



The Impact of National Culture in Cognitive Biases and Its Relationship with Workplace Teams' Formation

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Abstract

Title: The Impact of National Culture in Cognitive Biases and Its Relationship with Workplace Teams' Formation

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The environment we live in is known to influence our decisions. Culture has been studied and examined within several spectrums by many people. Also, we already understood that our decisions are not completely rational due to the existence of cognitive biases, a field of study that has been growing interest in the current times. This study aims to relate the two concepts, by trying to understand if being from one type of culture (measured through Hofstede's cultural dimensions) can influence the level of cognitive biases, more specifically: optimism bias, confirmation bias and intuitive thinking bias. Additionally, I try to extrapolate the implications found into the workplace environment when trying to form multicultural teams to see if it is possible to balance cognitive biases by joining people from opposite cultures. The results of this study show a significant relationship between three of the six cultural dimensions with optimism bias and between two cultural dimensions and intuitive thinking bias. Regarding confirmation bias, no significant relationship was found. Finally, the implications of these results are discussed, along with some limitations and ideas for future studies.

Keywords: Culture; Cultural Dimensions; Multicultural Groups; Cognitive Biases; Workplace; Teams;

Sumário

Título: O Impacto da Cultura Nacional nos Enviesamentos Cognitivos e a sua Relação com Formação de Equipas em Ambiente de Trabalho

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O ambiente em que vivemos é conhecido por influenciar as nossas decisões. A Cultura é algo que tem vindo a ser estudado nas suas diversas perspetivas, por várias pessoas e desde sempre. Para além disso, também já se percebeu que as nossas decisões não são completamente racionais, devido à existência de enviesamentos cognitivos, um campo de estudo que tem ganhado cada vez mais interesse nos últimos tempos. Este estudo pretende relacionar os dois conceitos, tentando perceber se o facto de pertencermos a um tipo de cultura (medida através das dimensões culturais de Hofstede), pode influenciar o nosso nível de enviesamentos cognitivos, em particular: otimismo, viés confirmatório e pensamento intuitivo. Adicionalmente, tento extrapolar as implicações encontradas para o ambiente de trabalho, nas situações em que se tentam formar equipas multiculturais, tentando perceber se é possível equilibrar estes enviesamentos cognitivos juntando pessoas de culturas diferentes. Os resultados mostram uma relação significativa entre três das seis dimensões culturais com o enviesamento do otimismo, e entre duas dimensões culturais e o enviesamento do pensamento intuitivo. Relativamente ao viés confirmatório, nenhuma relação significativa foi encontrada. Além disso, as implicações deste estudo são discutidas, tal como algumas limitações e ideias para investigação futura.

Palavras-chave: Cultura; Dimensões Culturais; Grupos Multiculturais; Desvios Cognitivos; Ambiente de Trabalho; Equipas;

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Glossary

&	And
CD	Cultural Dimension(s)
e.g.	<i>exempli gratia</i> , for example
F	F distribution, fishers F ratio
IDV	Individualism <i>versus</i> Collectivism
i.e.	<i>id est</i> , this is
IVR	Indulgence <i>versus</i> Restraint
LTO	Long Term Orientation <i>versus</i> Short Term Normative Orientaion
M	Sample Mean
MAS	Masculinity <i>versus</i> Femininity
Max	Maximum
Min	Minimum
<i>N</i>	Total number of cases
<i>p</i>	p-value
PDI	Power Distance Index
R^2	Multiple correlation squared; measure of strength of association
RQ	Research Question
<i>SD</i>	Standard Deviation
<i>SE</i>	Standard Error
<i>t</i>	t-statistic
UAI	Uncertainty Avoidance
vs.	<i>versus</i>

1. Introduction

“Culture is the collective programming of the mind which distinguishes the members of one human group from another.” (Hofstede, 1980, p.21)

“We can be blind to the obvious, and we are also blind to our blindness.” (Kahneman, 2011, p.24)

We all live in the same world, but we might understand it completely different regarding the way we think, feel and act. And those patterns, from the simplest and more ordinary ones such as greeting, to the more complex such as religion, are captured in the word *culture* (Hofstede et al., 2010).

We are not born with a given culture inputted in our mind (i.e., culture is not innate), but we are born in a social environment where most people already share the same way of thinking which we will learn and reproduce after. And since we experience different environments and belong to different groups through our lives, we all end up with our minds programmed differently as individuals but similar within our circle(s).

Culture can be realized at many levels, such as ethnic, gender, generation, corporate and more, which can even generate conflicts among them. The level of culture I will focus on is the national one, when we share values and practices with people from the same country. While it is important to highlight the fact that all members of a country may not agree with all of its beliefs and cultural traits, most people consent on some core values on some level as they are “the key, basic, or central values that integrate culture and help distinguish it from others” (Kottak, 2009, p.29).

We might be living in a *Global Village* (McCluhan, 1962), the term used to express the idea that people all around the world are connected through technology and its developments, shrinking and expanding the world’s culture at the same time. However, we are still not living in a homogeneous world, all having the same exact beliefs and culture. In fact, people of different backgrounds have different norms that reflect their cultural heritage (Cox, Lobel, & McLeod, 1991), making multiculturalism a fact and something we face every day in several aspects of our lives. For the purpose of this thesis, I will focus on diversity in the workplace.

According to PORDATA (2020), 7.8% of the labor force in the European Union (EU) was foreign, ranging from 0.1% in Bulgaria to 52.9% in Luxemburg, in 2020. Portugal was the eighth country with the smallest percentage (3.1%). In fact, this number has had the tendency to grow both in Portugal (from 2.3% to 3.1%, between 2002 and 2020) and in the EU (from 4% to 7.8%, between 2002 and 2020). However, probably due to COVID-19 and all the restrictions involved, this number has slightly reduced from 2019 to 2020, in both cases. Regarding

Portugal, another period of retraction existed between 2008 and 2016 due to the financial crisis and its impact on the country. So, to survive in today's diverse world, companies are required to manage this diversity, otherwise, they will be at a competitive disadvantage (Copeland, 1988; Schmidt, 1988). Due to this importance, there is a growing literature on the benefits and/or disadvantages of diversity within workplace that I will go deeply further ahead.

Although we are influenced by our culture, we as human beings and economic agents are rational and make our own decisions, right? Traditional Economics would immediately answer *yes* to this question. However, this perfect rationality assumed by theories such as *The Expected Utility* has increasingly been questioned (e.g., Herbert, 1956) and a lot of research has been made about the behavioral and cognitive aspects of the decision making process (Costa et al., 2017). The work of Daniel Kahneman and Amos Tversky was particularly important in this field, by presenting the *Prospect Theory* which accounts for preferences ignored by the traditional theory (Tversky & Kahneman, 1986). Since then, the terms *heuristic* and *cognitive bias* have gained popularity not only in behavioral economics but in many fields of today's society, such as finance and management. Heuristics are the shortcuts and simplifications we use to solve complex problems (Caputo, 2014) that turn into systematic deviations in decision making (i.e., cognitive biases; Tversky & Kahneman, 1974). These are properties of intuitive thinking and they are present in many decisions and assumptions we make, being more common than we might think mainly because we are "blind to our blindness", as Kahneman mentioned in the citation opening this introduction. How often do we try to validate our point of view by asking a person we already know that shares the same opinion? Probably, more often than we should. This is known as the confirmation bias and it is only an example of the many biases we use daily. This and other bias, such as being too optimistic (optimism bias) or even deciding without thinking twice (intuitive thinking bias), are also present within the business and workplace environment. It can actually help to explain why similar companies behave differently when faced with similar opportunities (Graham et al., 2013), and it might be harming a company's performance and the achievement of its goals, since there are very important decisions in terms of competitiveness and growth (Raveendra et al., 2018) and they can be influenced by such biases.

But is it possible that I, as a Portuguese woman, fall victim to the confirmation bias more often than my German friend? Are these biases general for all human beings or can culture influence them? If yes, and since companies' environment is increasingly heterogenous in terms of culture, can these possible differences be used to benefit companies? This is the starting point for my research, since I will try to understand how can national culture, represented by cultural

dimensions developed by Hofstede, influence cognitive bias and the impact it might have within a workplace environment.

1.1. Problem Statement

To better understand the relationship between culture and cognitive biases, I investigated the relationship between the six cultural dimensions developed by Hofstede (explained further ahead in Section 2.2), with three cognitive biases usually present within workplace environments: optimism bias, confirmation bias and intuitive thinking bias (explained further ahead in Section 3). Then, in order to try to extrapolate some implications for the workplace environment, I tried to understand if there was a significant difference between cultural homogenous groups and heterogenous ones. The problem can then be divided in two main research questions (RQ):

RQ1: Does a person's culture correlate with the level of certain cognitive biases?

RQ2: Is there a difference in the levels of cognitive bias between culturally heterogenous and culturally homogeneous groups?

2. Literature Review

2.1. Culture

Derived from the Latin word *culturae* (meaning *cultivation*), culture can be defined in several ways and can have different meanings. In the narrow sense, culture usually means *civilization* and it manifests through education, art and literature (Hofstede et al., 2010). Schwartz, who has contributed a lot in the fields of social learning and social cognitive theories with the formulation of the values scale, for example, sees culture as a hypothetical variable – the normative value – that shapes and influences manifestations, such as symbols, beliefs, actions and goals (Schwartz, 2014). To Hofstede, culture includes a system of values (Hofstede, 1984) as a mental software that “consists of the unwritten rules of the social game” (Hofstede et al., 2010, p.6). In condensation and as a consensus of anthropological definitions, culture can be defined as “patterns of and for behavior acquired and transmitted by symbols, constituting the distinctive achievements of human groups, including their embodiments in artifacts; the essential core of culture consists of traditional (i.e., historically derived and selected) ideas and especially their attached values” (Kroeber & Kluckhohn, 1952).

Since we belong to different groups throughout our lives, we end up acquiring some of their traits leading to several layers of culture. Thereby, academics distinguish between different levels of culture, but this distinction can be presented in several ways. Kottak refers the

following three: international culture, national culture, and subculture. The broader one expands national limits mainly because culture is learnt and, due to globalization, many cultural patterns have reached international scope. The national level includes all the values and traits shared by people with the same nationality, and the most narrow one, subculture, is related with particular groups within the same society (Kottak, 2009), such as hippies, skaters or vegans.

Besides the national level, Hofstede gives us even more “layers of mental programming”: regional, ethnic, religious and/or linguistic affiliation level; gender level (related with being a boy or a girl); generation level (separating grandparents, parents and children); social class level (regarding education and professional status); and organizational or corporate level (related with one’s work organization and its social practices; Hofstede et al., 2010).

For the purpose of this thesis, the focus will be held in national culture, since it is the most feasible level as it is easier to get data from nations than from other group categories (Hofstede et al., 2010).

2.2. Culture Dimensions

All societies face problems, and the more basic ones are equal for all, only the path chosen to face them might be different. Such idea was proliferated by anthropologists, namely Ruth Benedict and Margaret Mead (as cited in Hofstede et al., 2010). Three of these societal problems were seen as the most essential: the definition of boundaries and relations between the individual and the group, the coordination between individuals for economic purposes, and the utilization of human and natural resources (Kluckhohn & Strodtbeck, 1961; Parsons, 1951; Comte, 1896, Durkheim, 1897 and Weber, 1922, all cited in Schwartz, 2014). Yet, other lists of essential societal problems exist. Alex Inkeles and Daniel Levison, for example, suggested the following ones: relation to authority, conception of self (particularly, the relationship between the individual and society and the individual’s concept of masculinity and femininity) and ways of dealing with conflicts (including the control of aggression and the expression of feelings). These societal problems were empirically found by Geert Hofstede in an IBM study (Inkeles & Levison, 1954, as cited in Hofstede, 1980).

These common problems culminate in culture dimensions, something that we can use to compare different cultures. The identification of such dimensions has been the main goal of several studies due to its importance in opening “the way to more adequate operationalizations of the concept of culture” (Smith et al., 1996).

The first to quantify cultural dimensions was Hofstede. He based his study on a survey conducted by himself and the responses of employees from IBM in 67 countries. From this

analysis, he identified four cultural dimensions: individualism vs. collectivism, masculinity vs. femininity, power distance and uncertainty avoidance (Hofstede, 1980). This IBM questionnaire was used by many people and improved in what is called *Values Survey Modules* (e.g., Hoppe, 1990, Shane, 1995, de Mooij, 2001 and van Nimwegen, 2002, all cited in Hofstede, 2010). But other surveys, particularly the *Rokeach Value Survey*, used in the Asia-Pacific area and, later, the *Chinese Value Survey*, both used by Michael Harris Bond, made Hofstede add a fifth dimension: long-term vs. short-term orientation (Ng et al., 1982 and Chinese Culture Connection, 1987, both cited in Hofstede, 1991). Finally, with the development of the *World Values Survey*, by Ronald Inglehart and with the help of Misho Minkov, a sixth dimension was added more recently: indulgence vs. restraint (Inglehart et al., 1998). In the end, the cultural dimensions presented by Hofstede are the following:

- **Power Distance Index (PDI):** the degree to which the less powerful members of a society accept and expect that power is distributed unequally. The higher the index, the less justifications are required to have higher hierarchical levels;
- **Individualism vs. Collectivism (IDV):** the difference between societies where individuals are expected to take care of only themselves and their immediate families (individualism) or can expect their relatives or members of a particular ingroup to look after them (collectivism);
- **Masculinity vs. Femininity (MAS):** the difference between societies where there is a preference for achievement, heroism, assertiveness, and material rewards for success, i.e., competitive (masculinity) or a preference for cooperation, modesty, caring for the weak and quality of life, i.e., consensus-oriented (femininity);
- **Uncertainty Avoidance Index (UAI):** the degree to which individuals feel uncomfortable with uncertainty and ambiguity. How society deals with the unknown future. The higher the index, the more rigid codes and intolerance towards unorthodox ideas exist;
- **Long Term Orientation vs. Short Term Normative Orientation (LTO):** the difference between societies that prefer to maintain traditions and norms, disliking societal changes (short-term oriented) or prefer to prepare for the future by investing in modern education (long-term oriented);
- **Indulgence vs. Restraint (IVR):** the difference between societies that allow free gratification related to enjoying life or that repress the idea of having fun with the use of strict social norms.

Despite being the most popular and invoked work, some criticism has been raised, such as the way Hofstede presumed a too stable notion of national culture and overestimated the number of dimensions, while using data of “questionable quality” (Beugelsdijk & Welzel, 2018) due, for example, to the use of “limited and predetermined questionnaire answer pools” (Ailon, 2008), misrepresenting the dynamics of culture.

Unlike Hofstede, Schwartz derived seven cultural value dimensions based on *a priori* theorizing. He considered that societies were placed in these dimensions depending on the most common answers given by people of that culture (Schwartz, 2014). Based on a survey in 25 countries, that included a list with 56 or 57 value items (Schwartz & Boehnke, 2004 and Schwartz, 1992, cited in Schwartz, 2014), the following set of cultural dimensions was presented:

- **Conservatism:** the preference for maintaining the status quo, avoiding actions that might disturb the traditional order;
- **Intellectual autonomy:** the incitement for individuals to pursue their own ideas and intellectual directions;
- **Affective autonomy:** the incitement for individuals to pursue hedonism and positive personal experience
- **Hierarchy:** acceptance of an unequal distribution of power relying on a hierarchical distribution of roles;
- **Egalitarian commitment:** individuals see others as moral equals, promoting cooperation acts of solidarity;
- **Harmony:** societies that avoid conflicts and try to fit in the social and natural world, without exploiting it;
- **Mastery:** societies that encourages individuals to change the social and natural environment in order to achieve their goals.

We can find significant similarities in these two approaches’ results, and Schwartz himself has noted them (Smith et al., 1996; Schwartz, 2014). A comparison between the two is present in Table 1, where conceptual similarities were considered and some empirically overlap was found.

Table 1

Similarities between Hofstede's and Schwartz's Cultural Dimensions (based on Schwartz, 2014)

Hofstede	Schwartz
Individualism vs. Collectivism	Autonomy/Conservatism
Power Distance	Egalitarian Commitment/Hierarchy
Masculinity vs. Femininity	Mastery
Uncertainty Avoidance	Harmony

Another well-known project is the *Global Leadership and Organizational Behavior Effectiveness* (GLOBE), by Robert J. House conceived in 1991 which “examines culture as practices and values” (House et al., 2004), measuring them in three different levels throughout 62 cultures: industry, organization, and society.

In the end, GLOBE presented us with nine dimensions (some of them similar to the ones of Hofstede):

- **Future Orientation:** related with societies that are concerned about future prosperity and therefore take care of and invest in the present;
- **Gender Egalitarianism:** connected with societies where women have more rights and economic independence from men;
- **Assertiveness:** linked with competitive societies in economic matters, usually meaning a lack of awareness towards natural resources;
- **Humane Orientation:** related with empathic cultures, where hospitality is recognized;
- **In-Group Collectivism:** related with societies that emphasise family values;
- **Institutional Collectivism:** linked with less segmented societies;
- **Performance Orientation:** related with cultures that promote creativeness and are usually nondogmatic;
- **Power Distance:** connected with differences between people from opposite social and economic status;
- **Uncertainty Avoidance:** related with societies where there is scientific progress and investment in economic activities.

These dimensions were tested in a survey with seventy-eight questions, where half of them were about the culture “as it is” and the other half “as should be”.

Again, a conceptual comparison can be made between GLOBE’s and Hofstede’s dimensions (see Table 2). However, Hofstede strongly criticized some of GLOBE’s methods, particularly those related with the wording and the formulation of the questions. In fact, some of the terms in both approaches are the same but with different meanings (e.g., the term “practices” is used in GLOBE for answers about culture “as it is”, while Hofstede uses it for symbols visible to the outside observer, complicating a straightforward comparison between the two (Hofstede et al., 2010).

Table 2

Similarities between Hofstede’s and GLOBE’s Cultural Dimensions (based on Hofstede, 2010)

Hofstede	GLOBE
Power Distance	Power Distance
Uncertainty Avoidance	Uncertainty Avoidance
Individualism vs. Collectivism	In-group Collectivism and Institutional Collectivism
Masculinity vs. Femininity	Assertiveness and Gender Egalitarianism
Long Term Orientation vs. Short Term Normative Orientation	Future Orientation
Masculinity vs. Femininity	Humane Orientation and Performance Orientation

2.3.Culture within Workplace Environment

Globalization has brought into focus topics such as climate change, business growth and, the one of greater relevance to this dissertation, multicultural changes, resulting in a cross-border movement of the working population helped by the more unrestrained international labor legislation (Maznevski, 1994, as cited in García-Cabrera & García-Soto, 2010). We can observe this phenomenon more and more within organizations, where people from different cultures, with different skills, experience and values coexist in the same workplace environment. At the same time, teamwork has become one of the most important skills in the labor market and one of the most sought by employers. In 2016, The Hamilton Project referenced a survey from

PayScale, which concludes that “about a third of hiring managers said recent college graduates lacked data analysis and teamwork skills” (Schanzenbach et al., 2016, p.2). In a 2018 LinkedIn report, collaboration was considered one of the top soft skills companies would look for in 2019 (Petrone, 2018). Also, in a 2020 World Economic Forum report, working with people was perceived as a skill group with a growing demand by 2025, by about 50% of the companies surveyed (World Economic Forum, 2020). The conjugation of globalization and teamwork demands has brought to debate the impact of diversity within teams (e.g., Cox et al., 1991; Hopkins & Hopkins, 2002). In advance, let me differentiate the concept of *working group* with the one of *team*. While in the first one performance is built upon what members do individually, in a team is the result of both “individual and mutual accountability” (Katzenbach & Smith, 2005). However, for the purpose of this thesis, the word *group* might be used to refer to either of these concepts for simplicity reasons.

Managing diversity in teams is a factor of strategic competitiveness and increasing the heterogeneity among teams to create synergies has become a strategy for multinational companies (García-Cabrera & García-Soto, 2010). Many advantages are behind this decision, such as the ability to attract and retain the best talent, the adaptation it brings to an increasingly global market, and the higher level of creativity inside the organization while displaying multiple and different perspectives on the same issue (Amaram, 2007). Actually, a 2020 McKinsey report on more than one thousand large companies concluded that the top quartile companies for ethnic and racial diversity in management were 36% more likely to have higher financial returns than the industry average (Dixon-Fyle et al. 2020). Another benefit has been referred in recent years: diverse teams are smarter. And this happens because they focus more on facts, process them more carefully, and are more innovative (Viki, 2016). In spite of these many benefits, some issues might be risen, such as the costs in time and financial resources, the higher levels of confusion and frustration making it harder to make an agreement among the team, and the possibility of discrimination of minorities which can lead to higher turnover levels (Amaram, 2007).

Due to its importance, the impact of diversity in organizations and within a workplace environment has been addressed by many researchers that reached interesting conclusions. For example, Cox (1991) analysed the impact that differences in cultural norms between Anglo-Americans and Asian, Hispanic and Black Americans have on behaviours within a group task, concluding that those composed by people from collectivist cultures cooperate more than those formed by people from individualistic ones (Cox et al., 1991). Also related with individualist vs. collectivist cultures, Earley (1993) assessed how they differ on performance based on a

study of 163 managers from the USA, China and Israel. Results showed that the performance of people from the USA (individualists) was lower when working in teams than when working alone, while the opposite happened in the other two countries (collectivists). Perkins (1993) arrived at the same conclusions but also analysed preferences related to the structure of the team, finding that people from individualistic cultures prefer more informal teams while collectivist ones have a preference for highly structured teams. Rubaii-Barret and Beck (1993) examined climate perceptions and levels of job satisfaction in employees from Anglo-American and Mexican-American governments, concluding that the latter ones are more satisfied with personnel procedures than the former ones. More recently, Fietz et al. (2021) investigated the influence of national culture (measured by the dimensions of Hofstede) on organizational resilience on 464 companies from the North American Free Trade Agreement (NAFTA) region, showing that the dimensions of power distance, individualism vs. collectivism, uncertainty avoidance and indulgence are significantly related with the organizations' level of resilience confirming that "cultural influences play a significant role in human resource trainings, choices of location, leadership styles, and managing stakeholders and external alliances to improve organizational resilience" (Fietz et al. 2021). As such, there is ample evidence that cultural variables have influence in how people experience and behave in the workplace.

Despite the several studies related with culture within a workplace environment, and some of them using the cultural dimensions of Hofstede as a measure, the relationship between those and behavioral biases has not been addressed and that is the gap I am to fill with this dissertation.

2.4. Cognitive Biases

We all make decisions every day, some of which are not critical, but others might have implications in important fields of our lives. Therefore, we might think that decisions are made through rational means. That is what theories such as the Expected Utility, axiomatized by von Neumann and Morgenstern (Neumann & Morgenstern, 1944, cited in Tversky & Kahneman, 1986), and generalized by Savage (Savage, 1954, cited in Tversky & Kahneman, 1986), based on the improved concept of expected utility by Bernoulli (Bernoulli, 1954, cited in Kahneman, 2011), defend since we are supposed to access perfect information while having perfect rationality (i.e., the ability to always choose the optimum and most feasible alternative). However, is it now known that we make many decisions unconsciously using heuristics (i.e., we just use part of the available information, which is usually easier for us; Ellis, 2018). Often, this does not lead to any problem. On the other hand, some poor judgements might be made and our behavior is considered "irrational". Underpinning these judgements are errors or

deviations - the so-called cognitive biases (Tversky & Kahneman, 1974). Let me illustrate with an example. When asked to choose between a gamble where you have 70% chance to win \$100 and 30% chance to win nothing or receiving \$60 for sure, most people would prefer the sure thing. However, if they chose based on the Expected Utility theory (i.e., if they acted rational), the gamble option should be chosen since its expected value is \$70 ($0.7 \times 100\$ + 0.3 \times 0\$$), therefore higher than the one from the sure option ($1 \times 60\$ = 60\$$; this is known as risk aversion).

In this field, the work of Tversky and Kahneman was particularly important by demonstrating that human decision making is influenced by the context and is highly vulnerable to biases (Ailon, 2008). Kahneman & Tversky (1979; Tversky & Kahneman, 1986) presented a new theory: the Prospect Theory. This theory tells us that people treat gains and losses differently showing that the value function is concave for gains (people avoid risk in gaining situations) and convex and steeper for losses (people seek risk in loss situations; Kahneman & Tversky, 1979; Tversky & Kahneman, 1986).

Although Tversky and Kahneman's theory became very popular, it did not escape without criticism. For example, Gigerenzer (1999) defended that we can be accurate while using heuristics, especially under an uncertain situation. Another critic is related with the lack of organization among biases, heuristics and their concepts (Ellis, 2018). We can just exemplify that with the fact that the Cognitive Bias Codex by Benson (2016) tries to organize more than 200 biases according to causes and strategies (see Appendix A). Ellis and Dix (2015) categorize biases related with the visualization of data and Valdez et al. (2018) suggest a framework for investigating biases by suggesting methods for the different levels of cognitive processing: perceptual biases (at the perceptual level), action biases (at the decision-making level) and social biases (that affect judgment on a social level).

To simplify, Ellis (2018) refers four examples of common biases: (1) familiarity/availability bias: when people estimate the likelihood of something to happen by how easy it is to recall similar events; (2) confirmation bias: when people tend to look for arguments that corroborate their own assumptions rather than contradict them; (3) representational bias: the fact that different representations (e.g., visualizations) of the same information/data can influence people's decision; and (4) overconfidence bias: when people tend to judge their opinions as more accurate than they actually are.

Also related with biases, Croskerry et al. (2013) examined strategies to achieve debiasing, suggesting three types of interventions: educational strategies, workplace strategies and forcing functions (rules that encourage a desired response). Also, it was found that people's degree of

behavioral biases can be affected by some individual characteristics, such as education (Becker & Mulligan, 1997), working experience (Jones & Sudgen, 2001), gender (Jacobsen et al., 2014), or someone's culture.

2.5. Cognitive Biases within Workplace Environment

The Business world is one where the impact of biases is most explored. This is probably because the business world is so important on peoples' lives, be it for employment reasons, productivity reasons or investment decisions, for example. Further, behavioral biases have a determinant role in workplace issues and are usually unconscious (where people are influenced by others and/or the environment rather than logical when making decisions; Sharma, 2015, as cited in Raveendra et al., 2018). For example, Raveendra et al. (2018) did a study based on secondary data about human resource managers' biases in performance appraisal decision and investors' biases in investment decisions, giving emphasis to the following biases: halo error, recency effect, leniency error, contrast, central tendency, and discrimination. Mancuso et al. (2014) related the effects of confirmation bias on the decisions made by distributed teams, finding that teams have the tendency to focus more on incorrect information during the development of the project when it was presented on early stages, giving incorrect answers more often due to the influence of a confirmation bias in their deliberations. Graham et al. (2013) worked around optimism, risk aversion, loss aversion and present bias by exploring how US CEOs differ from non-US CEOs, finding that US CEOs differ significantly from non-US CEOs in terms of their personality traits, and how executives differ from non-specialized workers, finding that CEOs are significantly more optimistic and risk-tolerant than others.

3. Research Aims and Expectations

Despite all studies made about the interplay between biases and culture, most of them are financial research (maybe due to the high levels of uncertainty and volatility in this field). Also, the USA is the focus of most of these studies and their data collection, not only because it is where most business decisions are made and many people are employed, but also because there several cultures coexist. Additionally, executives and the higher levels of a company's hierarchy are the most examined. Therefore, some conclusions and takeaways from these studies might be misleading.

Nevertheless, the studies already conducted inspired me to choose the three cognitive biases for this study, previously mentioned:

- **Optimism bias:** people's tendency to expect better than average outcomes from their actions.
- **Confirmation Bias:** when people tend to look for arguments that corroborate their own assumptions rather than contradict them.
- **Intuitive Thinking Bias:** the tendency to use shortcuts to solve complex problems, which might raise some serious problems in work related situations and decisions.

I aimed to test the effect of culture on the levels of cognitive biases. In other words, to test if being from different countries makes us have significant different probabilities of being cognitively biased or not. Measuring culture by using Hofstede's six cultural dimensions, I created some expectations regarding the interplay between these and the cognitive biases stated above, based on their definitions and meaning. The expectations are the following:

Power Distance Index - PDI. Since a higher index suggests more acceptance towards an unequally distribution of power, I expected people from these countries to be less optimism biased, more confirmation biased and with the tendency to rely less on their intuition.

Individualism vs. Collectivism – IDV. Since a higher score means people belong to a country where individualistic behaviours are more common, I expected these to be more optimistic, more confirmation biased and with a higher tendency to rely on their intuition.

Masculinity vs. Femininity – MAS. Since a higher score suggests a preference for achievement, success and heroism, I expected people from these countries to be more optimistic, less confirmation biased and with a higher tendency to rely on their intuition.

Uncertainty Avoidance Index – UAI. Since a higher index suggests more discomfort towards uncertainty and ambiguity, I expected people from these countries to be less optimistic, more confirmation biased and with a lower tendency to rely on their intuition.

Long Term Orientation vs. Short Term Normative Orientation – LTO. Since a higher score suggests the preference towards the future, I expected people from these countries to be more optimistic, more confirmation biased and with a higher tendency to rely on their intuition.

Indulgence vs. Restraint – IVR. Since a higher score suggests a preference for enjoying life, I expected people from these countries to be more optimistic, less confirmation biased and with a higher tendency to rely on their intuition.

Furthermore, I wanted to test if these levels of cognitive biases were significantly different when joining people with similar cultures *versus* people of different cultures to infer some conclusions for the creation of teams in a workplace environment. To do that, I launched an online survey, aiming to obtain more answers with a higher diversity in terms of countries, since it was an important variable for this research.

4. Methodology

4.1. Research Design

The current study implemented a correlational, survey-based approach. The survey was designed with Qualtrics, an online survey tool, and distributed both through social media platforms (Facebook, Instagram and LinkedIn) and through email to international workers using contacts provided by a big company.

Regarding the teams' formation, I used the information collected with the survey and did experimental simulations using R, a software environment and programming language for statistical computing.

4.2. Procedure

Due to the international scope of this study, the survey was distributed in English, although it had the option to change it to Portuguese, since I was expecting most answers from Portuguese people as it was easier to reach them through the main platforms used.

After an introduction on the subject and intentions of the survey, participants went through four main parts: in the first one, participants answered to the Life Orientation Test – Revised (LOT-R - Scheir et al., 1994), so that their optimism was measured; secondly, they went through variations of the Wason selection task (Wason, 1968), so that confirmation bias was inferred; in the third part, participants answered the Cognitive Reflection Test (Frederick, 2005) adapted by the Science of Behavior Change (SOBC) research network, so that their intuitive thinking and the probability to rely on it was measured; and finally, participants provided basic demographic information needed for my control variables (i.e., age, gender, education levels and years of professional experience) as well as their nationality, which enabled me to attribute the correct levels of Hofstede's six cultural dimensions, previously mentioned. The survey was completely anonymously, especially because participants were subject to several tests and gambles within the field of psychology, where people might feel reluctant providing an answer

they are not sure about and might be wrong. The English version of the survey can be seen entirely in Appendix B.

4.3. Participants

Using social media and email addresses, as previously mentioned, I was able to gather 1328 answers, from which I immediately excluded 504 for being spam or because they were not finished. From the remaining 824, 60 were also excluded because participants were from countries that are not scored in all of the six dimensions of Hofstede. Therefore, the final sample was composed of 764 answers from 51 different countries (the complete list of the 81 countries (30 of them excluded) can be found in Appendix C).

Four hundred three participants were male, 357 were female and four considered themselves as “other”, which gives a good distribution in terms of gender (52.4% of males and 46.7% of females). The average age was 31 years old ($SD = 10.4$). The majority of participants had a higher education degree, since 46% had a Bachelor’s degree, 39% has a Master’s degree and 1% a Ph.D. Moreover, 4% has completed some college but still does not have any degree. Also, 6% has completed high school and only 0.7% has completed less than that. The remaining 3.3% of participants gave other answers, not provided by default. Regarding the employment status, 88% of participants were employed, 7% were students and 4% student-workers. Representing less than 1% of the sample (each one) were: unemployed, retired or people that gave other answers. Considering professional experience, 34% said they had between 1-5 years of professional experience, 29% more than 10 years, 16% between 6-10 years, 17% less than 1 year and only 4% said they had no experience at all. Since I intend to infer some conclusions into the field of working environment, I consider this sample a good starting point, especially given most of the sample was employed and had professional experience.

4.4. Measurement Variables

4.4.1. Dependent Variables

Optimism Bias. Optimism was measured through the Life Orientation Test – Revised (LOT-R, Scheir et al., 1994), which has been used several times within the field of psychological literature (e.g., Puri & Robinson, 2007) and in similar studies (e.g., Graham et al., 2013). Participants were asked to answer ten questions on a 0 (*Strongly Disagree*) to 4 (*Strongly Agree*) point scale. From the set of questions, four of them were filler questions, with the six coded ones being:

1. In uncertain times, I usually expect the best.
2. If something can go wrong for me, it will.
3. I'm always optimistic about my future.
4. I hardly ever expect things to go my way.
5. I rarely count on good things happening to me.
6. Overall, I expect more good things to happen to me than bad.

Since the goal is that high values demonstrate optimism, these were coded in two different ways: normal coded, where 4 was linked to “Strongly Agree” and 0 to “Strongly Disagree” (questions 1, 3 and 6), and reverse coded, where 4 was linked to “Strongly Disagree” and 0 to “Strongly Agree” (questions 2, 4 and 5). A participant score was then the sum of answer codes.

Confirmation Bias. To study confirmation bias, the goal was to analyse participants' answers when asked to test the veracity of conditional rules. Therefore, I used three different variations of the Wason selection task (Wason, 1968) which have been used in this type of analysis through psychological literature (e.g., Stanovich & West, 1998; Jones & Sugden, 2001), all of them with the same essence. Participants were confronted with a condition in the form of “If P... then Q” and four cards associated with it (P, not P, Q, and not Q, following this example). They were then asked to indicate two cards at maximum in order to verify the condition. Studies show that people tend to choose P and Q. However, by doing so they are only supporting the information they already have without adding new one, because the condition is one-sided. The correct answer is P and not Q, which gives the ability to verify if the condition is false (if when flipping not Q and a P appears, then we can verify that a P does not always imply having a Q on the other side). Here, the score represents the sum of incorrect responses. Considering the result, a participant was considered biased if they failed at least two of the three problems presented.

Intuitive Thinking Bias. To measure the tendency to rely in intuition, I used a variation of the Cognitive Reflection Test (Frederick, 2005) adapted by the Science of Behavior Change (SOBC) research network (SOBC, 2017). Participants answered five problems that varied in difficulty, and in each one of them there were three different types of answers: correct answer, intuitive incorrect answer, and other incorrect answer (non-intuitive incorrect answer). If the participant did not answer, it was considered as non-intuitive incorrect. Exemplifying with the first question:

Question: An apple and an orange cost \$1.10 in total. The apple costs \$1.00 more than the orange. How many cents does the orange cost?

Intuitive answer: 10

Correct answer: 5

Other incorrect answer: 2

There were some ways to score this test, and I opted with the one that can help predict a subject's tendency to rely on their intuition (SOBC, 2017), by creating a proportion based on total incorrect responses ($\#$ intuitively incorrect responses / $\#$ total incorrect responses). Therefore, scores range from 0 (no intuitively incorrect answers were given) to 1 (all of participants' incorrect answers were intuitively incorrect). For example, if a participant answered to the five problems with 1 correct answer, 3 intuitively correct answers, and 1 other incorrect answer, the total score would be 0.75 (3 intuitively incorrect answers / 4 total incorrect answers). Considering the result, a participant was considered biased if at least three of the answers were intuitively incorrect.

4.4.2. Explanatory Variables

I can separate the explanatory variables in two main groups. One includes the demographic variables directly asked in the survey: age, gender, education level and professional experience, which were used as control variables. The second, and the one I consider the main focus of this study, includes Hofstede's six cultural dimensions, inferred by the answer participants gave when asked about their nationality. These are: PDI, IDV, MAS, UAI, LTO and IVR.

4.5. Regression

Regarding RQ1, I wanted to verify the relationship between people's culture and their bias level, in order to analyse if people from the same spectrum of a culture dimension tend to have similar levels of cognitive bias. Therefore, the following regression model was used as the base model for this analysis:

$$Y_i = \alpha + \beta_1 CD_i + \beta_2 age_i + \beta_3 gender_i + \beta_4 educ_i + \beta_5 exper_i + \epsilon_i$$

Where Y is the cognitive bias level (optimism, confirmation or intuitive thinking bias), CD represents each one of the six culture dimensions (PDI, IDV, MAS, UAI, LTO and IVR), age , $gender$, $educ$ and $exper$ are the demographic variables (age, gender, education level and professional experience, respectively), ϵ is the error term and i represents the number of

observations. In the end, by combining the different *Y*s with the different CDs, there were a total of 12 different regressions models (due to multicollinearity problems – see Section 5.2.1).

4.6. Simulation

Regarding RQ2, I wanted to verify if there was a significant difference in the cognitive bias levels when comparing groups of people from similar cultures and groups of mixed cultures. The separation between what is similar or not was made using the *median* of the culture dimension in analysis. Therefore, three groups were defined: (1) the mixed group, where people from all the population were randomly selected; (2) the high unmixed group, where people whose index was above the *median* of a given cultural dimension were randomly selected; and (3) the low unmixed group, where people whose index was below the *median* of a given cultural dimension were randomly selected. For the simulations, 1000 groups were created and they were composed by five people, since it is the most commonly accepted number of people to form a group (e.g., Ringelmann, 1913; Mueller, 2017). The final score for the groups was calculated using Steiner's task typology (1972), where the team *mean* of the variable of interest (each of the three biases) is thought to be the best operationalization to join individual levels, since the team's performance is thought to be equal to the sum of the team's parts. To compare the groups two t-tests were conducted for each culture dimension analysed: one between the mixed and the high unmixed groups, and other between the mixed and the low unmixed groups.

5. Results

5.1. Summary Statistics

Table 3 shows the descriptive statistics for the dependent variables. The averages scores but for each country can be found in Appendix D.

In the end, 435 (56.9%) participants were considered as “biased” regarding optimism (for this consideration, a participant was considered optimistic, and therefore biased, if their average score among the six coded questions was 2.5 or higher), 727 (95.2%) regarding confirmation bias and 161 (21.1%) regarding intuitive thinking.

Regarding cultural dimensions, the minimum and maximum values recorded, as well as the countries that are represented by those scores, can be seen in Table 4.

Table 3

Summary Statistics – Dependent Variables

	<i>N</i>	<i>M</i>	<i>SD</i>	Min	Max
Optimism Score	764	15.010	4.019	0	24
Confirmation Bias Score	764	2.755	0.707	0	3
Intuitive Thinking Score	764	0.440	0.384	0	1

Table 4

Culture Dimensions' Minimum and Maximum Values

	Min	Countries (<i>min</i>)	Max	Countries (<i>max</i>)
PDI	11	Austria	100	Czech Republic, Switzerland, Australia and Malasya
IDV	12	Venezuela	91	USA
MAS	5	Sweden	100	Slovakia
UAI	23	Denmark	100	Uruguay
LTO	13	Tunisia and Colombia	87	China
IVR	13	Canada, Lebanon, United Kingdom and the USA	100	Venezuela

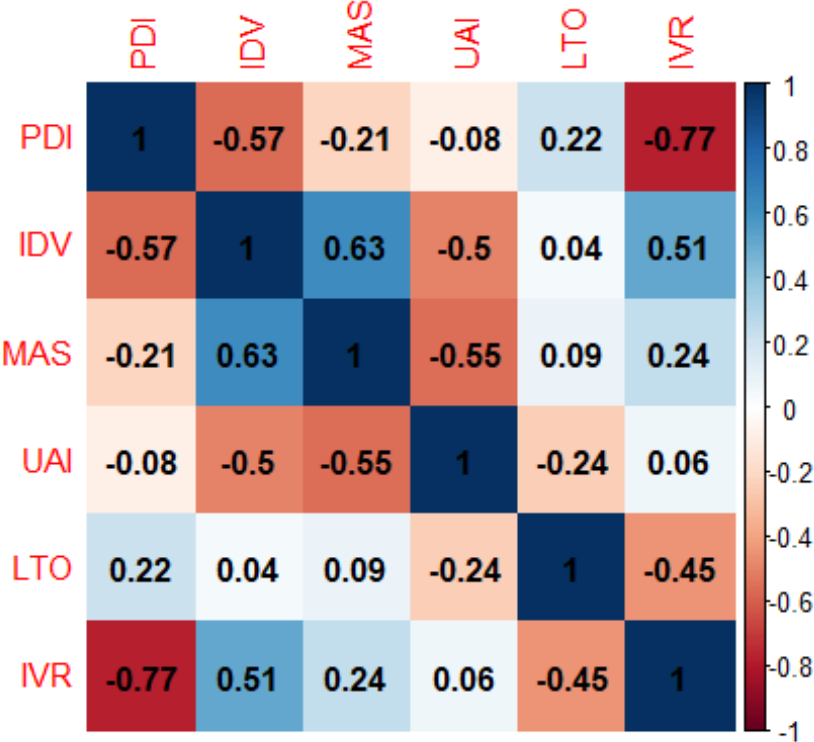
5.2. Hypothesis Testing**5.2.1. RQ1: Does a person's culture correlate with the level of certain cognitive biases?**

For the regression analysis, I started by seeing the distribution of my dependent variables. Since only the optimism bias score was normal distributed, I used a normal linear model when studying that variable and a logistic regression model when using the other two. Therefore, the dependent variables for the confirmation bias and the intuitive thinking bias were transformed in a dummy form, regarding the results (biased or not) of the tests.

Regarding culture dimensions, I suspected they were correlated due to the similar culture characteristics they represent. This is confirmed in Figure 1, which shows the Spearman correlation coefficients between the referred variables and, as we can observe, there are several

pairs with a coefficient higher than 0.3 (absolute value), representing the existence of multicollinearity. Therefore, I decided to analyse each cultural dimension individually.

Figure 1
Spearman Correlation Coefficients Between Cultural Dimensions



5.2.1.1.Optimism Bias

In Table 5, we can observe that when the optimism bias score was the dependent variable, three of the culture dimensions have a statistically significant relationship with it (PDI, IDV, and IVR), while the other three don't. Confirming my expectations (see Section 3), PDI has a significant negative relationship with the optimism bias ($\beta = -0.026, SE = 0.008, p < .01$), IDV a significant positive one ($\beta = 0.016, SE = 0.006, p < .05$), as well as IVR ($\beta = 0.028, SE = 0.008, p < .01$). Although the adjusted R^2 were not very high (3.897, 3.908 and 3.891, respectively), the regressions models were significant with $p < .01$. All regression coefficients can be found in Appendix E (Table E1). This means that the more a person's culture tends to accept inequality in power distribution, the lower that person's optimism. While the more the culture where a person is inserted in is more individualistic (i.e., people tend to look more for themselves), the more optimistic that person tends to be, and the more the culture where a

person is inserted in encourages having fun and enjoying life, the more optimistic that person tends to be as well.

Table 5

Multivariate Regression of Cultural Dimensions on Optimism Bias Score

Dependent Variable: Optimism Bias Score						
OLS						
	(1)	(2)	(3)	(4)	(5)	(6)
PDI	-0.026*** (0.008)					
IDV		0.016** (0.006)				
MAS			-0.004 (0.010)			
UAI				0.002 (0.006)		
LTO					0.00002 (0.008)	
IVR						0.028*** (0.008)
Constant	15.585*** (0.859)	13.049*** (0.719)	13.964*** (0.794)	13.666*** (0.760)	13.784*** (0.766)	12.899*** (0.700)
Observations	764	764	764	764	764	764
R ²	0.077	0.072	0.064	0.064	0.064	0.080
Adjusted R ²	3.897	3.908	3.924	3.924	3.925	3.891
F Statistic	4.446***	4.137***	3.651***	3.646***	3.639***	4.647***

Note. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Note 2. This table only reports the coefficients for the variables considered a focus for the analysis. The entire report with all variables can be found in Appendix E.

5.2.1.2. Confirmation Bias

In Table 6, we can observe that, regarding confirmation bias, although IDV, UAI and LTO matched my expectations (comparing Section 3 and the respective sign of the β), none of the culture dimensions was statistically significantly related with the dependent variable. This means that being from different cultures does not have an impact on our tendency to be confirmation biased. All regression coefficients can be found in Appendix E (Table E2).

However, as observed previously, a little more than 95% of the participants were considered biased in the test linked with this bias and, therefore, there might be lack of heterogeneity within

the data collected. This could be due to insufficient participants or the difficulty level of the test. Therefore, a concrete conclusion cannot be stated.

Table 6

Multivariate Regression of Cultural Dimensions on Confirmation Bias Score

Dependent Variable: Confirmation Bias Score						
GLM (<i>logit</i>)						
	(1)	(2)	(3)	(4)	(5)	(6)
PDI	-0.005 (0.010)					
IDV		0.008 (0.007)				
MAS			0.005 (0.012)			
UAI				0.002 (0.007)		
LTO					0.015 (0.009)	
IVR						0.03 (0.009)
Constant	-2.479** (1.038)	-3.195*** (0.863)	-3.102*** (0.965)	-3.006*** (0.940)	-3.485*** (0.904)	2.784*** (0.852)
Observations	764	764	764	764	764	764

Note. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Note 2. This table only reports the coefficients for the variables considered a focus for the analysis. The entire report with all variables can be found in Appendix E.

5.2.1.3. Intuitive Thinking Bias

In Table 7, we can observe that when the intuitive thinking bias result was the dependent variable, two of the culture dimensions have a statistically significant relationship with it (UAI and LTO), while the other four don't. Confirming my expectations (see Section 3), UAI has a significant negative relationship with the intuitive thinking bias ($\beta = -0.006$, $SE = 0.004$, $p < .01$), and LTO a significant positive one ($\beta = 0.018$, $SE = 0.006$, $p < .01$). All regression coefficients can be found in Appendix E.

This means that the more the culture where a person is inserted in tends to avoid uncertainty, the tendency to rely on their intuition is lower. While the more the culture where a person is inserted in looks into the future by investing in the present, the tendency to rely on their intuition is higher.

Table 7
Multivariate Regression of Cultural Dimensions on Intuitive Thinking Bias Score

	Dependent Variable: Intuitive Thinking Bias Score					
	GLM (<i>logit</i>)					
	(1)	(2)	(3)	(4)	(5)	(6)
PDI	-0.001 (0.005)					
IDV		0.005 (0.004)				
MAS			0.005 (0.006)			
UAI				-0.006* (0.004)		
LTO					0.018*** (0.006)	
IVR						-0.005 (0.005)
Constant	1.823*** (0.558)	1.514*** (0.463)	1.510*** (0.501)	2.127*** (0.491)	0.926* (0.498)	1.895*** (0.455)
Observations	764	764	764	764	764	764

Note. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Note 2. This table only reports the coefficients for the variables considered a focus for the analysis. The entire report with all variables can be found in Appendix E.

5.2.2. RQ2: Is there a difference in the levels of cognitive bias between culturally heterogenous and culturally homogeneous groups?

To answer RQ2, I only proceeded with the analysis on the variables that showed to be significant in RQ1. Therefore, three simulations were made for the optimism bias (using PDI, IDV and IVR), and two for the intuitive thinking bias (UAI and LTO). Since none of the culture dimensions was significant for the confirmation bias analysis, no further test was conducted for this variable.

5.2.2.1. Optimism Bias

Regarding PDI, when comparing the mixed group with the high PDI unmixed group (see Section 4.6), a statistically significant difference was found, $t(1991.3) = 2.8591$ with a $p < .05$ (mixed PDI group mean = 14.951; high PDI unmixed group mean = 14.727). However, in this case, since the mean for the PDI mixed group is higher than the PDI unmixed one, having a heterogenous group did not reduce the bias. When comparing the mixed group with the low PDI unmixed group, a statistically significant difference was also found, $t(1997.9) = -10.436$ with $p < .01$ (low PDI unmixed group mean = 15.788), and in this case, having a heterogenous

group (i.e., people that either accept more or less the inequality in power distribution) is better since the bias is reduced.

Regarding IDV, a statistically significant difference was found when comparing the IDV mixed group with the high IDV unmixed group, $t(1998) = -9.329$ with a $p < .01$ (IDV mixed group mean = 14.951; high IDV unmixed group mean = 15.704), which means that having a heterogenous group (i.e., people more individualistic and people more collectivistic) is better since the bias is reduced. However, when comparing the IDV mixed group with the low IDV unmixed group, no significant difference was found since the p-value is higher than any significance value, $t(1995) = 5.552$ with a $p > .1$ (low IDV unmixed group mean = 14.512).

Regarding IVR, a statistically significant difference was found when comparing the IVR mixed group with the high IVR unmixed group, $t(1998) = -9.441$ with $p < .01$ (IVR mixed group mean = 14.951; high IVR unmixed group mean = 15.712), which means that having a heterogenous group (i.e., people more indulgent and more restraint people) is better since the bias is reduced. However, when comparing the IVR mixed group with the low IVR unmixed group, no significant difference was found since the p-value is higher than any significance value, $t(1997) = 5.513$ with a $p > .1$ (low IVR unmixed group mean = 14.510).

5.2.2.2. Intuitive Thinking Bias

Regarding UAI, when comparing the UAI mixed group with the high UAI unmixed group (see Section 4.6), a statistically significant difference was found, $t(1998) = -2.344$ with a $p < .05$; (mixed group mean = 0.435, high unmixed group mean = 0.453), which means that having a heterogenous group (i.e., people more worried about the present and people more concerned about the future) is better since the bias is reduced. However, when comparing the UAI mixed group with the low UAI unmixed group, no significant difference was found since the p-value is higher than any significance value, $t(1995) = -0.151$ with a $p > .1$ (low UAI unmixed group mean = 0.436).

Regarding LTO, when comparing the LTO mixed group with the high LTO unmixed group (see Section 3.6), a statistically significant difference was found, $t(1997) = 2.844$ with a $p < .01$ (LTO mixed group mean = 0.432, high LTO unmixed group mean = 0.410), which means that having a heterogenous group (i.e., people more uncomfortable about uncertainty and people more comfortable about the unknown future and unorthodox ideas) is better since the bias is reduced. However, in this case, since the mean for the LTO mixed group is higher than the LTO unmixed one, having a heterogenous group does not reduce the bias. Finally,, when comparing the LTO mixed group with the low LTO unmixed group, no significant difference was found

since the p-value is higher than any significance value, $t(1995) = -5.970$ with a $p > .1$ (low LTO unmixed group mean = 0.477).

6. Discussion

6.1. Summary of Results

Six culture dimensions were tested to see if they had a significant correlation with the levels of the three cognitive biases in analysis. Regarding optimism bias, PDI demonstrated a significant negative relationship, while IDV and IVR a significant positive one. Related with intuitive thinking bias, UAI presented a significant negative relationship, while LTO a positive one. When it comes to confirmation bias, none of the culture dimensions showed a significant relationship with the dependent variable.

Concerning the comparison between groups in terms of the optimism bias, we observed a significant difference between PDI's mixed groups with both high and low unmixed groups, IDV's mixed groups with high unmixed groups and IVR's mixed groups with high unmixed groups. In terms of the intuitive thinking bias, a significant difference was found between UAI's mixed groups with high unmixed groups and between LTO's mixed groups with high unmixed groups. However, it is good to notice that in two situations, in spite of existing a significant difference between groups, having a heterogeneous group did not reduce the bias. This happened for optimism bias between PDI's mixed and high unmixed groups, and for intuitive thinking bias between LTO's mixed and high unmixed groups.

6.2. Implications

This research has supported the idea developed by previous studies that culture can indeed influence our level of cognitive biases (e.g., Graham et al., 2013). It brought some originality to the existent literature, since the population in analysis was from a large number of countries from all over the world, therefore reducing the common Western bias. Besides, we can visualize the conclusions individually for each of the six cultural dimensions in analysis, speaking of which, were never all used for this type of analysis.

The focus on the optimism, confirmation and intuitive thinking biases can also be considered a plus since this specific approach has never been done, and the conclusions reached can be a good starting point when extrapolating them for the real-life workplace environment and the formation of teams within it.

From the simulation analysis, we can retrieve that having a heterogenous group might be useful in some situations, but not always. For example, this study suggests that if we are trying

to reduce an excess of optimism in our company (it might have led to risky decisions in the past), mixing people from countries that accept unequally power distribution, such as Malaysia, with people from those who do not, such as Austria, might help, but only if we had a homogeneous group of people from cultures that score low in the power distance dimension (since the high PDI unmixed groups presented lower bias levels than the mixed ones). So, mixing people from Malaysia and from Austria to form teams in a company might reduce optimism bias if we are in a company with most employees from Malaysia, for example. What might also help reducing the same bias is mixing people from individualistic countries, such as the USA, with people from collectivistic ones, such as Venezuela, but only if the homogeneous group is composed by people from individualistic cultures (since no significant difference was found between the mixed and low IDV unmixed groups). So, mixing people from the USA and from Venezuela to form teams in a company might reduce optimism bias if we are in a company with high levels of individualistic employees. The same happens when mixing people from more indulgent countries, such as Venezuela, with people from more restrained ones, such as the UK. Regarding the intuitive thinking bias, if we are trying to reduce the tendency of a company's employees to rely on their intuition without thinking twice about the decision made (which can bring several issues for the company), mixing people from countries that do not like the idea of uncertainty, valorising rigid codes, such as Uruguay, with people from countries that are more tolerant towards unorthodox ideas, such as Denmark might help, but only if the homogeneous group is composed by people high in uncertainty avoidance (since no significant difference was found between the mixed and low UAI unmixed groups). So, mixing people from Uruguay and from Denmark to form teams in a company might reduce intuitive thinking bias if we are in a company whose employees have a high uncertainty avoidance. Also, when mixing people from countries that worry about the present, valorising traditions, such as Colombia, with people from countries that invest in the present because they value the future, such as China, although it was found a significant difference (and only if the homogeneous group is composed by people from the high in long-term orientation), having a heterogenous group does not reduce the bias (since the high LTO unmixed groups presented lower bias levels than the mixed ones).

6.3. Limitations and Future Research

This research has limitations that need to be considered when analysing the results. First, although the sample was composed by a good number of participants, the countries were not equally represented. Regarding methodological issues, the way the survey was conducted didn't

prevent people from cheating (since I could not control if they were being helped during the tests by someone or by searching the internet) and cannot substitute real life situations and decisions. Another problem worth mentioning is related with the Wason selection task. It aimed to measure confirmation bias, however, it did not have enough variance to see any effect (performance was bad for almost everyone) and none of the culture dimensions showed to be statistically significantly related with confirmation bias. So, it would be interesting if in future studies this bias was analysed by other tests or by trying other variations of the same test (since the way the question is formulated might lead people to answer in a certain way). Then, although the LOT-R has been the chosen test to infer optimism in similar studies (e.g., Graham et al., 2013), it can be considered more as a self-evaluation than a test. This can be one of the reasons that some of the independent variables did not show to be statistically significantly related with optimism bias (MAS, UAI and LTO). Also, the adaptations made to the CRT and the scale used to score the test might justify the fact that some of the independent variables did not show to be statistically significantly related with intuitive thinking bias (PDI, IDV, MAS and IVR). Another limitation regarding this test is the fact that the questions were all number/mathematical related, and in real-life not all decisions are within that field. Besides, some people are more keen on numbers than others but that does not mean that are less biased, which by having a better performance on this test might led us to think. So, in future studies, I would recommend trying different scales, increasing the number of questions, or having more variance within the questions' subject.

Also, the simulations made when forming groups of five people might not demonstrate reality in the most proper way since participants were not actually observed as a group nor confronted with real life problems or tasks meant to be solved as a team. Having this in mind, future research can be made in order to improve the study made for the purpose of this thesis. With more time and resources available, an interesting upgrade could be the observation and comparison of the groups analysed but in person and trying to solve more working related problems.

Something to also be taken into account is the choice of variables, both independent and dependent. Firstly, the cognitive biases chosen were influenced by the literature (e.g., Mancuso et al., 2014; Graham et al., 2013) and my understanding of what could be the more common ones within a workplace environment. But as stated earlier (see Section 2.4), there is a lack of organization among biases and their concepts (Ellis, 2018). Therefore, what was tested as optimism bias, confirmation bias and intuitive thinking bias, might be categorized as another bias (if not several for the same one) depending on the concepts chosen (e.g., Benson, 2016;

Valdez et al., 2018; Ellis, 2018), which can lead to confusion when analysing the results. For example, is the concept of optimism bias chosen compatible with the one of overconfidence bias used by Ellis (2018), or others within the spectrum of the Cognitive Bias Codex (see Section 2.4)? If I made those type of connections, maybe more tests could be found to analyse the bias. Secondly, the cultural dimensions chosen were the ones developed by Hofstede, which have been used in other studies (e.g., Fietz et al., 2021). However, as pointed out by Beugelsdijk and Welzel (2018) and Ailon (2008), this classification might misrepresent the dynamics of culture. Therefore, the results achieved by this study might be conditioned since the beginning due to this choice. Also, they could have been different if another set of dimensions was used. For example, we saw that despite being apparently similar, some terms used by GLOBE dimensions (House et al., 2004) have different meanings (Hofstede et al., 2010). So, for instance, we might think that the conclusions reached for the PDI dimension can be extrapolated when talking about the power distance dimension of GLOBE. However, due to different meanings, the results could have been different if I chose the latter one. Thus, future studies could use different biases and cultural dimension frameworks to expand this work.

Finally, something I considered as a plus regarding the possibility of visualizing the conclusions individually for each of the six cultural dimensions, can also be seen from the less positive side, since someone's culture is the result of all of the dimensions. So even when the heterogenous groups proved to reduce biases, it was only taking one dimension into consideration. If companies follow the suggestions of this study when forming teams, they might join people of certain countries to reduce a bias regarding a cultural dimension's conclusions, but then those same countries can increase the same bias regarding other cultural dimension's conclusions. Therefore, some advice for future research is the use of a unique but global measure for culture, avoiding multicollinearity problems such as the ones found here.

7. Conclusion

Cognitive biases are being analysed more and more due to their implications in everyday life, including work-related decisions. Also, culture has been demonstrated to influence the way we act and think. This study come to support that idea relating the two concepts. It also tried to extrapolate this relationship into the formation of multicultural teams within a workplace environment, which are a common practice in today's companies. I hope this study serves as an inspiration to further analyse and explore this issue, to maximize a company's performance, since cognitive biases might be damaging it without we even noticing, because in the end "we are blind to our blindness".

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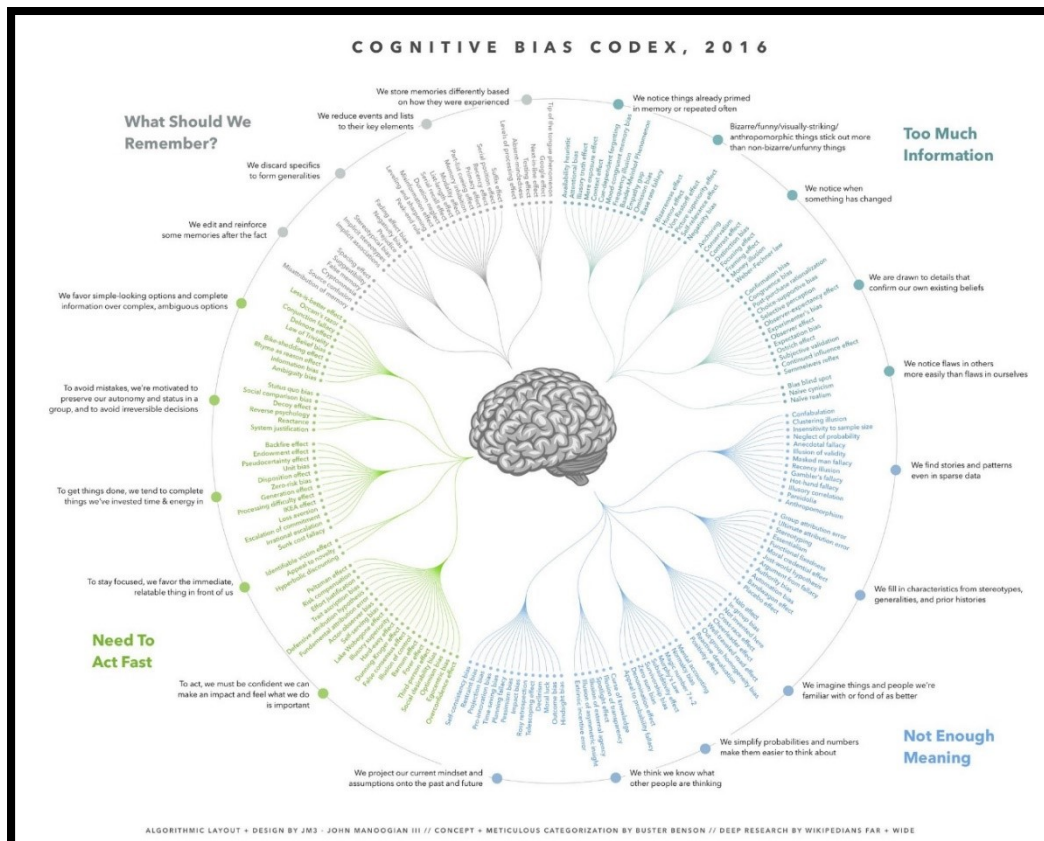
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9. Appendix

Appendix A: Cognitive Bias Codex, by Benson (2016)

Figure 1

Cognitive Bias Codex, 2016



Appendix B: Survey

Dear Participant,

Thank you in advance for participating in this research project.

My name is Joana Sousa Pereira and I am currently developing my Master's Thesis under the topic of Optimal Decision Making.

With this questionnaire, I intend to analyse the relationship between cultural dimensions (which will be deducted from nationality/country of living) and cognitive biases usually present in a workplace environment.

Your participation in this survey is voluntary and it will take you between 5 to 10 minutes to conclude. There will be three blocks of questions plus a last one on demographics. I ask you to answer honestly, ensuring you that all information will be recorded anonymously. You will not be asked to provide your name, identification number, or any other type of

information that might personally identify you.

If any doubts arise or you want to know more about the study, please contact me by email: [s-jspereira@ucp.pt](mailto:sjspereira@ucp.pt)

Completion of this survey implies your consent to serve as a participant in this research.

Once again, thank you for your time and availability!

Please answer the following questions about yourself by indicating the extent of your agreement.

Be as honest as you can throughout, and try not to let your responses to one question influence your response to other questions. There are no right or wrong answers.

	0 (Strongly Disagree)	1 (Disagree)	2 (Neutral)	3 (Agree)	4 (Strongly Agree)
In uncertain times, I usually expect the best.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's easy for me to relax.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If something can go wrong for me, it will.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I'm always optimistic about my future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I enjoy my friends a lot.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It's important for me to keep busy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I hardly ever expect things to go my way.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I don't get upset too easily.

I rarely count on good things happening to me.

Overall, I expect more good things to happen to me than bad.

For the following questions, imagine you are a quality control technician working for a card games manufacturer. You have to ensure that cards have been produced in accordance with a specific rule.





Please indicate which card(s)* you need to turn over in order to verify the rule is met and the cards are being produced correctly.

*Select 2 at maximum for each rule





If a card has a vowel on one side, then it has an even number on the other side.

- A
- B
- 2
- 7

If a card has a star on one side, then it has the colour yellow on the other side.

<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

If a card has an apple on one side, then it has a happy face on the other side.

<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	
<input type="checkbox"/>	

For this set of questions, below you have some problems that vary in difficulty. For every question, enter your numeric answer. If you don't, it will be considered as incorrect. So, please try to answer as many as you can.

An apple and an orange cost \$1.10 in total. The apple costs \$1.00 more than the orange. How many cents does the orange cost? ____

If it takes 10 machines 10 seconds to make 10 decks of cards, how many seconds would it take 100 machines to make 100 decks? ____

In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? ____

In an athletics team, tall members are three times more likely to win a medal than short members. This year the team has won 60 medals so far. How many of these have been won by short athletes? ____

Helen received both the 15th highest and the 15th lowest mark in the class. How many students are in the class? ____

Age: ____

Genre:

- Female
- Male
- Other

Nationality:

▼ Afghanistan ... Zimbabwe

Current country of residence:

▼ Afghanistan ... Zimbabwe

Highest level of school completed:

- Less than high school
- High school degree
- Some college but no degree
- Bachelor's degree
- Master's degree
- Ph.D
- Other: ____

Employment status:

- Employed
- Unemployed
- Retired
- Student
- Student-worker
- Other

Years of professional experience:

- No experience
- < 1 year
- 1-5 years
- 6-10 years
- >10 years

Appendix C: List of Countries Collected in the Survey

Table C1

Included Countries

Country	Number of Participants
Argentina	1
Australia	18
Austria	3
Bangladesh	1
Belgium	9
Brazil	14
Bulgaria	2
Canada	20
Chile	1
China	3
Colombia	3

Croatia	2
Denmark	4
Finland	1
France	14
Germany	34
Hungary	4
India	201
Ireland	6
Italy	20
Lebanon	4
Lithuania	1
Malaysia	2
Maldives	1
Malta	1
Mauritius	2
Mexico	9
Morocco	4
Namibia	1
Nepal	2
Netherlands	14
New Zealand	3
Nicaragua	1
Norway	4
Philippines	4
Poland	5
Portugal	160
Romania	18
Russian Federation	11
Slovakia	2
Slovenia	1
Spain	17
Sri Lanka	1
Sweden	3
Switzerland	2
Tunisia	1
Turkey	1
United Kingdom	35
United States of America	91
Uruguay	1
Venezuela	1

Table C2

Excluded Countries

Country	Number of Participants
Afghanistan	1
Albania	3
Algeria	1
Andorra	1
Armenia	1
Azerbaijan	1
Belarus	3
Bosnia and Herzegovina	1
Cameroon	1
Costa Rica	1
Cyprus	2
Ecuador	1
Egypt	2
Guatemala	1
Honduras	2
Iraq	1
Israel	4
Jamaica	1
Jordan	1
Kazakhstan	3
Kyrgyzstan	1
Malawi	1
Nigeria	3
Panama	1
Republic of Moldova	2
Saudi Arabia	2
Senegal	1
South Africa	12
Ukraine	4
Zimbabwe	1

Appendix D: Statistics by Country

Table D1

Average Optimism Bias Score, by Country

Country	Average Score
Argentina	12.0
Australia	16.6
Austria	13.3
Bangladesh	13.0
Belgium	15.9
Brazil	15.2

Bulgaria	16.0
Canada	16.7
Chile	22.0
China	16.0
Colombia	13.0
Croatia	18.0
Denmark	17.3
Finland	19.0
France	15.5
Germany	15.4
Hungary	14.5
India	15.8
Ireland	14.3
Italy	16.0
Lebanon	14.9
Lithuania	17.0
Malaysia	12.0
Maldives	11.5
Malta	13.0
Mauritius	12.0
Mexico	15.5
Morocco	16.4
Namibia	15.0
Nepal	13.0
Netherlands	14.5
New Zealand	16.9
Nicaragua	21.3
Norway	16.0
Philippines	12.7
Poland	13.8
Portugal	11.4
Romania	14.4
Russian Federation	15.1
Slovakia	13.5
Slovenia	18.5
Spain	16.0
Sri Lanka	17.4
Sweden	15.0
Switzerland	19.0
Tunisia	14.0
Turkey	13.0
United Kingdom	14.0
United States of America	15.8
Uruguay	14.0
Venezuela	23.0

Table D2

Average Confirmation Bias Score, by Country

Country	Average Score
Argentina	3.0
Australia	2.5
Austria	3.0
Bangladesh	3.0
Belgium	2.7
Brazil	2.8
Bulgaria	3.0
Canada	2.7
Chile	3.0
China	3.0
Colombia	2.5
Croatia	3.0
Denmark	3.0
Finland	3.0
France	2.8
Germany	2.7
Hungary	2.7
India	3.0
Ireland	2.8
Italy	3.0
Lebanon	2.4
Lithuania	2.7
Malaysia	3.0
Maldives	3.0
Malta	3.0
Mauritius	3.0
Mexico	2.5
Morocco	3.0
Namibia	3.0
Nepal	2.8
Netherlands	3.0
New Zealand	2.3
Nicaragua	2.3
Norway	2.3
Philippines	2.9
Poland	2.6
Portugal	2.4
Romania	3.0
Russian Federation	2.2
Slovakia	3.0
Slovenia	2.7
Spain	3.0
Sri Lanka	3.0
Sweden	3.0

Switzerland	2.8
Tunisia	3.0
Turkey	3.0
United Kingdom	3.0
United States of America	2.5
Uruguay	3.0
Venezuela	3.0

Table D3

Average Intuitive Thinking Bias Score, by Country

Country	Number of Participants
Argentina	0.00
Australia	0.59
Austria	1.00
Bangladesh	0.00
Belgium	0.26
Brazil	0.51
Bulgaria	0.33
Canada	0.32
Chile	0.60
China	0.40
Colombia	0.37
Croatia	0.50
Denmark	0.25
Finland	0.50
France	0.53
Germany	0.39
Hungary	0.45
India	0.39
Ireland	0.43
Italy	0.86
Lebanon	0.32
Lithuania	0.44
Malaysia	0.60
Maldives	0.00
Malta	0.42
Mauritius	0.34
Mexico	0.38
Morocco	0.00
Namibia	0.50
Nepal	0.51
Netherlands	0.75
New Zealand	0.25
Nicaragua	0.22
Norway	0.38
Philippines	0.53

Poland	0.22
Portugal	0.28
Romania	0.63
Russian Federation	0.56
Slovakia	0.67
Slovenia	0.56
Spain	0.63
Sri Lanka	0.00
Sweden	0.50
Switzerland	0.40
Tunisia	0.00
Turkey	0.80
United Kingdom	0.00
United States of America	0.59
Uruguay	1.00
Venezuela	0.00

Appendix E: Regression Analysis' Reports

Table E1

Multivariate Regression of Cultural Dimensions on Optimism Bias Score

	Dependent Variable: Optimism Bias Score					
	OLS					
	(1)	(2)	(3)	(4)	(5)	(6)
PDI	-0.026*** (0.008)					
IDV		0.016** (0.006)				
MAS			-0.004 (0.010)			
UAI				0.002 (0.006)		
LTO					0.00002 (0.008)	
IVR						0.028*** (0.008)
Age	-0.001 (0.024)	0.004 (0.024)	0.009 (0.024)	0.008 (0.024)	0.009 (0.024)	0.0004 (0.024)
Factor(gender)	0.513* (0.287)	0.512* (0.288)	0.480* (0.289)	0.480* (0.289)	0.475 (0.289)	0.532* (0.287)
Male						
Factor(gender)	-4.712** (2.006)	-4.734** (2.012)	-4.581** (2.022)	-4.613** (2.020)	-4.614** (2.027)	-4.779** (2.003)
Other						
Factor(educ)						
High School	-1.167* (0.631)	-0.975 (0.634)	-1.140* (0.643)	-1.130* (0.642)	-1.100* (0.635)	-1.091* (0.630)
Degree						

Factor(educ)						
Less than High School	-2.825 (1.778)	-2.533 (1.792)	-3.104* (1.779)	-3.091* (1.801)	-3.025* (1.791)	-2.627 (1.777)
Factor(educ)						
Master's Degree	0.060 (0.310)	0.061 (0.311)	0.091 (0.312)	0.092 (0.312)	0.096 (0.314)	0.106 (0.309)
Factor(educ)						
Other	-0.167 (0.810)	-0.315 (0.810)	-0.324 (0.814)	-0.312 (0.816)	-0.333 (0.815)	-0.198 (0.807)
Factor(educ)						
Ph.D	-1.180 (1.211)	-1.074 (1.213)	-0.899 (1.218)	-0.904 (1.218)	-0.917 (1.217)	-1.142 (1.208)
Factor(educ)						
Some College but No Degree	-1.210 (0.739)	-1.035 (0.740)	-1.060 (0.743)	-1.064 (0.745)	-1.046 (0.743)	-1.235* (0.738)
Factor(exper)						
>10 years	1.878*** (0.652)	1.769*** (0.653)	1.825*** (0.656)	1.833*** (0.658)	1.817*** (0.656)	1.699*** (0.651)
Factor(exper)						
>1-5 years	0.648 (0.427)	0.549 (0.428)	0.588 (0.431)	0.583 (0.431)	0.573 (0.430)	0.507 (0.426)
Factor(exper)						
>6-10 years	1.036* (0.531)	0.919* (0.532)	0.968* (0.536)	0.968* (0.537)	0.949* (0.534)	0.879* (0.530)
Factor(exper)						
No Experience	-0.487 (0.784)	-0.342 (0.787)	-0.462 (0.790)	-0.465 (0.791)	-0.450 (0.790)	-0.393 (0.783)
Constant	15.585*** (0.859)	13.049*** (0.719)	13.964*** (0.794)	13.666*** (0.760)	13.784*** (0.766)	12.899*** (0.700)
Observations	764	764	764	764	764	764
R ²	0.077	0.072	0.064	0.064	0.064	0.080
Adjusted R ²	3.897	3.908	3.924	3.924	3.925	3.891
F Statistic	4.446***	4.137***	3.651***	3.646***	3.639***	4.647***

Note. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table E2

Multivariate Regression of Cultural Dimensions on Confirmation Bias Score

	Dependent Variable: Confirmation Bias Score					
	GLM (logit)					
	(1)	(2)	(3)	(4)	(5)	(6)
PDI	-0.005 (0.010)					
IDV		0.008 (0.007)				

MAS			0.005 (0.012)			
UAI				0.002 (0.007)		
LTO					0.015 (0.009)	
IVR						-0.03 (0.009)
Age	-0.026 (0.027)	-0.027 (0.027)	-0.025 (0.028)	-0.024 (0.027)	-0.025 (0.028)	-0.023 (0.028)
Factor(gender) Male	0.959** (0.386)	0.963** (0.386)	0.945** (0.386)	0.961** (0.386)	0.961** (0.386)	0.950** (0.386)
Factor(gender) Other	-14.896 (3,175.697)	-14.957 (3,160.990)	-14.925 (3,173.825)	-14.866 (3,180.918)	-15.231 (3,104.077)	-14.859 (3,174.675)
Factor(educ) High School Degree	-15.421 (943.552)	-15.332 (944.040)	-15.341 (945.571)	-15.441 (943.660)	-15.347 (943.152)	-15.403 (944.129)
Factor(educ) Less than High School	-15.277 (2,844.761)	-15.085 (2,836.897)	-15.208 (2,846.788)	-15.385 (2,850.630)	-15.070 (2,848.838)	-15.338 (2,852.550)
Factor(educ) Master's Degree	0.522 (0.368)	0.516 (0.368)	0.539 (0.367)	0.526 (0.368)	0.497 (0.370)	0.535 (0.367)
Factor(educ) Other	-15.346 (1,283.472)	-15.368 (1,281.793)	-15.379 (1,286.078)	-15.346 (1,286.762)	-15.407 (1,287.174)	-15.373 (1,287.754)
Factor(educ) Ph.D	0.977 (1.131)	0.968 (1.129)	1.023 (1.126)	1.059 (1.123)	1.028 (1.139)	1.074 (1.127)
Factor(educ) Some College but No Degree	0.871 (0.691)	0.919 (0.690)	0.934 (0.691)	0.876 (0.696)	0.951 (0.694)	0.923 (0.691)
Factor(exper) >10 years	0.069 (0.692)	0.036 (0.691)	0.042 (0.693)	0.061 (0.696)	0.038 (0.702)	0.057 (0.697)
Factor(exper) >1-5 years	-0.268 (0.477)	-0.296 (0.476)	-0.304 (0.478)	-0.272 (0.478)	-0.340 (0.479)	-0.278 (0.476)
Factor(exper) >6-10 years	-0.637 (0.663)	-0.676 (0.662)	-0.692 (0.667)	-0.634 (0.668)	-0.689 (0.664)	-0.654 (0.663)
Factor(exper) No Experience	-0.307 (1.128)	-0.256 (1.132)	-0.276 (1.129)	-0.312 (1.128)	-0.323 (1.137)	-0.304 (1.128)

Constant	-2.479** (1.038)	-3.195*** (0.863)	-3.102*** (0.965)	-3.006*** (0.940)	-3.485*** (0.904)	2.784*** (0.852)
Observations	764	764	764	764	764	764

Note. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Table E3

Multivariate Regression of Cultural Dimensions on Intuitive Thinking Bias Score

	Dependent Variable: Intuitive Thinking Bias Score					
	GLM (<i>logit</i>)					
	(1)	(2)	(3)	(4)	(5)	(6)
PDI	-0.001 (0.005)					
IDV		0.005 (0.004)				
MAS			0.005 (0.006)			
UAI				-0.006* (0.004)		
LTO					0.018*** (0.006)	
IVR						-0.005 (0.005)
Age	-0.031** (0.016)	-0.032** (0.016)	-0.031** (0.016)	-0.029* (0.016)	-0.027* (0.016)	-0.029* (0.016)
Factor(gender) Male	0.625*** (0.186)	0.637*** (0.186)	0.619*** (0.186)	0.615*** (0.186)	0.641*** (0.186)	0.612*** (0.186)
Factor(gender) Other	0.396 (1.226)	0.384 (1.237)	0.367 (1.229)	0.418 (1.237)	0.147 (1.303)	0.432 (1.227)
Factor(educ) High School Degree	-1.019*** (0.347)	-0.982*** (0.348)	-0.969*** (0.351)	-0.925*** (0.351)	-1.036*** (0.347)	-1.021*** (0.347)
Factor(educ) Less than High School	0.160 (1.159)	0.299 (1.167)	0.247 (1.164)	0.360 (1.164)	0.305 (1.158)	0.060 (1.158)
Factor(educ) Master's Degree	0.049 (0.203)	0.042 (0.203)	0.057 (0.203)	0.060 (0.203)	-0.039 (0.205)	0.045 (0.203)
Factor(educ) Other	0.240 (0.570)	0.241 (0.569)	0.217 (0.568)	0.149 (0.570)	0.090 (0.570)	0.189 (0.568)
Factor(educ) Ph.D	0.147 (0.807)	0.118 (0.807)	0.138 (0.806)	0.105 (0.806)	0.199 (0.813)	0.197 (0.806)

Factor(educ)						
Some College but No Degree	-0.442 (0.437)	-0.431 (0.435)	-0.418 (0.436)	-0.383 (0.435)	-0.410 (0.438)	-0.398 (0.437)
Factor(exper)						
>10 years	0.723 (0.447)	0.708 (0.447)	0.713 (0.448)	0.667 (0.448)	0.693 (0.449)	0.740* (0.446)
Factor(exper)						
>1-5 years	0.257 (0.272)	0.247 (0.271)	0.235 (0.272)	0.221 (0.272)	0.229 (0.272)	0.265 (0.271)
Factor(exper)						
>6-10 years	0.222 (0.337)	0.210 (0.337)	0.196 (0.338)	0.155 (0.339)	0.205 (0.339)	0.231 (0.337)
Factor(exper)						
No Experience	-0.035 (0.461)	-0.002 (0.462)	-0.019 (0.461)	0.016 (0.461)	0.047 (0.466)	-0.048 (0.462)
Constant	1.823*** (0.558)	1.514*** (0.463)	1.510*** (0.501)	2.127*** (0.491)	0.926* (0.498)	1.895*** (0.455)
Observations	764	764	764	764	764	764

Note. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$