asymmetry between gains and losses. Losses have a greater impact on preferences than do gains (Kahneman et al, 1991; Swee-Hoon and Devlin, 2011; Tversky and Kahneman, 1991).

Capuano and Ramnsey (2011) suggest that loss aversion is a cognitive bias that lowers risk assumption and the use of financial products, which is exacerbated by socioeconomic factors such as poverty and low income. Risk is a cognitive bias that is frequently studied in economic behaviour, as it is important due to its negative consequences (going into debt, purchasing inappropriate products, etc.), especially in a sample of economically vulnerable consumers. Moreover, risk in addition to fear and distrust are important variables behind why many consumers are still unwilling to use online banking (ADs) (see Arora and Kaur, 2018). Risk also influences the choice to conduct online transactions (Bhatnagar et al., 2000) and is related to the reluctance of many consumers to shop online (Forsythe and Shi, 2003). Overconfidence and optimism are also associated with risk-taking and investment (Blasco and Ferreruela, 2017).

Fandos et al. (2006) state that the most important types of value perceived by consumers in banking services are emotional value (the feelings generated in the consumer) and the value from the assistance provided by personnel. Calvo-Porral and Lévy-Mangin (2020) also highlighted that customer behaviour is determined by emotional or affective responses experienced during banking service use. In fact, the values that consumers give to financial (in terms of incentives), social (personal relationship) and structural (valuable services, such as information, study reports, etc.) bonds determine their loyalty in the bank (Yi-Ching Hsiehb, Yu-Chuan Lic, and Monle Leed, 2005; see also McCall, 1970).

Cognitive and emotional factors are interrelated. Loss aversion is related to anxiety and other emotions, but these have been ignored in economic behaviour, even though such emotions are important for making decisions (Swee-Hoon and Devlin, 2011). An emotion is a behavioural (changes in facial expression, crying, smiling, approach-avoidance), physiological, **cognitive** (evaluation of stimuli) and subjective response to a stimulus. There are six basic emotions (Lewis, 2014): happiness, sadness, disgust, anger, fear and surprise, in addition to secondary (social) emotions that are acquired during our development, such as shame, empathy, pride, guilt, pity, and jealousy.

Thus, emotion modulates our financial behaviour, leading both to positive or negative decisions and, therefore, to financial difficulties. In general, negative emotions are associated with distrust and greater loss aversion, as well as a style of vigilance and rumination. In contrast, positive emotions are associated with greater trust, optimism, cooperation, and intuitive responses (for a review of the strong relationship between emotions and economic decisions, see Cryder, Lerner, Gross and Dahl, 2008; Damasio, 1995; Gangemi et al, 2013; Guven, 2012; Han et al, 2007; Li, Yang, Zhou, 2018; Loewenstein and Lerner, 2003; Olson, 2006; van Winden, Krawczyk and Hopfensitz, 2011). In the banking context, useful categories of basic emotions are those proposed by Haapio (2019): contentment, happiness, trust, pride, sadness, fear, anger, and shame. However, other negative emotions, such as anxiety, regret, rumination and lack of self-control or relaxation, affect the relationship (Fandos et al, 2006; Spanish Red Cross, 2016).

Fear is probably the emotion most often used to achieve the desired behaviour (e.g., in fake news and misinformation). In marketing, it is also frequently used to increase the choices of healthy products (Krishen and Bui, 2015) or reduce driving speed (Giachino et al, 2017). Similarly, guilt reduces the consumption of junk food (Durkin et al, 2012; see Zheng, 2020 for a review of how emotions affect marketing). Fear about the future can promote savings for retirement, or fear after watching a serious accident or a burning house can increase insurance purchases (Loewenstein, 2000). Additionally, fear of catching COVID-19 during the pandemic has increased the use of credit card payments (Huterska et al, 2021).

Lerner, Small and Loewenstein (2004) found that emotions can have dramatic effects on economic transactions. While fear (guilt, sadness) is related to avoidance and escape, anger has a pattern of approach or attack behaviour that can have consequences in the relationship with companies or banks. Funches (2011) claimed that consumer anger stems from broken promises (poor services, employee mistakes), unfair treatment (waiting), or expressed hostility such as rudeness. However, anger could also be associated with the decision to invest and risk, whereas anxiety motivates individuals to avoid investments (Gambetti and Giusberti, 2012; see also Gambetti and Giusberti, 2009).

Consumers with lower levels of anxiety and higher levels of distrust tend to engage in more recommended financial management behaviours and, thus, more savings behaviours (Hayhoe et al, 2012). Likewise, customers with low self-esteem see the organizational support of the financial service as a way to feel safe and are more inclined to participate in interactions with service providers, accept support from them (relational banking) and, finally, enjoy even more of the service, which would be reflected in their emotional well-being (Bustamante and Amaya, 2019). However, people with distrust of the bank and/or the services delivered could lead to financial self-exclusion (ADs) (Devlin, 2005; Kempson and Whyley, 1999). This means the nonuse of services to which the consumer is assumed to have access, as using them would lose control of their finances (PDs).

Self-exclusion may also be based on shame due to the self-perception that the institution will reject them as a customer, for example, in credit, experiencing feelings of not being "up to the task", that the product "is not made for me", etc. These negative emotions can affect people's financial decisions (AD or UD) and their well-being (PD) (Bustamante and Amaya, 2020). Moreover, people reject or accept inappropriate financial products to avoid regret and shame (Baker and Nofsinger, 2002).

Bad experience can also explain self-exclusion. Consumption emotions (those experienced by consumers during the service encounter) change rapidly, and the uncertainty that exists for consumers before the service encounter begins can cause consumers to experience conflicting or mixed emotions (positive and negative). As people tend to react negatively to mixed emotions (Lau-Gesk et al, 2011), these feelings may lead customers to avoid the service situation in the future.

Focusing specifically on vulnerable consumers, data from the Spanish Red Cross survey (2016) show that distrust when entering a bank branch, even refusing to enter, and (self-perceived) misunderstanding of the explanations provided by the bank agent are closely associated with difficulties in the relationship with banks.

In summary, individual mental models regarding financial product ownership are influenced by the values, beliefs and emotions experienced by users and determine their perceived utility, leading, for example, to the misunderstanding, rejection or compulsive consumption of financial services (De la Cuesta et al, 2021; Kusey et al, 2017; O'Connor et al, 2019; Salignac et al, 2016).

### 2.2. Emotions and rationality in a digital financial context.

The expansion of digital channels in the banking business, involving the reduction of the branch network and the reorientation of customers towards online banking and ATMs, is widespread in advanced economies. However, the speed of the process and its level of acceptance depend on various sociodemographic characteristics, being more intense in countries with higher levels of income, education and urban populations (Menrad and Varga, 2020). Some consumer groups, such as the elderly or those with low incomes, have been identified as particularly vulnerable to this process, as there are fewer resources to serve them in person (Ipsos Mori, 2016; Coppock, 2013, Corrado and Corrado, 2015).

Several studies have investigated differences in people's feelings when interacting with machines or people. For some people, the use of technological interfaces dehumanizes service encounters (Zeithaml and Gilly, 1987), while other people negatively value some aspects of human interaction (e.g., less speed, possibility of human error) and do not value the social aspect of human interaction. For these customers, technological interfaces are preferred to human interactions. Branca (2007) analyses the impact of cognitive versus affective aspects on the consumer usage of financial service delivery channels and finds that both aspects, including positive emotions, influence a higher usage frequency of technology-based channels, while only cognitive factors affect branch usage, suggesting that impersonal channels can be associated with the desire for anonymity a higher sense of control and a lower perceived quality of service through human-based channels. This can be especially relevant for vulnerable consumers, who feel embarrassed by the staff of financial institutions, perceiving shorter service times, lack of understanding and being seen as inferior (De la Cuesta et al, 2021).

Sanfey et al. (2003) presented the ultimatum game that consists of one player (A) having to share an amount of money with another player (B). If player B declines the offer, then no player wins anything, and if player B accepts the offer, then a deal is made, and both players win the money. The authors found that people accepted a deal when the split of money was fair (equally, for example, 5 euros for player A and 5 euros for player B); however, they rejected the deal when it was unfair, even though player B could win 1, 2 or 3 euros. In terms of economic benefit, this meant that people should have always accepted the deal, regardless of whether the offer was fair. However, such a decision is modulated by emotion. When people evaluated a situation as being unfair, they rejected it, even when they lost money. People accepted more unfair offers when they regulated their emotions through re-evaluation (Van´t Wount et al, 2010). However, patients with lesions in their ventromedial prefrontal cortex (area related to emotion) rejected more unfair offers than did a control group (Koenigs and Tranel, 2007). A similar effect was found in people with induced sadness and disgust (Lempert and Phelps, 2016). These results seem to indicate that emotion interferes with rational responses (understood as profits or economic gains). The interesting result was that people modulated this response depending on whether player A was a person or a computer. In the latter case, people accepted more unfair situations, and therefore, they were more rational in terms of economic benefits. In the current context of online banking and digitization, this task seems especially suitable to explore whether these responses to machines or people modulate financial decisions.

Taking into consideration all the cognitive and emotional factors that can affect economic decisions and their rationality reviewed in the literature, we try to explain how they are interrelated in the generation of banking difficulties and to shed light on the understudied relationship of vulnerable consumers with banks. Thus, we propose the following hypothesis:

H1. Negative emotions can increase financial difficulties, such as self-exclusion or the nonuse of bank services.

H2. In an increasingly digital context in terms of banking supply and shorter face-to-face service times, more irrational decision-making by vulnerable consumers when interacting with people can increase banking difficulties.

H3. Attitudes towards risk affect the financial difficulties of vulnerable consumers in terms of access (ADs), use of services (UDs) and well-being (PDs).

## 3. Methodology

To test our hypotheses, we built our results from the bottom up without determining a priori which emotions are most relevant. We wanted emotions to emerge from a discourse analysis in which interviewers construct particular versions of their experiences (Gill, 1996). We codified them according to the main emotions that participants showed in previous studies (Spanish Red Cross, 2016). We used the ultimatum game and four risk problems to test for irrational decision-making or cognitive biases.

### 3.1. Sample selection: country and participants

This empirical study was performed in Spain, focusing on economically vulnerable consumers (low income and low working intensity). According to the 2019 Survey on Living Conditions by the Spanish Statistical Office, 21.5% of households were at risk of poverty, and 55.2% stated that they had problems "making ends meet", despite high bancarization levels (93.8% of people over 15 years old). Studies related to the financial difficulties faced by vulnerable people in Spain have addressed problems such as access to offices (Martin-Oliver, 2019), overindebtedness (Gutiérrez-Nieto et al, 2017) or their link with social exclusion (Fernández-Olit et at, 2018). However, this study assumes that psychological factors, including affective and cognitive factors, can be added to socioeconomic factors to explain banking difficulties and financial exclusion.

The research participants were selected using convenience and snowball sampling. Two charities (Fundación Tomillo and EAPN-CLM) working with vulnerable people collaborated in the selection of 30 people. The sample was balanced by gender and age (mean of 42.5 years). All participants had to be in situations of low working intensity and low income. Participants were rewarded for taking part with a voucher. Figure 1 shows the main sociodemographic attributes of the sample.

[Insert Figure 1 here]

### 3.2. Data collection method

We chose a qualitative method for gathering data and experiential focus groups (Fern and Fern, 2001). This approach encouraged shared attitudes and behaviours towards banks and enabled us to understand the vocabulary, knowledge and experiences arising in interactions between vulnerable people and banks. In addition, if properly moderated, focus groups may evolve from mere exchanges of experiences to discussions about factors affecting the topic debated (Morgan and Spanish, 1984), in this case FE. Finally, focus groups provide results that are difficult to obtain with other methodologies and highlight differences among participants (Diefenbach, 2009).

Focus groups were held in Spanish in Madrid, Toledo and Guadalajara during autumn 2018, led by a moderator using a guide of predefined questions based on the literature review. Table 1 shows the script of the moderator. The moderator hired was a woman working for an NGO dealing with FE (Economist without frontiers). Each of the authors attended at least two focus groups. The authors participated occasionally, just when they thought it was needed to clarify an intervention.

[Insert Table 1 here]

Prior to the interviews, participants also had to complete a questionnaire providing both basic sociodemographic data and information concerning their use of banking products and emotions when visiting a bank branch. We build on a previous study conducted on vulnerable consumers and data from the Spanish Red Cross survey (2016). Particularly, participants were asked to consciously evaluate the intensity of seven emotions: trust, shame, anger, fear, safety, misunderstanding and relaxation (Spanish Red Cross, 2016). Some of them have also been considered by Haapio (2019) and Fandos et al. (2006).

We aimed to study two different contexts that could cause problems related to access or the use of banking services: first, a fair vs. unfair context and a human (personalized) vs. machine (digital) context and, second, a risky or safe context.

In the first context, we presented the ultimatum game, which consisted of two players. Player A split a sum of money (10 euros) between both players. Player B (the participant) could either accept or reject the offer. If it was accepted, then the money was split as proposed, but if Player B rejected it, then no player received anything. Half of these offers were fair (Players A and B received 5 euros), and the other half offered an unfair distribution (two offers of 9:1, two offers of 8:2, and one offer of 7:3). We presented 20 rounds; participants heard Player A´s offer on a computer. Player A could be the voice of a woman (10 rounds) or a machine (10 rounds). The order of presentation was counterbalanced; some participants heard first the human recordings and then the machine recordings, and the other half heard the recordings in the reverse order (Sanfey et al, 2003).

To study the second context, we presented four problems. Each participant was given two alternatives and asked to choose the best option. One option presented a safe choice, and the other presented a risky choice. The best options in terms of economic benefits were the safe option in two problems and the risk option in the other two problems.

Finally, collective interviews were conducted following the script in Table 1. Each author attended two or more focus groups to monitor the process and collect the surveys. Before the beginning of each focus group, all participants signed a confidentiality statement granting their permission for the data gathered in the study, including the audio and video recordings of the sessions, to be used uniquely for research purposes. To ensure consistency, the same moderator conducted all the focus groups using the predefined guide. All the interviews were transcribed for subsequent analysis, and the confidentiality of the content was guaranteed.

### 3.3. Data processing

Focus groups are a qualitative data collection method. However, since the transcriptions of the focus groups' interviews served as the basis for quantitative and qualitative data analysis, the research followed a mixed-methods methodology (Tashakkori and Teddlie, 2010). According to Percy et al. (2005), a qualitative approach is well suited to mixed methods studies because qualitative data can usually be restructured as quantitative data for statistical analysis purposes. In addition, although many studies have analysed the drivers of FE and its relationship with social exclusion, few rely on qualitative analyses (de la Cuesta-González et al., 2021; Harper et al., 2018; Coppock, 2013).

To operationalize the data of the transcriptions, we linked a tree of nodes to the focus group guide to facilitate the codification process of the interviews. These nodes reflected the different categories of consumer difficulties regarding their relationships with banking use, defined by the academic literature (see Figure 2). Among the internal causes of these difficulties were psychological factors (De la Cuesta-González et al., 2021; Gutiérrez-Nieto et al. 2017), which are the focus of this paper.

[Insert Figure 2 here]

We proceeded to codify all the transcriptions of the group interviews according to the above-referenced tree of nodes using computer-assisted qualitative data analysis software (CAQDAS) (Solomon et al, 2011), which facilitates both the systematization of the analytical process and the comparison of researchers' outputs (Weitzman, 1999). QSR NVivo was chosen from among the various CAQDAS programs due to its advantages reported in previous studies (e.g., Stock and Boyer; 2009; Solomon et al, 2011).

To ensure the consistency and uniformity of the criteria applied in the analysis, we followed a three-step procedure (see Table 2). First, two analysts performed the codification simultaneously and discussed the nodes that best suited each sentence. At least one of the two analysts had attended the focus group to be transcribed, thus providing a field-research background for the process. The preliminary definition of the nodes was then revised and completed during the analysis. The result of this process was an intermediate definition of the nodes. Second, each analyst coded two transcriptions separately, using the intermediate definition of the nodes. All analysts met periodically to solve any doubts with respect to the application of the criteria and to evaluate the inclusion of new nodes. Table 2 visually summarizes the three-step procedure followed to codify the transcriptions. All this process was carried out in Spanish. The nodes and the interview sentences included in the article were translated to English at the end of the analysis.

[Insert Table 2 here]

Table 3 summarizes the collected data, including the independent variables (affective and cognitive factors) and the dependent variables (ADs, UDs and PDs):

[Insert Table 3 here]

## 4. Results

One-way analysis of variance (ANOVA) was used to test whether the subjects, grouped according to their affective and cognitive factors, showed a different level of incidence with respect to the different types of difficulties with banking.

### 4.1. Results of affective factor analysis

ANOVA has three assumptions: normally distributed data, homogeneity of variance and independence of samples from the population (randomness). If these assumptions are not met, then the nonparametric version of the ANOVA, the Kruskal–Wallis test, is an alternative statistic that can be used to account for differences between groups. Two measures of effect size are provided: effect size squared ($r^2$) and omega squared ($w^2$). When the value of $w^2$ is negative, zero is the most plausible value (Okada, 2017), thus having no effect.

[Insert table 4 here]

Among these affective factors, we found significant differences only for the case of distrust and shame (Table 4):

a) Distrust has a significant effect on UDs: $F(2, 24) = 7.569$, $p < .01$, $\omega^2 = .327$. In fact, people who feel distrust have a higher level of UDs ($M = 22.33$; $SD = 9.71$) than those who feel more trust ($M = 6.95$; $SD = 6.16$). In the discussion with participants, we heard statements such as the following:

*"It's that I really feel, they make you feel... I say maybe because I'm like that, they do that to me..., or I don't know, or they do it to everyone... I always go the first week of every month, I update [the bank book], and I have to be there pending to see what they have charged me... because if not... if you... if you neglect a little, God knows what will happen there in the account."*

*Subject 6 [female, 41]*

This type of concern can affect decision making. The lack of either subjective financial knowledge (or financial goal self-efficacy) and self-confidence increases financial worry (Magwegwe, 2020), and this subjective dimension affects the objective financial situation (O'Connor et al, 2019). This profile could be denoted as "unconfident". They can be afraid of dealing with banks or consuming financial products due to previous bad experiences. Blázquez and Moro-Egido (2020) found a scaring effect of past financial strain (personal or lived by relatives/friends) on current levels of financial well-being and perceptions regarding future financial events. Furthermore, we found some examples of the rejection and regret of using banking products:

*[after the explanation of a past debt problem for which she had to close her account] "…I was working for two days recently, and they asked me for my bank account, and I had to give my partner's because I didn't get another one..."*

*Subject 21 [female, 31]*

*"Yes, like me nowadays, in my account, I do not enter anything at all, but then, [every] six months… 'bang', commission, after that, every three months… 'bang', commission, and when something comes in, it turns out that they [the bank] have taken everything...And you say, why do I have an account?"*

*Subject 2 [female, 53]*

b) Shame significantly affects the increase in UDs: $F(2, 24) = 5.893$, $p <.01$, $\omega^2 =.252$. In fact, people who feel more shame have a higher level of UDs ($M = 19.75$; $SD = 1.26$) than those who feel less shame ($M = 7.35$; $SD = 6.34$). This feeling of shame could impel banked vulnerable consumers to accept the products and conditions proposed by the bank, but not optimizing their financial situation, not daring to ask for other services, or not complaining, despite feeling uncomfortable. Following the European Union (2016), the main problem for vulnerable consumption is that consumers "do not compare deals", and shame could reinforce the bias of staying with the default (De Meza et al, 2008). This group could be denoted as "trapped".

*"When I go to ask for an advance [at the bank], it does make me feel a bit ashamed... and look, it's mine ... I am always a bit ashamed."*

*Subject 28 [female, 45]*

*[regarding a debit card] Before, I didn't want it, well…my husband; I do not have the right to have it because I do not have any income. We didn't want it because we wanted to have… things controlled. We have been told that each year we have to pay about sixty euros a year for not having it, it is mandatory to have that card."*

*Subject 6 [female, 41]*

We did not find a significant quantitative relationship between consciously recognized emotions and perception difficulties (PDs). There seems to be a disconnect between the subjective and objective dimensions, as was also highlighted by O'Connor et al. (2019) regarding the financial situation of individuals.

### 4.2. Results of the rationality analysis of consumer interactions with machines or people

One of the aims of this paper is to address whether irrational decisions generate different levels of banking difficulties when vulnerable consumers interact with people or with machines. Thus, in our experiment, we define a consumer who perceives the deals proposed by the person or the machine as being equally unfair as the most rational profile.

[Insert Table 5 here]

The results (Table 5) show that this rational profile has a lower average level of difficulties (perception: *M* = 5.00; *SD* = 5.86; and use: *M* = 7.41; *SD* = 6.79) in dealing with banks. Additionally, people who accept less unfair deals from people than from machines show the highest level of difficulties: PDs (*M* = 12.57; *SD* = 7.52) and UDs (*M* = 18.71; *SD* = 12.43). These results corroborate previous studies (see Sanfey et al., 2003). This profile could be denoted as "people suspicious", and the opposite profile could be denoted as "machine suspicious". This higher irrational response to people than to machines could partially be explained by consumers' previous negative experiences (Blázquez and Moro-Egido, 2020). Vulnerable consumers feel embarrassed by the staff of financial institutions (De la Cuesta et al, 2021), and impersonal channels such as machines may be a better channel to maintain anonymity and a greater sense of control (Branca, 2007). This result would support hypothesis 2: the rationality of the financial decisions of vulnerable consumers is different when they interact with machines than when they interact with people, and it generates differences in the level of banking difficulties, particularly PDs ($F(2, 27) = 4.414$, $p < .05$, $\omega^2 = 0.185$) and UDs ($F(2, 27) = 4.696$, $p < .05$, $\omega^2 = 0.198$). In the case of the "machine-suspicious" profile, it shows an intermediate level of PDs ($M = 5.33$; $SD = 2.50$) and UDs ($M = 12.17$; $SD = 6.08$) but higher than the level of the rational profile, which suggests that generally, the perception of injustice generates irrationality in the making of financial decisions and an increase in banking difficulties. In addition, this irrationality is aggravated for the "people-suspicious" profile when this irrational decision making occurs specifically in dealing with people, which is also consistent with the results of Fandos et al. (2006), who concluded that the highest amount of value perceived by a consumer in the banking sector is related to the emotional value (the feelings generated in the consumer) and to the personnel attending to the public.

This preconceived suspicion of banking personnel and its influence on decision making can be found when analysing the discourse of participants:

*"Nothing on the phone, face to face, so we both see each other and see... what is in between. Because by phone you can arrive and... 'well, yes, I accept it and so on...', but then, maybe, they will charge five to twenty percent more, and since you have accepted, then you have to pay... from three thousand you pay seven thousand, and it is better face to face."*

*Subject 24 [male, 39]*

*"You are asking why we do not trust online banks: if I do not trust [in] the bank in... in the person who is working there, that I am talking to, I no longer trust her. How can I trust a machine that who knows who runs it? That's not me."*

*Subject 6 [female, 41]*

**4.3 Results of the risk aversion and banking difficulties of vulnerable people**

The descriptive statistics show that risk attitudes increase the financial difficulties of vulnerable consumers in terms of ADs (*M* = 5.60; *SD* = 7.80) and UDs (*M* = 17.40; *SD* = 16.32) compared to people with safe attitudes (ADs*:* *M* = 1.96; *SD* = 1.65; UDs: *M* = 9.72; *SD* = 7.02). However, we obtained no significant result for these mean differences.

Nevertheless, the discourse analysis highlights some of these difficulties. For example, we found particular problems of access to credit in consumers exhibiting highly risky attitudes:

*"[...] I have never asked for a loan, neither will I ask for it, nor they will grant it to me."*

*Subject 10 [male, 56]*

*"I went to ask for some money [to the bank], but they didn't give it to me. I said 'okay, so far fine, right? Okay, get out '; I went out, did a bad deal outside, went in, told them 'Now you're going to pay me everything'; 'bang', and I stole it, and that's it. Then, I paid six years in jail for it but hey, I stole it. Since they didn't give me the right way, they gave me the wrong way."*

*Subject 4 [male, 53]*

Loss aversion is also related to UDs, especially to high costs for reckless behaviour or to extra costs imposed by banks, intensified by a vulnerable economic situation:

*"Sure. They open you an account, it gets out of money, and they charge you thirty-five euros for overdraft[…] now, the banks charge you for everything[…] Yes, but with a loan that I took out once... apart from the loan they charge you thirty percent of the loan... Or they make you get life insurance..."*

*Subject 2 [female, 53]*

Following Tversky and Kahneman (1991, pp.1057), "the decision maker who seeks to maximize the experienced utility of outcomes is well advised to assign greater weight to negative than to positive consequences". Capuano and Ramnsey (2011) suggest that loss aversion is a cognitive bias that lowers risk assumption and the use of financial products, which is exacerbated by socioeconomic factors such as poverty and low income. This behaviour is contextual: there is a greater predisposition towards risk when people have had a string of gains and their confidence raises.

## 5. Discussion and conclusions

This paper has addressed which affective and cognitive factors condition the banking relationships among economically vulnerable consumers and how they contribute to enlarging financial exclusion in terms of ADs, UDs and PDs. Its results outline a series of affective and cognitive profiles that face difficulties in their banking relationships, providing feedback on the socioeconomic vulnerability of these consumers. In summary, the results show that economically vulnerable consumers (low income and low working intensity) who tend to feel shame and distrust respond more irrationally to people than to machines, showing loss aversion and more financial difficulties. Unconfident consumers have problems of access and self-exclusion, and ashamed consumers have difficulties of use. Other emotions highlighted by previous studies (Haapio, 2019; Fandos et al, 2006; Spanish Red Cross, 2016), such as fear or anger, emerged recurrently in the discourse analysis associated with banking difficulties, but no statistically significant relationship could be established. This may be due to the limited sample size, and future research, with larger samples, could help confirm its relationship with the generation of banking difficulties.

“Unconfidents” are defined by a lack of confidence (distrust) when dealing with banks, which often generates self-exclusion and inaction in banking markets (Devlin, 2005; De Meza et al, 2008, Kempson and Whyley, 1999, Red Cross 2016). When using banking services, “unconfidents” also show a high level of difficulties, such as paying constant attention to abusive fees and tend to engage in more recommended financial management behaviours (Hayhoe et al, 2012).

Shame creates difficulties of use and traps those consumers who are already banked. This “trapped” profile does not dare to ask or consume more banking services, feels uncomfortable but does not complain, or consumes services imposed by the bank (Sourdin and Atherton, 2019; Baker and Nofsinger, 2002). They inappropriately reject or accept financial products to avoid regret and shame (Baker and Nofsinger, 2002) and "do not compare deals" (European Union, 2016).

The perception of injustice, for example, in the evaluation of unfair deals leads to irrational decision making and to banking difficulties ("machine-suspicious" and "person-suspicious" profiles). These difficulties are higher when we find a "person-suspicious" profile, that is, when injustice is particularly perceived when dealing with a person. Previous bad experiences and a lower quality of interactions at a bank branch for consumers with a low profitability-risk profile may affect the value added and the financial well-being obtained by those consumers and lead them to avoid the service situation in the future (self-exclusion) (Lau-Gesk et al, 2011). The frustration of not obtaining value added from their scarce resources and the high fees inherent in a low banking margin context may prevent vulnerable consumers from regulating their negative emotions through re-evaluation when dealing with bank agents (Van´t Wount et al, 2010). Our results support that the digitalization of banking services could avoid the injustice and "person-suspicious" bias affecting the rationality of the economic decisions of socioeconomically vulnerable consumers. Nevertheless, this process should be adapted to other characteristics or difficulties of this collective (lack of access to technology, lack of financial literacy, etc.).

Our results also confirm that economically vulnerable consumers tend to show loss aversion; therefore, they frequently make decisions with less gains but more safety. This finding corroborates previous studies (see Tversky and Kahneman, 1981). Although this study has not empirically verified this finding in a control group, the literature indicates that the context of the socioeconomic vulnerability of the group can exacerbate this bias (Capuano and Ramsey, 2011; Kusev et al, 2017). Nevertheless, the "loss aversion" profile faces a higher level of difficulties. Thus, the interpretation of this bias should be different from that proposed by the general literature in behavioural finance: for socioeconomically vulnerable people, risk aversion is not a barrier preventing the maximization of investment profitability (in fact, these individuals do not invest) but rather a self-control formula to avoid overindebtedness, the loss of their savings or even more serious problems. However, how is this loss aversion balanced with an environment where bank fees are rising? In the current context, the mere possession of savings banking products implies a loss of profitability, which could impel vulnerable consumers even to reject banking services altogether.

These results are consistent with previous literature that has found that economically vulnerable consumers are especially affected in terms of their ability to make rational decisions in their banking transactions, which can aggravate their condition of being vulnerable consumers in financial markets (Roa-Garcia, 2013; Baker et al, 2005). Additionally, negative emotions—considering negative perceptions both towards oneself (lack of self-confidence, shame) and towards the bank (lack of trust)—affect the well-being of these consumers and generate difficulties that hinder their relationship with banking institutions and the value obtained from financial services (Salignac et al. 2016; Bustamante and Amaya, 2020; Fandos et al, 2006; Calvo-Porral and Lévy-Mangin, 2020). Although affective and cognitive factors can complicate access to banking services, in our opinion, they mostly affect already banked consumers (Carbó et al, 2005, Spanish Red Cross, 2016). The vulnerability added by these factors would lead socioeconomically vulnerable people to consume unwanted products, assume higher costs and maintain an unsatisfactory relationship with banks.

***Implications and contributions***

Following the results of this research, a change to digital services would be favourable since people exhibit more rational behaviour even when they feel injustice. In this way, feelings of shame and distrust (which tend to arise more due to dealing between people) would be avoided. According to the heuristic simplification, vulnerable low-income people have bad experience biases that make them mistrust banks. This lack of trust makes them prefer machines to people. Therefore, the current context of digitalization would not harm socioeconomically vulnerable consumers or promote greater financial exclusion, and the prospect theory of Kahneman and Tversky (2013), which claims that decision making depends on the frame or context of a situation or problem, would be fulfilled. The question arising from this research is who is going to guarantee the making of suitable financial decisions for consumers: households or individuals, through the assumption of greater responsibility and financial training, regulators tightening their supervision, or banks offering adequate advice? The results supporting that those affective and cognitive factors are related to the specific difficulties of vulnerable consumers in banking operations do not seem to advise that consumers assume the main responsibility.

One of the contributions of this paper is the “translation” of psychological factors into the realm of general banking activities—off the beaten path of investing—and to the experience of socioeconomically vulnerable consumers. The results contribute to expanding the literature regarding the contextual, affective and cognitive factors of financial decision making and can be useful for regulators and policy makers in terms of both consumer protection and financial education (Kusev et al, 2017).

As practical conclusions for regulators and practitioners, the risk or convenience surveys proposed by the Market in Financial Instruments Directive (MiFID) may not be collecting all the necessary elements to generate an adequate user profile. There is no incorporation of psychological aspects in the measurement of these tools. Additionally, the current regulation compels banks to use these tests just for investment proposals. Our results suggest that risk attitudes and some negative emotions are related to difficulties in the general banking operative, which could be addressed in advance by opinion and psychological survey tools. The training of banking personnel could also take into account affective and cognitive factors and be oriented towards vulnerable consumers, as already proposed by the European Union (2016). For example, banks should be aware of the existence of vulnerable people, who are very sensitive to the treatment of banking personnel, probably by contextual factors, and capable of rejecting transactions that bring them benefits by perceiving them as being unfair. Understanding vulnerable consumers’ difficulties could help banks reduce complaints and improve their social responsibility and reputation. Paraphrasing Kahneman and Riepe (1998) in Muradoglu and Harvey (2012, p.74), this understanding should contribute to helping banks *“communicate realistic odds of success to their vulnerable clients”.*

The use of a mixed methodology (experimental research and discourse analysis) has made it possible to assess both the quantitative relationship between affective and cognitive factors and banking difficulties and qualitatively analyse their relationship within the specific context of socioeconomic vulnerability. The inclusion of a qualitative dimension into the analysis contributes to a better understanding of how affective and cognitive factors are related to the making of financial decisions. However, the quantitative results are supported by a limited sample imposed by the collection of qualitative information. A future line of research would be the extension of this quantitative analysis using larger samples. It would also be appropriate to perform experiments considering a control group to check whether the same affective and cognitive factors affect the banking decision making of the general population. Regarding context, it would also be interesting to delve into the relationship between affective and cognitive factors and subjects' past financial experience, for example, comparing people of different nationalities who are exposed to different financial systems. Future research may also point to whether the vulnerable financial consumer profile may be applicable in other geographical contexts beyond Spain.

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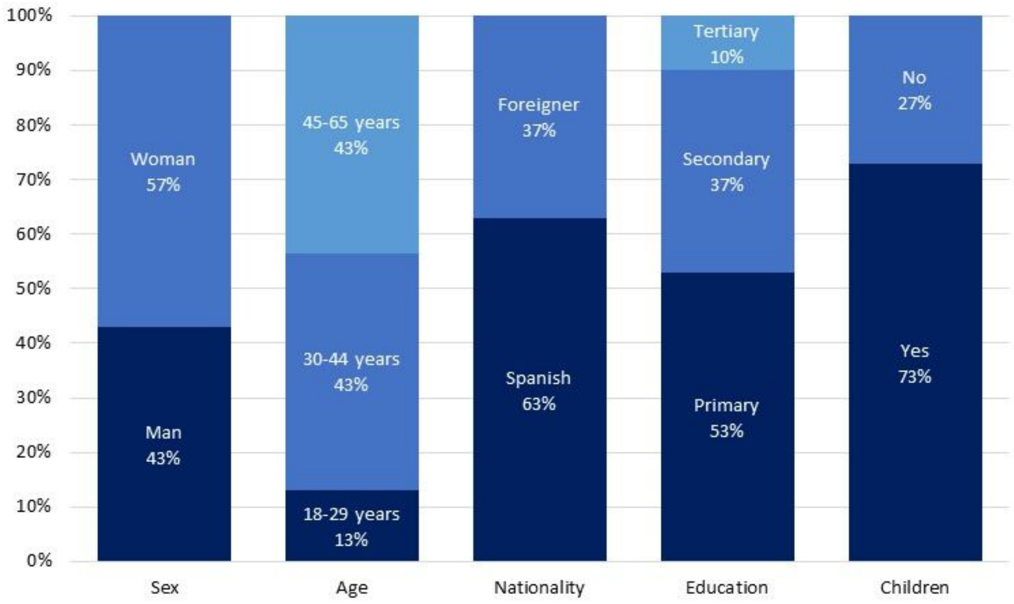
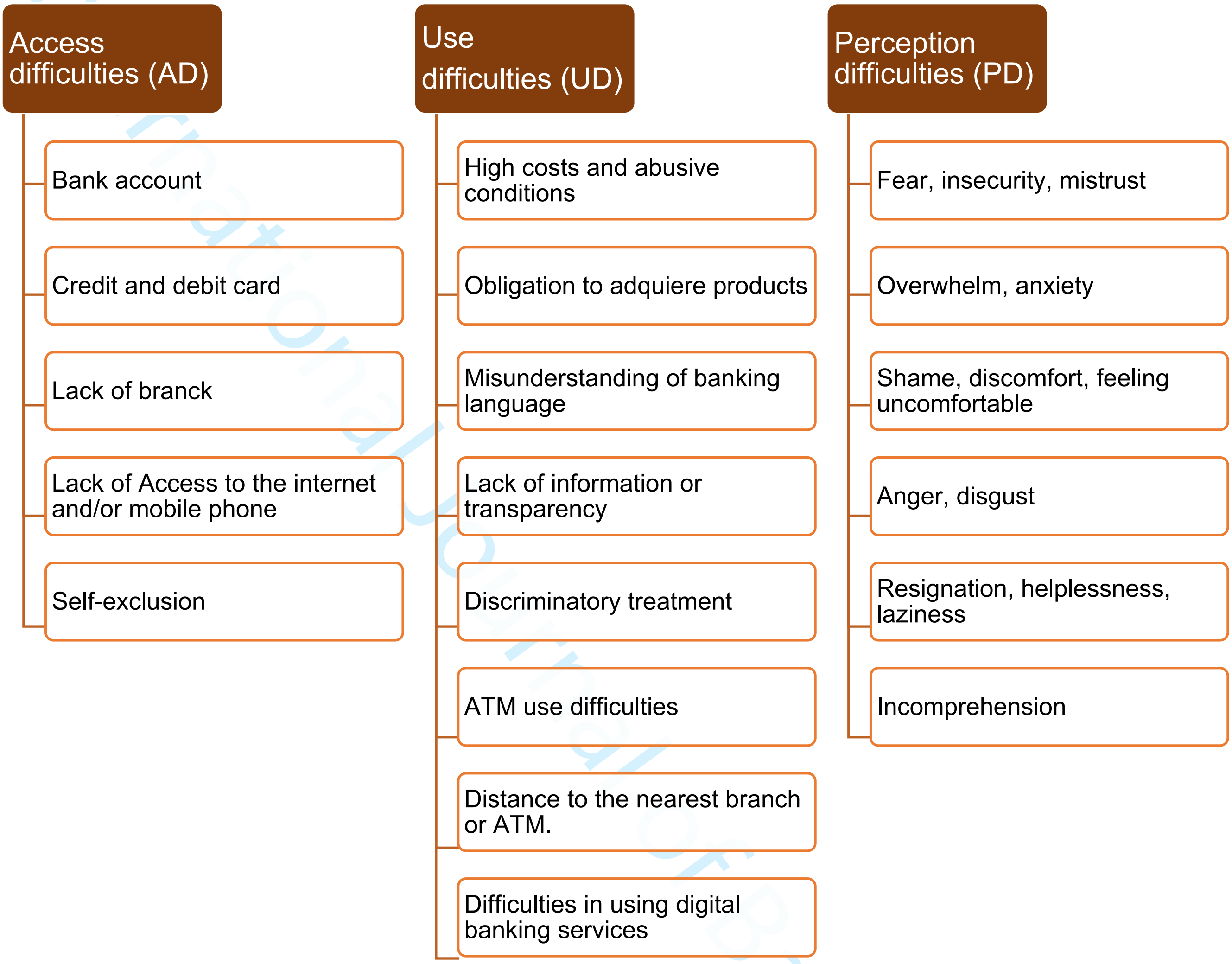
[Insert Annex-Table A1 here]

**Figure 1. Attributes of the sample**




Source: own elaboration (Nvivo).

**Figure 2. Node structure: banking difficulties**




Source: Authors (2021).

**Table 1. Script of the focus group interview**

| Section | Objective |
|---|---|
| A. General use of banking products and services | - To define the level of use of banking products (access difficulties (ADs))<br>- To define the motivations for self-exclusion<br>- To detect use difficulties (UDs) in branch operations<br>- To detect interest in gathering information and the analysis of alternative banking products |
| B. Digital banking services | - To identify participants' skills, attitudes and difficulties faced regarding digital banking services |
| C. Indebtedness | - To detect participants' aptitudes and differences in their attitudes towards face-to-face and digital indebtedness (confidence in their financial knowledge, attitude and aptitude concerning fine print, as well as their attitudes towards risks) (use (UDs) and perception difficulties (PDs)) |
| D. Alternatives to banking services and other risks | - To discuss participants' attitude towards fringe banking or other informal financial channels |

Source: own elaboration.

**Table 2. Summary of the codification procedure**

| | Stage 1. Initial coding | | | | Stage 2. Final coding | | | | Stage 3. Revision of final coding | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Each interview is coded simultaneously | | | | Each interview is coded separately | | | | Third reviewer codification | | | |
| | *Int. 1* | *Int. 2* | *Int. 3* | *Int. 4* | *Int. 1* | *Int. 2* | *Int. 3* | *Int. 4* | *Int. 1* | *Int. 2* | *Int. 3* | *Int. 4* |
| *Author 1* | ✓ | | ✓ | | | ✓ | | ✓ | ✓ | | | |
| *Author 2* | | ✓ | ✓ | | ✓ | | | ✓ | | | ✓ | |
| *Author 3* | | ✓ | | ✓ | ✓ | | ✓ | | | ✓ | | |
| *Author 4* | ✓ | | | ✓ | | ✓ | ✓ | | | | | ✓ |

Source: own elaboration.

**Table 3. Definition of variables**

| **Dependent:** | | | **Definition** |
|---|---|---|---|
| Banking difficulties | | Access difficulties (ADs) | Number of ADs expressed by interviewed person |
| | | Use difficulties (UDs) | Number of UDs expressed by interviewed person |
| | | Perception difficulties (PDs) | Number of PDs expressed by interviewed person |
| **Independent:** | | | **Categories** |
| Affective and cognitive variables | Affective | Anger | Low<br>Medium<br>High |
| | | Fear | |
| | | Safety | |
| | | Confidence | |
| | | Misunderstanding | |
| | | Relaxation | |
| | | Shame | |
| | Cognitive | Risk attitude | Non-risk-averse (majority or same election of risky options)<br>Risk-averse (majority of secure options) |
| | | Difference in accepting fair deals | Higher acceptance of a person's fair deals<br>No difference<br>Higher acceptance of a machine's fair deals |
| | | Difference in accepting unfair deals | Higher acceptance of a person's unfair deals<br>No difference<br>Higher acceptance of a machine's unfair deals |

Source: own elaboration.

**Table 4. Affective variables related to 'entering a bank branch'.**

| | | Pre-test | | ANOVA | | | | Effect size | |
|---|---|---|---|---|---|---|---|---|---|
| | | K-S | Levene | Quadratic Mean | F | F df | Sig. | $r^2$ | $w^2$ |
| Anger | | | | | | | | | |
| | AD | 0.258 | 0.084 | 0.170 | 0.049 | (2.24) | 0.952 | 0.004 | -0.076 |
| | PD | 0.345 | 1.993 | 20.774 | 0.535 | (2.24) | 0.592 | 0.043 | -0.036 |
| | UD | 1.371 | 1.240 | 56.335 | 0.848 | (2.24) | 0.441 | 0.066 | -0.011 |
| Fear | | | | | | | | | |
| | AD | 2.337 | 7.959 *** | 6.114 | 2.044 | (2.24) | 0.151 | 0.146 | 0.072 |
| | PD | 0.71 | 0.305 | 8.523 | 0.216 | (2.24) | 0.808 | 0.018 | -0.062 |
| | UD | 2.962 | 5.010** | 144.027 | 2.322 | (2.24) | 0.120 | 0.162 | 0.089 |
| Safety | | | | | | | | | |
| | AD | 0.364 | 3.542[a]* | 1.300 | 0.471 | (2.23) | 0.630 | 0.039 | -0.042 |
| | PD | 1.694 | 1.182[b] | 11.315 | 0.306 | (2.23) | 0.739 | 0.026 | -0.056 |
| | UD | 2.659 | .476[c] | 57.453 | 1.299 | (2.23) | 0.292 | 0.101 | 0.022 |
| Confidence | | | | | | | | | |
| | AD | 4.856* | 0.881 | 12.673 | 5.279 | (2.24) | 0.013 | 0.306 | 0.241 |
| | PD | 4.282 | 0.708 | 52.720 | 1.458 | (2.24) | 0.253 | 0.108 | 0.033 |
| | UD | 7.811** | 0.483 | 330.062 | 7.569*** | (2.24) | 0.003 | 0.387 | 0.327 |
| Misunders. | | | | | | | | | |
| | AD | 0.201 | 0.527 | 0.015 | 0.004 | (2.24) | 0.996 | 0.000 | -0.080 |
| | PD | 1.771 | 2.963* | 53.580 | 1.484 | (2.24) | 0.247 | 0.110 | 0.035 |
| | UD | 1.584 | 1.253 | 82.542 | 1.285 | (2.24) | 0.295 | 0.097 | 0.021 |
| Relax | | | | | | | | | |
| | AD | 2.464 | 0.369 | 5.243 | 0.372 | (2.25) | 0.693 | 0.029 | -0.047 |
| | PD | 1.645 | 0.970 | 43.362 | 0.960 | (2.25) | 0.396 | 0.071 | -0.003 |
| | UD | 2.364 | 0.440 | 134.070 | 1.622 | (2.25) | 0.218 | 0.115 | 0.043 |
| Shame | | | | | | | | | |
| | AD | 0.926 | 0.573 | 2.150 | 0.701 | (2.27) | 0.505 | 0.051 | -0.021 |
| | PD | 3.605 | 2.316 | 33.928 | 0.963 | (2.27) | 0.395 | 0.069 | -0.003 |
| | UD | 9.032*** | 3.468** | 296.019 | 5.893*** | (2.27) | 0.008 | 0.312 | 0.252 |

*** $p<0.01$, ** $p<0.05$

**Table 5. Difference between human or machine unfair deals (Ultimatum Game)**

| | Pre-test | | ANOVA | | | | Effect size | |
|---|---|---|---|---|---|---|---|---|
| | K-S | Levene | Quadratic Mean | F | F df | Sig. | $r^2$ | $w^2$ |
| Anger | | | | | | | | |
| AD | 3.435 | 5.422** | 22.454 | 1.904 | (2.27) | 0.168 | 0.124 | 0.057 |
| PD | 0.722 | 2.665 | 250.560 | 4.414** | (2.27) | 0.022 | 0.246 | 0.185 |
| UD | 2.390 | 2.334 | 321.810 | 4.696** | (2.27) | 0.018 | 0.258 | 0.198 |

*** p<0.01, ** p<0.05

**Annex.**

**Table A1. Descriptive statistics**

| | | | N | Mean | Std. Deviation | Min | Max |
|---|---|---|---|---|---|---|---|
| DIFFInjustice | | | | | | | |
| | AD | Human | 7 | 4,71 | 6,63 | 0 | 19 |
| | | Equal | 17 | 1,71 | 1,76 | 0 | 6 |
| | | Machine | 6 | 2,50 | 1,05 | 1 | 4 |
| | | Total | 30 | 2,57 | 3,54 | 0 | 19 |
| | PD | Human | 7 | 12,57 | 7,52 | 0 | 22 |
| | | Equal | 17 | 5,00 | 5,86 | 0 | 18 |
| | | Machine | 6 | 5,33 | 2,50 | 3 | 9 |
| | | Total | 30 | 6,83 | 6,49 | 0 | 22 |
| | UD | Human | 7 | 18,71 | 12,43 | 0 | 35 |
| | | Equal | 17 | 7,41 | 6,79 | 0 | 20 |
| | | Machine | 6 | 12,17 | 6,08 | 5 | 21 |
| | | Total | 30 | 11,00 | 9,27 | 0 | 35 |
| Risk_attitude | | | | | | | |
| | AD | Risk-aversion | 25 | 1,96 | 1,65 | 0 | 6 |
| | | Non risk-aversion | 5 | 5,60 | 7,80 | 1 | 19 |
| | PD | Risk-aversion | 25 | 6,24 | 5,73 | 0 | 19 |
| | | Non risk-aversion | 5 | 9,80 | 9,76 | 0 | 22 |
| | UD | Risk-aversion | 25 | 9,72 | 7,02 | 0 | 21 |
| | | Non risk-aversion | 5 | 17,40 | 16,32 | 0 | 35 |
| | | | N | Mean | Std. Deviation | Min | Max |
| ANGER | | | | | | | |
| | AD | Low | 19 | 1,89 | 1,82 | 0 | 6 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Medium | 6 | 2,17 | 2,04 | 0 | 6 |
| | | High | 2 | 2,00 | 1,41 | 1 | 3 |
| | | Total | 27 | 1,96 | 1,79 | 0 | 6 |
| | PD | Low | 19 | 6,84 | 6,53 | 0 | 19 |
| | | Medium | 6 | 5,17 | 5,64 | 1 | 16 |
| | | High | 2 | 2,50 | 2,12 | 1 | 4 |
| | | Total | 27 | 6,15 | 6,12 | 0 | 19 |
| | UD | Low | 19 | 9,47 | 7,24 | 0 | 20 |
| | | Medium | 6 | 11,67 | 11,34 | 2 | 33 |
| | | High | 2 | 3,00 | 2,83 | 1 | 5 |
| | | Total | 27 | 9,48 | 8,10 | 0 | 33 |
| FEAR | | | | | | | |
| | AD | Low | 22 | 1,68 | 1,46 | 0 | 6 |
| | | Medium | 4 | 3,50 | 3,00 | 0 | 6 |
| | | High | 1 | 3,00 | | 3 | 3 |
| | | Total | 27 | 2,00 | 1,80 | 0 | 6 |
| | PD | Low | 22 | 5,95 | 6,15 | 0 | 19 |
| | | Medium | 4 | 8,00 | 7,16 | 1 | 16 |
| | | High | 1 | 8,00 | | 8 | 8 |
| | | Total | 27 | 6,33 | 6,10 | 0 | 19 |
| | UD | Low | 22 | 8,23 | 6,78 | 0 | 20 |
| | | Medium | 4 | 16,25 | 13,20 | 3 | 33 |
| | | High | 1 | 18,00 | | 18 | 18 |
| | | Total | 27 | 9,78 | 8,27 | 0 | 33 |
| SAFETY | | | | | | | |
| | AD | Low | 1 | 2,00 | | 2 | 2 |
| | | Medium | 3 | 2,67 | 2,89 | 1 | 6 |
| | | High | 22 | 1,68 | 1,49 | 0 | 6 |
| | | Total | 26 | 1,81 | 1,63 | 0 | 6 |
| | PD | Low | 1 | 6,00 | | 6 | 6 |
| | | Medium | 3 | 8,33 | 4,04 | 4 | 12 |
| | | High | 22 | 5,41 | 6,24 | 0 | 19 |
| | | Total | 26 | 5,77 | 5,91 | 0 | 19 |
| | UD | Low | 1 | 14,00 | | 14 | 14 |
| | | Medium | 3 | 13,33 | 5,86 | 9 | 20 |
| | | High | 22 | 7,68 | 6,72 | 0 | 20 |
| | | Total | 26 | 8,58 | 6,73 | 0 | 20 |
| CONFIDENCE | | | | | | | |
| | AD | Low | 3 | 4,67 | 2,31 | 2 | 6 |
| | | Medium | 4 | 1,25 | 1,26 | 0 | 3 |
| | | High | 20 | 1,70 | 1,49 | 0 | 6 |
| | | Total | 27 | 1,96 | 1,79 | 0 | 6 |
| | PD | Low | 3 | 11,33 | 5,03 | 6 | 16 |
| | | Medium | 4 | 7,25 | 3,77 | 4 | 11 |
| | | High | 20 | 5,15 | 6,38 | 0 | 19 |
| | | Total | 27 | 6,15 | 6,12 | 0 | 19 |
| | UD | Low | 3 | 22,33 | 9,71 | 14 | 33 |
| | | Medium | 4 | 12,50 | 6,76 | 5 | 20 |
| | | High | 20 | 6,95 | 6,16 | 0 | 20 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | Total | 27 | 9,48 | 8,10 | 0 | 33 |
| MISUNDERSTANDING | | | | | | | |
| | AD | Low | 15 | 1,93 | 1,98 | 0 | 6 |
| | | Medium | 7 | 2,00 | 1,91 | 1 | 6 |
| | | High | 5 | 2,00 | 1,22 | 1 | 4 |
| | | Total | 27 | 1,96 | 1,79 | 0 | 6 |
| | PD | Low | 15 | 6,33 | 6,00 | 0 | 18 |
| | | Medium | 7 | 8,43 | 7,50 | 0 | 19 |
| | | High | 5 | 2,40 | 2,51 | 0 | 6 |
| | | Total | 27 | 6,15 | 6,12 | 0 | 19 |
| | UD | Low | 15 | 9,00 | 6,76 | 0 | 20 |
| | | Medium | 7 | 13,14 | 11,16 | 0 | 33 |
| | | High | 5 | 5,80 | 6,22 | 1 | 14 |
| | | Total | 27 | 9,48 | 8,10 | 0 | 33 |
| RELAX | | | | | | | |
| | AD | Low | 5 | 3,40 | 2,41 | 1 | 6 |
| | | Medium | 4 | 1,25 | 1,26 | 0 | 3 |
| | | High | 19 | 2,63 | 4,25 | 0 | 19 |
| | | Total | 28 | 2,57 | 3,67 | 0 | 19 |
| | PD | Low | 5 | 10,40 | 7,40 | 0 | 18 |
| | | Medium | 4 | 5,00 | 4,24 | 1 | 11 |
| | | High | 19 | 6,11 | 6,90 | 0 | 22 |
| | | Total | 28 | 6,71 | 6,71 | 0 | 22 |
| | UD | Low | 5 | 17,00 | 11,87 | 0 | 33 |
| | | Medium | 4 | 8,25 | 5,74 | 3 | 16 |
| | | High | 19 | 9,11 | 8,83 | 0 | 35 |
| | | Total | 28 | 10,39 | 9,30 | 0 | 35 |
| SHAME | | | | | | | |
| | AD | Low | 20 | 1,75 | 1,52 | 0 | 6 |
| | | Medium | 5 | 2,40 | 2,07 | 1 | 6 |
| | | High | 4 | 2,75 | 2,50 | 0 | 6 |
| | | Total | 29 | 2,00 | 1,73 | 0 | 6 |
| | PD | Low | 20 | 5,40 | 6,39 | 0 | 19 |
| | | Medium | 5 | 7,20 | 5,72 | 1 | 16 |
| | | High | 4 | 9,75 | 1,71 | 8 | 12 |
| | | Total | 29 | 6,31 | 5,93 | 0 | 19 |
| | UD | Low | 20 | 7,35 | 6,34 | 0 | 20 |
| | | Medium | 5 | 13,80 | 11,61 | 2 | 33 |
| | | High | 4 | 19,75 | 1,26 | 18 | 21 |
| | | Total | 29 | 10,17 | 8,23 | 0 | 33 |