Universidade do Minho
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A Comparative Analysis of Conceptual Metaphors and the Influence of Gender on Spatial Representations of Power in English and Portuguese

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Supervised by
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Statement of Integrity

I hereby declare having conducted this academic work with integrity. I confirm that I have not used plagiarism or any form of undue use of information or falsification of results along the process leading to its elaboration.

I further declare that I have fully acknowledged the Code of Ethical Conduct of the University of Minho.

Resumo

Análise Comparativa da Influência de Género nas Representações Espaciais das Metáforas Conceptuais de Poder em Inglês e em Português

Saber como conceitos abstratos, como o de poder, se representam através de metáforas conceptuais e que variáveis podem afetar tais representações são questões-chave da Linguística Cognitiva que permanecem por esclarecer. Neste trabalho, procuramos analisar os efeitos de língua e de género nas representações espaciais das metáforas concetuais de poder recorrendo a um paradigma experimental no qual pares de palavras (profissões) variando em género gramatical e equiparadas quanto à distribuição social de género foram dispostas verticalmente no ecrã de um computador junto de uma amostra de 33 falantes nativos do Inglês Britânico (26 mulheres, M_{idade} = 25.6, *DP* = 1.98) e 48 falantes nativos do Português Europeu (24 mulheres; M_{idade} = 23.4, *DP* = 3.90). Aos participantes de cada língua foi pedido que detetassem, da forma mais rápida e precisa possível, onde no ecrã do computador (em cima ou em baixo) se encontrava o elemento feminino ou masculino de cada um dos pares (e.g., médico/médica, *male doctor/ female doctor*), registando-se os tempos de reação (em milissegundos) e a exatidão das suas respostas (% de respostas corretas). Os resultados das análises de modelos lineares mistos revelaram que, embora os participantes ingleses e portugueses tenham sido globalmente mais rápidos a detetar nomes femininos do que masculinos independentemente da posição onde foram apresentados no ecrã do computador, e globalmente mais rápidos a detetar nomes apresentados em cima do que em baixo independentemente do seu género gramatical, os participantes ingleses foram ainda assim mais rápidos a detetar nomes femininos do que masculinos quando apresentados em cima, enquanto os participantes portugueses foram mais lentos a detetar nomes masculinos do que femininos quando apresentados em baixo. Estes resultados revelam que, mesmo perante uma tarefa mais implícita e com um controlo de estímulo mais forte, é possível observar assimetrias de género nas representações espaciais de poder, ainda que as características da língua pareçam modelar este efeito.

Palavras-chave: Linguística Cognitiva, Género, Metáfora, Poder.

Abstract

A Comparative Analysis of Conceptual Metaphors and the Influence of Gender on Spatial Representations of Power in English and Portuguese

To understand how abstract concepts, such as power, are conveyed through conceptual metaphors and which variables can affect such representations are key issues that remain to be clarified in Cognitive Linguistics. In this dissertation, we examined the effects of language and gender on the spatial representations of conceptual metaphors of power using an experimental paradigm in which pairs of words (professions) varying in grammatical gender and with an even social distribution of both genders were vertically displayed on a computer screen to a sample of 33 native speakers of British English (26 women, M_{idade} = 25.6, *DP* = 1.98) and 48 native speakers of European Portuguese (24 women; M_{idade} = 23.4, *DP* = 3.90). Participants of each language were asked to detect, as quickly and accurately as possible, where on the computer screen (up or down) the female or male element of each pair was presented (e.g., male doctor/female doctor, *médico/médica*), whilst we recorded reaction times (in milliseconds) and the accuracy of their answers (% of correct answers). The results of the linear mixed model analysis revealed that while English and Portuguese participants were globally faster to detect female nouns than male nouns regardless of where they were displayed on the computer screen, and globally faster to detect names displayed above than below regardless of grammatical gender, English participants were even faster at detecting female than male names when presented above, while Portuguese participants were slower to find male than female names when presented below. These results reveal that, even with a more implicit task and with a more controlled set of stimuli, it is possible to observe gender asymmetries in spatial representations of power, even though language characteristics seem to model this effect.

Keywords: Cognitive Linguistics, Gender, Metaphor, Power.

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Introduction

As a scientific discipline established in the late half of the twentieth century, Cognitive Linguistics has highlighted the study of Semantics as a fundamental topic to understand how language is acquired and developed. Within Semantics, this dissertation has focused on figurative language, particularly on Conceptual Metaphors as defined by George Lakoff and Mark Johnson in *Metaphors We Live by* (1980). According to the authors of the Conceptual Metaphor Theory, metaphors cannot simply be classified as devices of "the poetic imagination and the rhetorical flourish—a matter of extraordinary rather than ordinary language" (Lakoff & Johnson, 1980, p. 3). Instead, the authors clarify that metaphors are mechanisms through which concepts are internally approached and understood in terms of other concepts, and then reflected in language. Hence, by classifying one thing in terms of another, metaphors present the structure of our internal conceptual system when thinking of abstract concepts such as the concept of power.

Previous studies testing the conceptualisation of power through a spatial dimension have identified a relationship between power and a vertical dimension in which a top position is connected with power and quantity, whereas a down position is identified as a source of powerlessness and absence (e.g., Lakens et al., 2011; Meier & Robinson, 2004; Schubert, 2005; Zanolie et al., 2012). Specifically, research has focused on experimental paradigms to ask participants to detect which element of a pair of words (e.g., master/servant) displayed vertically on a computer screen was the powerful/powerless. Results revealed slower response times when the pair was in a metaphor-incongruent position (i.e., more powerful down), (Schubert, 2005). More recently, the effects of gender on the conceptualisation of power through a spatial dimension have been tested to identify if one gender (either female or male) would be more easily identified with one position on a vertical space (Winter et al., 2020). Hence, participants were faced with pairs of powerful/powerless professions attached to a gender determiner (e.g., male doctor/female nurse) displayed vertically on a screen and asked to find "who has more power". Results showed that participants were quicker to find who had less power when the variation was both presented below and was female, thus supporting the previously hypothesised relationship between powerless, the female gender, and the down position.

Despite its pertinence, these studies leave several questions unanswered: i) to discern if similar effects could be observed beyond the English language, especially in languages with

distinct morphological gender marks (such as Portuguese); ii) whether these effects would be detected with a controlled set of stimuli (given that the pairs used in previous studies displayed distinct psycholinguistic characteristics such as word frequency in the lexicon and extension measured through the number of letters that may have affected participants' processing); iii) if similar results would be observed with a more implicit task, that is without openly questioning participants on power, as to test if asymmetries would occur in the absence of explicit information.

Hence, in this dissertation, we set out to assess if the extracted results concerning the effects of gender on power metaphors could be replicated in an experiment with an implicit paradigm (i.e. a task in which participants were not explicitly asked about power) and using a more controlled set of stimuli. Thus, in the experimental study designed for this dissertation, participants were unaware that the relationship between power, metaphors, and gender were tested. In other words, and instead of being specifically asked to select the group with more power, participants were merely asked to find either the female variation or the male variation of a profession when presented with two professions varying only in gender and displayed vertically on a screen (e.g. "Where is the female variation?" in English and *Onde está a profissão no feminino?* in Portuguese).

Moreover, the stimuli used in the experimental study was collected through a pilot study conducted to retrieve neutral professions. Using a list of 122 professions, the pilot study consisted of a judgment task in which participants were requested to classify a profession according to its representation in society. Thus, participants viewed a profession and chose from the available options (female/male/both) according to how that profession was, in their experience, represented in society concerning its gender distribution.

Furthermore, we wished to extract how the morphosyntactic characteristics of a language may shape the influence of gender in the conceptualisation of power. Therefore, unlike previous studies to our knowledge, the empirical work conducted for this dissertation (including both the pilot study and the experimental study) was completed in two languages, using native speakers of British English and native speakers of European Portuguese. By designing the experimental study in these languages, we compared the collected results, raising the question of how speakers of different languages may conceptualise gender in power representations differently.

To present our empirical work in its current context, the first part of this dissertation introduces the theoretical and empirical literature divided in two chapters. Chapter one conveys a review of the theoretical literature focusing firstly on the Conceptual Metaphor Theory and its role in Cognitive Linguistics. Additionally, addressing this theory's evolution, the chapter identifies three ramifications concerning figurative speech, arguing for a reciprocal relationship amongst cognitive processes in figurative language. Finally, the distinction between structural and orientational metaphors is approached to introduce metaphors of power as they are explored throughout chapter two.

The second chapter of the theoretical framework approaches the empirical framework grounding the topic of this dissertation. Thus, section one presents the Embodied Cognition Hypothesis (Rosch et al., 1991), analysing the role of the human body in cognitive processes, primarily focusing on its pertinence concerning the Conceptual Metaphor Theory. This theory defends that the brain, as an embodied organ, is influenced by the body's experience of the outer world. Following the advancements made on this theory, the second section of this chapter concerns the experimental research that modelled the design of our empirical work, mainly focusing on "Your Highness: Vertical Positions as Perceptual Symbols of Power" (2005) by Thomas W. Schubert and "Power, Gender, and Individual Differences in Spatial Metaphor: The Role of Perceptual Stereotypes and Language Statistics" (2020) by Bodo Winter, Sarah Duffy, and Jeannette Littlemore. The last section of this chapter outlines the research questions emerging from the approached empirical framework as well as the objectives supporting the empirical research detailed in part two of the dissertation.

Part two presents the empirical research conducted for this dissertation. Thus, chapter one is concerned with the pilot study designed to collect neutral professions used as stimuli for the experimental study. This chapter conveys detailed information regarding the objectives behind the study's procedure as well as its participants' characteristics and materials used. The final section of chapter one outlines the collected results and its analysis, conveying the final list of stimuli for the experimental study.

Lastly, chapter two of the empirical research is concerned with the experimental study designed to test the influence of gender on spatial metaphors of power in British English and European Portuguese. Using the list of neutral professions collected for this research, the chapter details the study's procedure alongside with its participants' details. The last section of the

chapter explores and discusses the results obtained, firstly in British English, followed by a presentation of the results of the European Portuguese version of the task. To conclude, an analysis comparing the results of both languages is outlined in light of the previously discussed research questions.

Part 1

Chapter 1 - Theoretical Literature

Part one of this dissertation is divided into two chapters concerning the theoretical and the empirical literature of conceptual metaphors of power, respectively. In chapter one, an overview of Cognitive Linguistics is presented, focusing on its historical path and its ramifications. Secondly, metaphors and their roles in Cognitive Linguistics are explored, highlighting the Conceptual Metaphor Theory (CMT) and its precursors. The third section of this chapter conveys the evolution of the Conceptual Metaphor Theory whilst outlining its implications on figurative language by analysing three fundamental theories: Conceptual Blending (Fauconnier & Turner, 1998; 2002), Metaphtonymy (Goossen, 1990) and Syntonymy (Teixeira, 2021). Lastly, the final section of the chapter defines orientational metaphors within which the representation of power through a spatial dimension is included.

1.1- Cognitive Linguistics

Cognitive Linguistics is a discipline concerned with the study of conceptual systems present in language. Founded in the late 1970s and early 1980s, Cognitive Linguistics' development derived from the work of numerous researchers interested in exploring the relationship between language and the mind. Furthermore, Cognitive Linguistics' expansion can be perceived as a result of two main factors: Firstly, the discipline developed as a contrary response to the prevailing tendency of explaining language and its acquisition using only the structural properties specific to language.

According to the theory of Operant Conditioning by B. F. Skinner (1957), the acquisition of language was based on behaviourist reinforcement principles in which children associated words with meanings and were positively reinforced when making the suitable association. Hence, because correct utterances would be positively reinforced, children would find the outcome rewarding, thus enhancing their language development. The theory of Operant Conditioning was heavily criticised, especially by the linguist Noam Chomsky (1959) who argued that children would never be able to acquire the entirety of the tools necessary to master a language if said acquisition depended on external positive reinforcement. As an alternative, Chomsky presented the Theory of Universal Grammar, according to which biological grammatical categories such as a noun category and a verb category were innate to the individual. Universal Grammar was considered to encompass all the grammatical information needed to combine these categories, thus simplifying the entire language development since the child's task would

only be to learn the words of their language (Chomsky, 1965). This theory, which prevailed throughout the better part of the twentieth century, segregated syntax from the remaining language components whilst disregarding semantics.

However, the evidence being uncovered, and fuelling the growth of Cognitive Linguistics, argued that the belief that categories such as nouns and verbs were biologically innate was implausible from a psychological and evolutionary point of view. Researchers began to propose that children might apply general cognitive and learning principles instead of having a language-specific mechanism for language processing (Chafe, 1970; Langaker, 1987, 1990, 1991; Talmy, 1975, 1978, 1985). According to these researchers, language could be acquired and processed employing the same mechanisms used to convey other types of information present in the world. This supported the claim that the same cognitive processes involved in attaining and developing other types of information were involved in the cognitive processes recruited for language processing.

Therefore, one could argue that a second factor contributing to the development and expansion of Cognitive Linguistics was the increasing relevance given to the theories in the realm of Cognitive Science, influencing psychology and areas of study such as linguistics. Until the second half of the twentieth century, one of the standard theories in psychology was the Faculty Psychology. Established primarily by Christian von Wolff (1734), and later developed by Thomas Reid (1764), this theory outlined the division of the mind into several categories (or faculties) whilst also perceiving the mind as a separate entity from the body. Thus, mental processes were thought to occur independently and unattached from the body. This theory was strongly established in the western culture with an inherited tradition supporting the idea that a faculty of reason detached from bodily functions separated humans from animals. As Lakoff and Johnson sum up (Lakoff & Johnson, 1999, p. 26):

> We have inherited from the Western philosophical tradition a theory of faculty psychology, in which we have a "faculty" of reason that is separate from and independent of what we do with our bodies. In particular, reason is seen as independent of perception and bodily movement. In the Western tradition, this autonomous capacity

> of reason is regarded as what makes us essentially human, distinguishing us from all other animals.

However, one of the most influential arguments put forward by researchers in Cognitive Science was that bodily capacities such as movement or perception could not be separated from thought processes. On the contrary, this argument maintained that reason and individual thought processes grew out of a mind that, by being embodied, was influenced by bodily processes. Moreover, Cognitive Science, presented as an interdisciplinary area of study, held as a central tenet that a complete and accurate understanding of the mind and its processes could not be achieved by studying one single discipline. Thus, to understand the various mental processes involved in different realms such as perception, reasoning, and language, cognitive scientists borrowed from psychology, neuroscience and linguistics.

The confluence of several areas impacted different fields of study, amongst which Linguistics was included. Hence, researchers initiating their theories in Cognitive Linguistics were interested in the interaction of language with components outside of the realm of language, such as other cognitive processes like perception. They defended that language was processed and learned similarly to other information, using cognitive processes common to other cognitive actions. Consequently, these scholars believed that the study of meaning should be the primary focus when studying language, arguing that if one is to accept the primary role of language as being categorisation, then one should infer the primary linguistic concern to be the meaning of words (Chafe, 1970; Lakoff & Johnson 1980; Langacker, 1986; Talmy, 1978).

Amongst these scholars, George Lakoff and Mark Johnson were two pioneers in the Cognitive Linguistics field who initiated their research by focusing primarily on semantics. Their considerations, particularly of metaphors, culminated in a revolutionary theory, summarised on their book *Metaphors We Live by* published in 1980, which defied the contemporary view of metaphors by stating that:

> Metaphor is pervasive in everyday language and thought—evidence that did not fit any contemporary Anglo-American theory of meaning within either linguistics or philosophy. Metaphor has traditionally been viewed in both fields as a matter of peripheral interest. We shared the intuition that it is, instead, a matter of central concern,

perhaps the key to giving an adequate account of understanding. (Lakoff & Johnson, 1980, p. IX)

Through this theory, the authors underlined the impact of the sensory-motor experiences of the body and of social surroundings as valid factors affecting the depiction of the world through language. This discussion proved to be of significant influence to Cognitive Linguistics by shifting the way figurative speech in general, and metaphors in particular, were perceived, as discussed throughout the next section of this chapter.

1.2- Metaphors and the Conceptual Metaphors Theory

The term "metaphor" was traditionally attributed to the sphere of poetic embellishment, used mainly in arts. The established definition across several fields and years admitted metaphors as concerning words rather than thoughts. This view supported the claim that metaphorical language was not used in ordinary speech but somewhat reserved as a rhetorical tool of primarily written speech conveying unusual twists of language. Moreover, metaphorical language could be seen as including a trait of deviancy since, through metaphors, words were not used to convey their literal meaning; on the contrary, they carried an implicit message.

Whilst the modern view of metaphors does not disregard its usage for stylistic purposes, the study and understanding of metaphors outside of the poetic sphere became a fundamental topic in Cognitive Linguistics. Such fact can be interpreted as an historical consequence since George Lakoff, as a founder of Cognitive Linguistics, focused primarily on metaphors. However, the growing interest in metaphors can also be perceived as an illustration of Cognitive Linguistics' nature and its reflection on metaphors. As established, Cognitive Linguistics focuses on how features of language are extracted from human cognition. Therefore, it can be argued that metaphors are a clear example of this phenomenon since these use the characteristics of one concept to portray another.

As it was mentioned in the previous section, in *Metaphors We Live by* the authors presented their Conceptual Metaphor Theory, coining the term Conceptual Metaphor. The thesis explored throughout the book disregards metaphors as being simply ways of embellishing speech. On the contrary, as the authors argued, metaphors reflect the way people think of one concept through the usage of another: "The essence of metaphor is understanding and experiencing one kind of thing in terms of another." (Lakoff & Johnson, 1980, p. 5) This line of

thought established the presence of metaphors beyond the lyrical sphere, entering the realm of human cognition.

According to the Conceptual Metaphor Theory, metaphors function by mapping a source domain to a target domain. On the one hand, the source domain is the concept that is commonly more understood in the realm of human experience. On the other hand, the target domain is frequently the more abstract concept being explained through the metaphor. In *Metaphor: A Practical Introduction*, the author Zoltan Kövecses explains these as "the conceptual domain from which we draw metaphorical expressions to understand another conceptual domain is called source domain, while the conceptual domain that is understood this way is the target domain." (Kövecses, 2010, p. 4)

Therefore, it is now established in Cognitive Linguistics that metaphors reveal a pattern of thought which conveys the metaphorical structure of the human conceptual system. For instance, to speak of arguments as wars, which are won or lost through an opponent's attack or defence, is no longer perceived as just a figure of speech. Instead, it is a way "we live by in this culture; it structures the actions we perform". (Lakoff & Johnshon, 1980, p. 4). Therefore, conceptual metaphors are recognised as tools that inevitably structure how things are understood in society and performed individually. According to the authors, the pattern of conceptual connotation, that is, the pattern of thought conveyed through metaphors, is not something one notices consciously because a significant amount of what we do and how we process actions is automatic and does not require reflection. However, the analysis of language is one of the ways we can access such mental processes.

Furthermore, Cognitive Linguistics recognises that many conceptual metaphors also entail different realms of cognition, such as perception. In other words, metaphors draw from bodily experiences to construct the conceptual dimensions behind metaphorical thought. Thus, conceptual metaphors are recognised as not being solely a linguistic phenomenon since these patterns of thought can be expressed in non-verbal ways, such as gestures and pictures:

> Metaphor allows conventional mental imagery from sensorimotor domains to be used for domains of subjective experience. For example, we may form an image of something going by us or over our heads (sensorimotor experience) when we fail to understand (subjective experience). (Lakoff & Johnshon, 1999, p. 50)

To conclude, the ramifications through several realms of cognition also contribute to the expansion and growth of the Conceptual Metaphor Theory across different fields. The next section of this chapter will focus on three primary theories which connect with the Conceptual Metaphor Theory and expand it in several ways.

1.3- Conceptual Metaphors in Figurative Speech

In 1994, Raymond W. Gibbs Jr., a psychology professor and researcher specialised in the fields of experimental psycholinguistics and Cognitive Science, wrote that "human cognition is fundamentally shaped by various poetic or figurative processes. Metaphor, metonymy, irony, and other tropes are not linguistic distortions of literal mental thought but constitute basic schemes by which people conceptualise their experience and the external world." (Gibbs, 1994, p. 1) As the author states, human cognition cannot be restricted simply to one isolated figurative process. Indeed, it is much more likely that several of these processes interact with each other. This claim is fundamental to understand the two studies developed for this dissertation.

As it will be outlined, our experimental study aimed to test the influence of gender in spatial metaphors of power in British English and European Portuguese. By asking participants to choose between two professions varying in gender and vertically disposed on a white screen, one can argue that study is grounded on several cognitive associations within figurative language. In other words, concepts from multiple spheres are associated with several cognitive processes that create patterns of thought visible through language. These include, for instance, the (inter)relation of concepts from the sphere of space with notions of superiority/inferiority and sexual gender, as well as power, sexual gender, and grammatical gender.

Therefore, such an argument presents the possibility that conceptual metaphors do not exist as a single conceptual process, isolated from other mechanisms and cognitive associations. Contrarily, these are combined with multiple cognitive and symbolic associations. To support this claim, the remainder of this section will approach three theories that combine two or more cognitive associations: Conceptual Blending, Metaphtonymy and Syntonymy.

Since the establishment of the Conceptual Metaphor Theory, the emphasis on semantics and figurative speech has allowed for several other approaches to evolve. One fundamental contribution was the Conceptual Integration Theory (CIT), also known as Conceptual Blending, developed by Gilles Fauconnier and Mark Turner (Fauconnier & Turner, 1998, 2002). The fundamental notion of this theory is that several types of human thought occur through the

integration or blending of mental spaces. In other words, conceptual blending presents the possibility that ideas or input spaces existing in the mind are integrated, or blended, to form an alternative concept in that same mind. From this perspective, the input spaces and the blended concepts can exist exclusively inside a person's mind or have a physical representation.

In order to explain their theory, the authors propose that the following speech is given by a contemporary philosopher leading a seminar. This philosopher is retelling an imaginative monologue between their thoughts and Immanuel Kant's theories:

> I claim that reason is a self-developing capacity. Kant disagrees with me on this point. he says it's innate, but I answer that that's begging the question, to which he counters, in *Critique of Pure Reason*, that only innate ideas have power. But I say to that, What about neuronal group selection? And he gives no answer. (Fauconnier & Turner, 2002, p. 54)

After which they explain Conceptual Blend by stating:

> The Debate with Kant blend has two input spaces. In one, we have the modern philosopher making claims. In a separate but related input space, we have Kant, thinking and writing. In neither input space is there a debate. The blended space has both people. In addition, the frame of debate has been recruited to frame Kant and the modern philosopher as engaged in simultaneous debate, mutually aware, using a single language to treat a recognised topic. (Fauconnier & Turner, 2002, p. 54)

An alternative typical example used to explain this theory is the computer desktop interface. The desktop can be perceived as a standard blend since it contains inputs from the realm of computers and simultaneously from a customary notion of a desk. The computer desktop is not a desk, but it can be conceptualised as one since people can move items and drop "files" into "folders" that are "on" the computer screen or even move things to the "recycle bin". Similar to what happens with conceptual metaphors, much of this blending is not seen as extraordinary, and it is, in fact, not even perceived since it occurs in a subconscious level of thought.

Another fundamental theory emerging from the advancements in figurative speech is the concept of Metaphtonymy. This term was coined by Louis Goossen (1990) when the author claimed that "although in principle metaphor and metonymy are distinct cognitive processes, it appears to be the case that the two are not mutually exclusive. They may be found in combination in actual natural language expressions." (Goossen, 1990, p. 323)

For this combination, the author admits that, as his research conveys, the links between metaphor and metonymy take several forms. Thus, both cognitive processes can be classified as continual and mutually implicating concepts. Metonymy draws a connection between two things belonging to the same sphere (instead of drawing a similarity between two concepts, as with metaphors). A typical example of metonymy is using the word dish to describe an entire plate of food. Although both metaphor and metonymy are defined as conceptual processes, they differ as Lakoff describes:

> (i) ... metaphoric mapping involves a source domain and a target domain. ... The mapping is typically partial. It maps the structure in the source domain onto a corresponding structure in the target domain.
>
> (ii) ... a metonymic mapping occurs within a single conceptual domain which is structured by an ICM (= an Idealised Cognitive Model). (Lakoff, 1987, p. 288)

Thus, the fundamental difference between the two concepts is related to the domains involved: in a metaphoric mapping, two domains are involved, but in a metonymy, one single domain contains the mapping. However, and in creating the term Metaphtonymy, Louis Goossens (1990) argues that although these are perceived as distinct cognitive processes, they are not mutually exclusive. On the contrary, the author claims, they appear to be contiguous and reciprocally implicative.

On “Metaphtonymy: The Interaction of Metaphor and Metonymy in Expressions for Linguistic Action” (1990), Goossens analyses a contemporary British database focusing on expressions from three source domains – body parts, sound and violent action – to explore the possible (inter)relations of metaphor and metonymy. Although the author admits the necessity of further research to be conducted, his research is able to collect four types of interactions between these two conceptual processes, supporting the claim that figurative language is not

made of compartmentalised sections but of many underlying processes and cognitive associations.

Furthermore, the concept of Syntonymy presents what is perhaps the most recent theory regarding the relationship binding cognitive processes. In this theory, José Teixeira (2021) puts forward what seems to be the logical consequence of what has been approached so far. According to the author, the concept of syntonymy defines symbolic associations as cognitively global, which can introduce, with fluidity, what is traditionally divided into metaphors, metonymy and synesthesia.

Synesthesia defines the usage of one sense to describe a feature of another. Similarly to metaphors, it was typically connected to lyrical purposes and present for instance, in Emily Dickinson's poetry when a colour (blue) is used to describe a noise ("a buzz"): "With blue, uncertain, stumbling buzz/ Between the light and me;/ And then the windows failed, and then/could not see to see." (Dickinson, 1890, p. 223). However, it has since evolved as a part of figurative speech to be found in written as well as spoken language.

In "Categorização e Concetualização: da Metáfora/Metonímia e Sinestesia à 'Sintonímia'" (2021), José Teixeira retrieved data relating to idiomatic expressions with colour in order to question the so-called divisions between the cognitive processes mentioned so far (metaphors, metonymy and synesthesia). According to the collected results, and paraphrasing the Portuguese version of the text, the author outlines:

> A constant cognitive feedback between perception and other linguistic categorisation processes. The vast and (in the current state of science) unknown complexity of how this happens, besides being astonishing, seems to indicate that the mind does not sustain rigid boundaries between the various processes it uses to which tradition, by limitation, attributed autonomous functioning, for instance, in the domain of metaphorical, metonymic and synesthetic processes. (Teixeira, 2021, p. 25)

Although synesthesia does not constitute the focus of this work, the notion of an interchangeability of concepts when addressing cognitive processes in figurative speech is relevant for the remainder of this dissertation. As stated at the beginning of this section, the

experimental research explored in the next chapter is grounded on the possibility that several of these cognitive associations can influence speakers, involving concepts and cognitive processes belonging to several spheres.

Drawing from the theoretical context explored throughout this chapter, the following section will proceed with the distinction between structural and orientational metaphors, focusing primarily on the influence of space on orientational metaphors since these entail the research conducted on the empirical part of this dissertation.

1.4- Structural and Orientational Metaphors

According to the Conceptual Metaphor Theory, metaphors can be divided into structural metaphors and orientational metaphors. As made evident by their name, structural metaphors focus on structuring one idea in terms of the other. For instance, thinking about arguments in terms of wars, as mentioned before, indicates that the core characteristics of wars are applied to the domain of arguments resulting in expressions such as the subject “attacked every weak point in my argument" or "You disagree? Okay, shoot!" (Lakoff & Johnshon, 1980, p. 4).

On the other hand, orientational metaphors do not focus only on one concept but instead on the organisation of an entire system of concepts through another system of concepts. The authors designate these as orientational metaphors because many are related to spatial orientation. The phenomenon of defining and conceptualising through spatial awareness has a profound connotation with our bodies and how we inhabit the world through them. As Lakoff and Johnson state: "Orientational metaphors give a concept a spatial orientation". (Lakoff & Johnson, 1980, p. 15). This spatial orientation given to a concept is related to what we associate through our experiences with the body. For example, if one focuses on the up/down dichotomy and its association with power and quantity, we could reason that this is influenced by the fact that one's body possesses a vertical axis since humans stand upright. Another example given by the authors is related to mundane activities such as "pouring more water into the glass and seeing the level go up." (Lakoff & Johnshon 1999, p. 47)

Furthermore, the authors highlight the vertical axis in conceptualisation as the fundamental orientational metaphor since it arises from a primary characteristic of human bodies, influencing how we perceive the world. In fact, social hierarchies are generally conveyed through a visual scheme in which the more powerful stands on top. In our everyday language, expressions such as "I am on top of the situation", "her power rose", and even "your royal

highness" highlight the mental conceptualisation of power as being up. In *Metaphors We Live by*, the authors explore this by stating:

> We have bodies, and we stand erect. Almost every movement we make involves a motor program that either changes our up down orientation, maintains it, presupposes it, or takes it into account in some way. Our constant physical activity in the world, even when we sleep, makes an up-down orientation not merely relevant to our physical activity but centrally relevant. (Lakoff & Johnshon, 1980, p. 56)

Therefore, orientational metaphors are not arbitrary. On the contrary, they are related, not only with one's body but also with one's cultural habitat. This has been expanded through several experimental researches testing the notions developed by theorists. In her experimental research titled "How Languages Construct Time", Lera Boroditsky (2011) explored how time was perceived through orientational metaphors in different cultures. Her findings concluded that:

> The metaphors we use to talk about time have both immediate and long term consequences for conceptualising and reason about this fundamental domain of experience. How people conceptualise time depends on how the languages they speak tend to talk about time, the current linguistic context (what language is being spoken), and the particular metaphors being used to talk about time at the moment. Further, people who conceptualise space differently also conceptualise time differently, suggesting that people co-opt representations of the physical world (e.g., space) to mentally represent more abstract or intangible entities (e.g., time). (Boroditsky, 2011, p. 339)

Hence, to admit metaphors shape how one thinks about a subject or action also entails admitting our bodily perception of the world shapes our cognitive processes. Thus, the following chapter approaches the influence of one's bodily experience in cognitive processes focusing on the Embodied Cognition Theory and its relationship with the Conceptual Metaphor Theory. This

connection will be established by focusing primarily on the experimental research conducted on this topic, introducing our research questions and hypotheses.

Chapter 2 - Empirical Framework

This chapter establishes the empirical groundwork supporting the experimental research conducted in this dissertation. The first section of this chapter presents the Embodied Cognition Hypothesis (Rosch et al., 1991) whilst addressing the empirical research concerning the influence of the body on cognitive processes. Subsequently, section two approaches the vertical dimension present in power metaphors, focusing on the previously conducted research. Finally, section three details the hypotheses and objectives of our empirical research, leading to the experimental study outlined in part two of this dissertation.

2.1- Embodied Cognition Hypothesis: Metaphors and Experimental Research

The argument for metaphors as embodied processes is grounded on the fundamental principle that a large part of cognition is in itself embodied. The Embodied Cognition Hypothesis (Rosch et al., 1991) reasons that our thought development is similar to how we interact through our bodies. Thus, according to this theory, the perceptual experience has a fundamental role in conveying ideas and relating them to objects or people in the world.

Extending the Embodied Cognition Theory to metaphors has led to the definition of embodied metaphors as cognitive processes using bodily experiences to convey and process non-bodily notions. Gibbs (2006) presents the argument that the reason why we can understand these metaphors "resides in the automatic construction of a simulation whereby we imagine performing the bodily actions referred to in these excerpts" (Gibbs, 2006, p. 435). In fact, these are metaphors that rely on a physical experience. According to the author's theory, "people's intuitive, felt, phenomenological experiences of their bodies shapes large portions of metaphoric thought and language use." (Gibbs, 2006, p. 436). Thus, these metaphors depend on our understanding of the body's experience to capture their meaning.

Evidence for the Embodied Cognition Theory has been significantly developed in the last two decades, with research building the argument that interpreting an action through language activates the same mechanisms of performing said action (Rohrer, 2006). The studies developed in this area collect measurements such as reaction times, eye-tracking and, more recently, neurological mechanisms such as FMRI work by essentially focusing on the relationship between cognition and bodily experiences (Ackerman et al., 2010; Bardolph & Colson, 2014; Boroditsky, 2011; Boroditsky & Ramscar, 2002; Boulenger et al., 2009; Brdar & Brdar-Szabó, 2017; Cienki,

2016; Desai et al., 2011; Kouchaki, Gino & Jami, 2014; Hasson & Gluksberg, 2008; Kaup, 2001; Lacey et al., 2012;).

Furthermore, behavioural psychology has provided significant contributions to the proven statement and observed condition that even on a non-linguistic level, witnessing an action such as laughing or crying activates the same neural circuits as doing such actions. Thus, watching an action, similarly to reading about it, triggers a similar response to performing it (Coslett, 1998; Coslett et al., 2002; Hauk & Pulvermüller, 2004; Rizzolatti & Buccino, 2005).

To conclude, it is possible to affirm that besides using what is encountered, conceptual metaphors might use what is experienced. Hence, and related to the theme of this dissertation, the following section has focused on detailing the pertinent experimental research regarding the conceptualisation of quantity and power through a spatial dimension.

2.2- Vertical Dimension in Spatial Metaphors: Quantity and Power

As argued so far, our relationship with a spatial notion is extremely primitive since we, as humans, depend upon our judgment of what surrounds us to survive. However, we also define it through our bodies. By attributing a front and back to our body, we assume that in space, and concerning our physique, there exists a moving that is forward and one that is backwards. Likewise, and through our relationship with our centre of gravity and with the ground, we, as humans, perceive an up and a down concept, and we stand upright. Moreover, the up-down concept is captured and understood by collecting motor functions that we associate with space.

Focusing on the written theory regarding this topic, several studies have been conducted adopting experimental paradigms to examine the processing of such concepts (Cassanto, 2008; Dancygier & Sweetser, 2014; Haidt, Graham, & Joseph, 2009; Lakoff & Johnson, 1980; Langston, 2002; Littlemore, 2019). Specifically, Langston (2002) designed a study suggesting that if participants were confronted with information that could be attributed to a spatial dimension through an orientational metaphor, they would develop a model from the text:

> If readers encounter a sentence that suggests an orientational metaphor image schema, then they will establish a basic structure consistent with that image schema. If the next sentence is consistent with the metaphor, comprehension will be fluent. If the next

sentence is inconsistent with the metaphor, a shift to a new structure will be required and comprehension will be disrupted. (Langston, 2002, p. 286)

To test these hypotheses, experiments 1 to 3b focused on presenting texts with three sentences each which conveyed a vertical arrangement of two items. See the example as follows:

David wants a lot of caffeine in his drink.

He placed Jolt first because Jolt is most caffeinated.

Under Jolt David placed Sprite. (Langston, 200, p. 287)

As conveyed, the first sentence presented the dimension for the arrangement whilst the second sentence defined an item as the most or the least of the dimension. Finally, the third sentence connected the second item to the first, always starting with the word "over" or "under". Thus, texts consistent with the canonical metaphor (more is up) were texts that included "the most" on the second sentence and had the third sentence start with the word "under" whilst texts that included "the least" on the second sentence had the third sentence begin with "the least".

These sentences entered the screen individually whilst participants were asked to push the spacebar when they had finished reading each sentence. The authors recorded the reading times by measuring the time elapsing from the presentation of the sentence until participants pushed the spacebar, dividing these by the number of characters present in a sentence to control for differences in sentence length. Results showed that the initial hypothesis was supported. Participants took longer to press the space bar when the texts were inconsistent with the "more is up" metaphor than when the texts conveyed the canonical representation, thus suggesting that orientational metaphors influence online comprehension tasks.

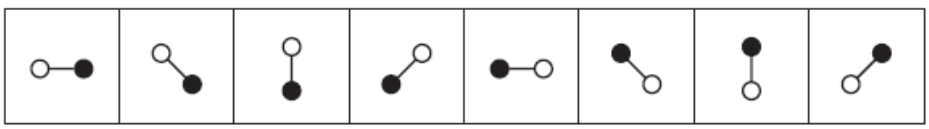
Furthermore, Schubert (2005) approached the relationship between conceptual metaphors and the spatial representation of power by testing the premise stated in *Metaphors We Live by* that "control is up, lack of control is down". (Lakoff & Johnson: 1980, p. 15) As Schubert (2005) highlights:

> Although spatial positions have been considered insofar as they are cues to the power of others in the environment (Argyle, 1988; Mehrabian, 1972), we do not know what role they play in thinking about power. Are we missing something important? Is it the case that metaphors about the vertical dimension are used only to talk about power but not to think about it? (Schubert, 2005, p. 1)

Hence, the author designed a set of studies to test participants' perception of power on a vertical scale. Participants were students of the University of Jena (Jena, Germany) answering the task in English. To test the hypothesis of a power=up scheme, Schubert (2005) developed an experiment based on a method developed by Richardson and colleagues (Richardson, Spivey, Barsalou, & McRae, 2003; Richardson, Spivey, Edelman, & Naples, 2003) in which horizontal and vertical verbs were identified (e.g., "pull" for horizontal verbs and "sink" for vertical verbs). Including such verbs in sentences, the study displayed several pictures and asked participants to connect pictures and sentences. As shown in Figure 1, pictures were made of different dispositions of black and white dots and participants were informed that these represented the connection of an agent (represented by a black circle) and a patient (represented by a white circle). The results of this study supported the hypothesised connection between a vertical scale used in words and reflected in a visual scheme.

Figure 1.

Deception of Pictures Shown to Participants Displaying Eight Different Angles Between Agent and Patient, as in Schubert (2005)

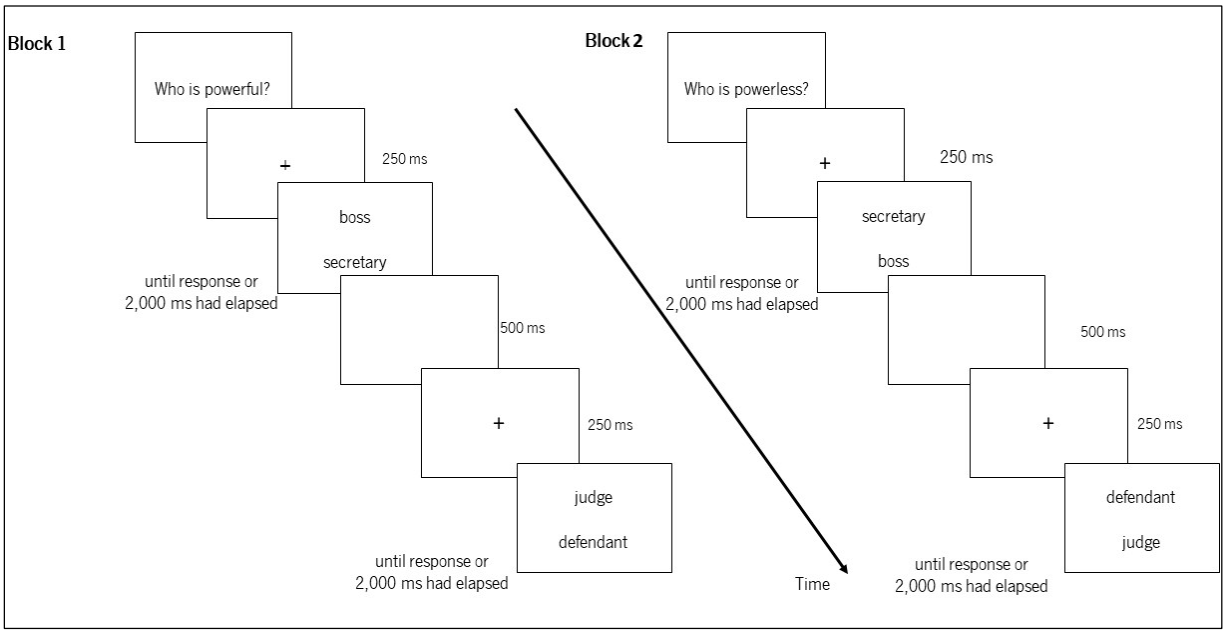


Furthermore, the author attempted to assess the connections between vertical positions and judgements of power. To do so, participants were faced with pairs of stimuli (words), presented vertically on the computer screen (e.g. Boss/Secretary) as depicted in Figure 2, and asked to identify as quickly as possible which word in the pair was the powerful or the powerless depending on the condition. The words made for 24 pairs of professions and social groups

displaying power asymmetries (as previously assured in a pre-test developed by the author). These pairs were shown twice, with the position of the words varying accordingly for counterbalance (powerful up and powerless down or powerful down and powerless up), thus resulting in 48 trials for each participant.

Figure 2.

Set-Up of the Task Used by Schubert (2005)



Results showed a close association with powerful groups and a superior position and simultaneously powerless groups and an inferior position. Hence, results confirmed that the metaphor congruent representation (i.e., powerful up and powerless down) led to shorter reaction times. In summary, and as the author declared, the study "discovered that the social concept of power is embodied in vertical spatial positions." (Schubert, 2005, p. 16)

Furthermore, Winter et al. (2020) developed an experimental paradigm specifically to test the effects of gender in conceptual metaphors of power. Thus, in a replication-extension of Schubert (2005), Winter et al. (2020) collected pairs of professions unto which the concept of gender was introduced by adding the words "female" or "male" before each profession. According to the authors, the decision to include a gender dimension was taken because, as previous studies have established, power and gender cannot be perceived as independent social

dimensions, but instead they are concepts that influence one another (e.g., Carli, 1999; Chen et al., 2009; Eagly et al., 2000; Rudman & Glick, 2002).

Thus, gender was factored into the original power/spatial metaphor paradigm by creating gendered pairs used as prompts, such as "male doctor/female nurse". Defining the aim of their experimental task, Winter et al. (2020) stated their wish to replicate the previous findings (participants responding faster when powerful groups were presented on top of powerless groups), whilst assessing if an association between a vertical position and a specific gender could be uncovered "with either male or female labels being processed more quickly when presented on top". (Winter et al., 2020, p. 11)

Subsequently, the authors created a list of 64 professions, drawing firstly from Schubert (2005) and extending it. The final set of stimuli included 32 pairs of words (i.e., the 64 collected professions organised in pairs) displayed vertically on a screen and following the design described for Schubert (2005). Accordingly, participants were asked which of the two groups was the more powerful group or the less powerful group (varying according to each block). The pairs were displayed on a white screen, and participants were asked to press the up arrow or the down arrow on the keyboard to indicate which group they chose.

Notably, the results reflected an interaction between the spatial condition and the gender condition, i.e., participants were slower for powerful=up when the female profession was presented on top, but not when the male profession was presented on top. On the contrary, and when the male profession was displayed on top, responses were faster to powerful=up (Winter et al., 2020). In other words, participants were faster to respond when the powerful profession was up and when this consisted of a male variation, thus confirming an interaction between power and gender in a vertical dimension.

Although recognising the pertinence of studies conducted on power through spatial metaphors (e.g., Gibbs & Macedo, 2010; Hong et al., 2019; Peipei et al., 2015; Ścigała & Indurkhya, 2016; Wu et al., 2016;), we have primarily focused on Schubert (2005), and Winter et al. (2020) for the design our empirical research wishing to complement what was, from our point of view, left to uncover. Hence, the final section of this chapter outlines the objectives and hypotheses developed through our empirical research.

2.3- Objectives and Hypotheses

Following the theoretical framework outlined heretofore, part two of this dissertation focuses on the conducted empirical research including both the pilot and the experimental study. When designing the experimental research, our primary objective was to test if the previously uncovered effects of gender in power spatial metaphors could be replicated in a more implicit task. Thus, we wished to test if the gender influence on spatial metaphors of power would be observed when participants were not explicitly asked about power. This was, from our point of view, a relevant question since, on everyday life, people are not regularly involved in conscious and intentional processes to decide who, being female or male, has more or less power. Therefore, it was important to clarify if the gender influence was still present when participants were not asked to focus on the power aspect specifically. In other words, we wished to understand if this gender effect on spatial metaphors of power could be defined as a fast and automatic process occurring even when participants were not aware of it. To that purpose, we chose to use the paradigm used in Winter et al. (2020), but requesting that participants detect as quickly and accurately as possible where the male of the female variant of a name (profession) was (up or down).

Additionally, we have also aimed to collect a more controlled set of stimuli to avoid the influence of several psycholinguistic and semantic variables. As it has been proven, characteristics such as the number of times a word occurs in a language (word frequency), the number of letters it contains (word length), and the number of words of the same length containing the same letters in the same positions except one (orthographic neighbourhood density measure, N metric) can affect word recognition (see Balota et al., 2007; Coltheart et al., 1978; Soares et al., 2014, 2015, 2017, 2018, 2019). However, these psycholinguistic variables were note taken into account in the above-mentioned studies. For instance, Schubert (2005) paired the word "perpetrator", 11 letters in length, with the word "victim", 6 letters in length. Furthermore, a similar argument could be raised if examining Winter et al. (2020) since the authors used pairs of words with disparate morphological characteristics. A clear example is the pairing of the word “referee” (7 letters) with the word “footballer” (10 letters).

Moreover, it could also be argued that the gender stereotypes surrounding professions could have affected the results. Although speculation is in place, it can be argued that several professions, by being occupied largely by one specific gender, could be more easily associated to said gender, hence influencing participants’ responses. This is the case if for instance one thinks

of nursing professions, which are generally occupied by females and could therefore lead to misleading results when connected to either one gender or the other.

Therefore, to neutralize potential effects of gender stereotypes associated with professions, we chose to pair the same profession varying only in gender. Furthermore, our pilot study was established to collect neutral professions, i.e., professions that had an equal distribution of males and females in society, and were not more readily associated with one particular gender. This was taken into account to avoid that social stereotypes, or the asymmetric distribution of men or women in said professions, could affect the results obtained. In order to do so, the pilot study asked participants to classify a list of professions into categories male, female, both or unknown profession (*masculino, feminino, ambos, desconheço a profissão* in Portuguese) based on their representation in society.

The professions extracted from the pilot study were used as stimuli in our experimental study to ensure that the social connotations of each profession did not affect the participants' judgement throughout the task. With said neutral professions, pairs varying only in gender were established and presented vertically on a screen whilst participants were asked to find, as quickly and accurately as possible, the female/male variation of the profession (depending on the block).

Finally, the third goal of our study involved the languages in which the experiments were being developed. Contrarily to what has been developed so far, we wished to extend our experimental research to a second language. Thus, our research was conducted on native speakers of British English and replicated in European Portuguese (using native speakers of this language as well). Since British English largely lacks grammatical gender, terms such as professions are typically neutral (e.g. writer). On the contrary, in Portuguese, grammatical gender is explicit in almost every word (e.g., *escritor/escritora*). Although grammatical gender is not a synonym of biological gender, several studies have studied the influence of attributing a grammatical gender to words (Boroditsky & Schmidt, 2003; Maciuszek et al. 2019; Saalbach et al., 2014). Hence, with the experimental research being conducted also in European Portuguese, we set out to collect and analyse how grammatical differences in language would translate regarding the gender influence on spatial metaphors of power.

Part 2

Chapter 1 - Pilot Study

This chapter outlines the pilot study's methodology, which was developed to collect the stimuli used in the experimental study. The pilot study was conducted with native speakers of British English as well as native speakers of European Portuguese. The first section of this chapter presents the information regarding the study's participants, followed by a detailed summary of its materials and the procedure adopted in the data collection. Lastly, the fourth and final section of this chapter is concerned with presenting and discussing the pilot study's results.

1.1 - Participants

Forty-two British English native speakers (22 females, M_{age} = 24.1; *SD* = 3.5, range: 18-30 years old) participated in the English version of the pilot study, whereas 68 European Portuguese native speakers (38 females, M_{ag} = 22.4, *SD* = 3.6, range: 18-30 years old) participated in the European Portuguese version of the same study. All of the participants were volunteers recruited through personal networks. Informed consent was obtained from all participants. The study was approved by the local research ethics committee (CEICSH 011/2021).

1.2 - Materials

A list of 122 words was selected from "Classificação Portuguesa das Profissões 2010". The words were chosen following the below criteria:

A. All words reflected existing professions both in British English and European Portuguese;
B. The English translation of the European Portuguese words consisted of one single word (e.g., *maquilhador/ maquiladora* [make-up artist] was translated to beautician);
C. The morphology of each European Portuguese word presented an explicit gender variation (e.g., words such as *juiz/ juíza* [judge] were included whereas words such as *massagista* [masseuse] were not).

The 122 Portuguese professions were translated into English using DeepL Translator available online (https://www.deepl.com/translator). The complete list of the words used in both languages is presented in Appendix 1. These are coded from 1 to 122 and presented firstly in British English followed by its form in European Portuguese (including both gender variations).

The 122 words in British English were used on the evaluation task conducted in English, whereas the 122 words in European Portuguese were used in Portuguese. In both tasks, participants were asked to choose which of the available options (in English: female, male, both, unknown profession; in Portuguese: *feminina*, *masculina*, *ambos*, *desconheço a profissão*.) was the option they believed to be more associated with each of the professions presented in society. The unknown profession category (*desconheço a profissão*) was added to avoid random responses to professions with which participants were not familiarised. Moreover, by including this option, we were able to exclude professions that were not known to most people.

In the Portuguese version of the task, two lists of materials were constructed to counterbalance the gender (male/female) of the word appearing first in each pair in the questionnaire preventing order effects in the results. Thus, in List 1, half of the pairs were presented with the female noun first (e.g., *juíza-juiz* [judge]), whilst on the other half, the reverse happened (e.g., *jogador-jogadora* [player]). Each of these halves was divided in two to assure the counterbalance of the multiple-choice options in the questionnaire, the first half having appeared with the options ordered as female, male, both, unknown profession (*feminina*, *masculina*, *ambos*, *desconheço a profissão* in Portuguese) and the remaining followed by the options male, female, both, unknown profession (*masculina*, *feminina, ambos*, *desconheço a profissão* in Portuguese) also to avoid order effects in the responses. On the second half of List 1, the same division was made, that is, professions were followed by the options ordered as female, male, both, unknown profession (*feminina*, *masculina*, *ambos*, *desconheço a profissão* in Portuguese) on the first half and the outstanding appeared with the options male, female, both, unknown profession (*masculina*, *feminina, ambos*, *desconheço a profissão* in Portuguese).

In List 2, the pairs in which the female nouns were presented firstly in List 1 appeared with the male noun first (e.g., *juiz-juíza* [judge]) and the other half, the other way around (e.g., *jogadora-jogador* [player]). Similarly to what was done with List 1, this half was divided to counterbalance the multiple-choice options. Therefore, the first half was presented with the options male, female, both, unknown profession (*masculina*, *feminina, ambos*, *desconheço a profissão* in *P*ortuguese) and the second half was followed by female, male, both, unknown profession (*feminina*, *masculina*, *ambos*, *desconheço a profissão* in Portuguese). The second half of List 2 followed this thread by presenting words followed by female, male, both, unknown profession (*feminina*, *masculina*, *ambos*, *desconheço a profissão* in Portuguese) and the

remaining by male, female, both, unknown profession (*masculina*, *feminina*, *ambos*, *desconheço a profissão* in Portuguese).

In the English version of the task, two lists of materials were also constructed. However, since English words could be presented without a gender connotation (e.g., judge), the gender counterbalance was only required on the multiple-choice options. Thus, List 1 had half of the words followed by the options female, male, both, and unknown profession, whereas the other half was presented with the options ordered as male, female, both and unknown profession. In List 2, the words that were followed by the options female, male, both, and unknown profession in List 1, were presented with male, female, both, and unknown profession whilst on the second part the reverse (i.e., followed by the options female, male, both and unknown profession).

Participants were arbitrarily assigned to the lists with the constraint that at least the same number of participants would complete a given list (20 participants per list).

1.3 - Procedure

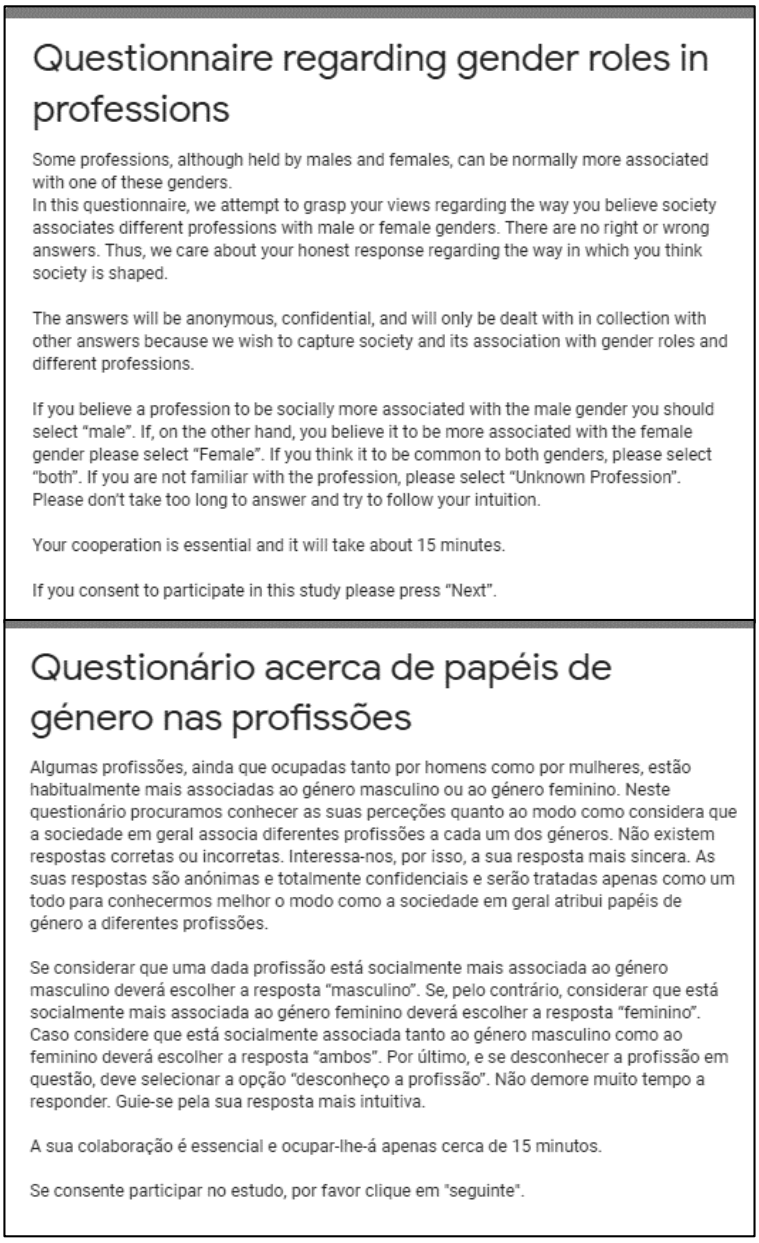
A web survey procedure was used to collect data. Online web surveys have been increasingly used in research (e.g., Balota et al., 2001; Brysbaert et al., 2014; Soares et al., 2012, 2017) since they allow easy access to a more significant number of participants with clear advantages for data collection. Moreover, they have been proven as reliable as the traditional paper-and-pencil procedure (see Soares et al., 2012 for details).

The web surveys were assembled using Google Forms both for the English and Portuguese versions. The links for each task were distributed to the English and Portuguese participants, respectively and individually via e-mail. As shown in Figure 3, the procedure's introduction in both languages (English version on the top panel and Portuguese version on bottom panel) included information concerning the study and its requested task.

Participants' consent was demanded, followed by the collection of demographic data, namely age, gender, nationality, education level, native language, and profession. Figure 3 depicts the introduction of each of the tasks (English top panel and Portuguese bottom panel).

Figure 3.

Instructions Provided to the British English Participants (Top Panel) and to the European Portuguese Participants (Bottom Panel)



Questionnaire regarding gender roles in professions

Some professions, although held by males and females, can be normally more associated with one of these genders.
In this questionnaire, we attempt to grasp your views regarding the way you believe society associates different professions with male or female genders. There are no right or wrong answers. Thus, we care about your honest response regarding the way in which you think society is shaped.

The answers will be anonymous, confidential, and will only be dealt with in collection with other answers because we wish to capture society and its association with gender roles and different professions.

If you believe a profession to be socially more associated with the male gender you should select "male". If, on the other hand, you believe it to be more associated with the female gender please select "Female". If you think it to be common to both genders, please select "both". If you are not familiar with the profession, please select "Unknown Profession". Please don't take too long to answer and try to follow your intuition.

Your cooperation is essential and it will take about 15 minutes.

If you consent to participate in this study please press "Next".

Questionário acerca de papéis de género nas profissões

Algumas profissões, ainda que ocupadas tanto por homens como por mulheres, estão habitualmente mais associadas ao género masculino ou ao género feminino. Neste questionário procuramos conhecer as suas perceções quanto ao modo como considera que a sociedade em geral associa diferentes profissões a cada um dos géneros. Não existem respostas corretas ou incorretas. Interessa-nos, por isso, a sua resposta mais sincera. As suas respostas são anónimas e totalmente confidenciais e serão tratadas apenas como um todo para conhecermos melhor o modo como a sociedade em geral atribui papéis de género a diferentes profissões.

Se considerar que uma dada profissão está socialmente mais associada ao género masculino deverá escolher a resposta "masculino". Se, pelo contrário, considerar que está socialmente mais associada ao género feminino deverá escolher a resposta "feminino". Caso considere que está socialmente associada tanto ao género masculino como ao feminino deverá escolher a resposta "ambos". Por último, e se desconhecer a profissão em questão, deve selecionar a opção "desconheço a profissão". Não demore muito tempo a responder. Guie-se pela sua resposta mais intuitiva.

A sua colaboração é essencial e ocupar-lhe-á apenas cerca de 15 minutos.

Se consente participar no estudo, por favor clique em "seguinte".

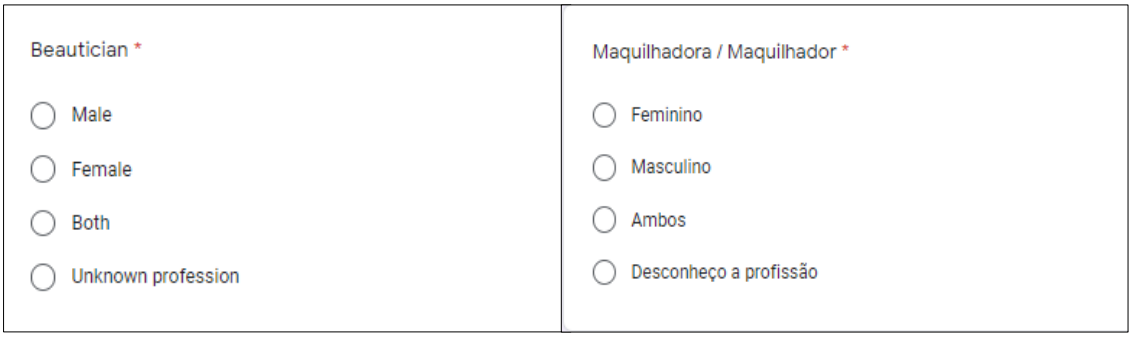
As displayed above, in both language participants were informed that the study aimed to obtain a representation of society rather than collect their opinions on how society should function. As it is stated, the objective was to "grasp (participants') views regarding the way (they) believe society associates different professions with male or female genders''. Therefore,

participants were encouraged to present their "honest response regarding how (they) think society is shaped" instead of trying to find the correct answer.

After pressing next to proceed, the study began with the presentation of each profession. In the English version of the task, the professions were conveyed through one single word, whereas in the Portuguese version the professions were presented as a pair of words (to allow for grammatical gender variation). The professions were followed by the options female, male, both and unknown profession (in Portuguese, *feminina*, *masculina*, *ambos*, *desconheço a profissão*) varying in accordance to what has been detailed. As abovementioned, participants were asked to choose the option best describing how society represented said profession. For instance, if when thinking of the profession "mechanic" (*mecânico/ mecânica*), a participant believed it to be more associated with males in society, they should select the option "male" (*masculina*). On the other hand, if a profession such as "beautician" (*maquilhador/maquilhadora*) was connected, to their knowledge, mostly with females, the answer should be "female" (*feminina*). However, if presented with a profession such as "professor" (*professor/ professora*), they believed it to be equally represented in society, the option "both" (*ambos*) should be considered. The option "unknown profession" (*desconheço a profissão*) should be used if they could not identify the profession. Figure 4, as an example of the display used in the English and European Portuguese versions of the task (left panel for the English version and right panel for the Portuguese version of the task), displays the different combinations of multiple options with the English version (left panel) presenting the male option first and the Portuguese version (right panel) presenting the female option first. As the asterisk in both images signifies, participants were mandatorily required to provide an answer to every profession to be able to proceed in the task. In each version of the task, the 122 professions appeared in a randomised order varying per participant. The overall duration of the procedure was 15 minutes.

Figure 4.

Example of Options' Presentation Provided to the British English Participants (Left Panel) and to the European Portuguese Participants (Right Panel)



1.4 - Results and Discussion

The mean percentage of the responses obtained for the "unknown profession", "male", "female" and "both" for each of the 122 professions in the English and Portuguese versions of the task is accessible in Appendix 2 (due to its extension and accounting for space economy). In here, words are referred to by the coded number individually attributed in the previous appendix. Each number is followed by the values obtained for the options unknown profession, male profession, female profession and both for the English versions of the task. Subsequently, the Portuguese values obtained for the options following the previously mentioned order (i.e., unknown profession, male profession, female profession and both) are presented.

It is worth noting that, before computing the values (means and standard deviations) provided by participants in each of the languages for the 122 professions included in the evaluation task, several verifications were carried out to ensure the integrity of the data. Besides admitting only British English and European Portuguese native speakers in the analyses of each language, we have also excluded any participants who assessed more than 66% of the words with the same value (indicating non-discriminative, random and/or inattentive responses).

A preliminary analysis of the results in each of the languages immediately revealed that most professions had been classified as "both" in English as well as in Portuguese. Specifically, the average percentage of "both" is 54.6% in English and 70% in Portuguese, whereas the average percentage for "male" is 26.7% in English and 22.5% in Portuguese, and 18.7% in English and 7.5% in Portuguese for the "female" option. Besides, when comparing the responses of both languages, it is clear that the distinction between "female" and "male" professions was more pronounced in English than in Portuguese. Indeed, while English participants rated 26.9% of the professions as "male" (n = 23, e.g., paver *[calceiteiro/calceteira]* and bricklayer *[pedreiro/pedreira]*) and 18.1% as "female" (n = 17, e.g., beautician *[maquilhador/maquilhadora]* and librarian [*bibliotecário/bibliotecária]*), Portuguese participants

rated 22.5% of the professions as "male" (*n* = 18, e.g., miner [*mineiro/ mineira*] and paver [*calceteiro/ calceiteira*]) and 7.5% as "female" (*n* = 2, i.e., embroider [*bordadora/ bordador*] and beautician [*maquilhadora/maquilhador*]).

Since we intended to use the same set of professions on the English versions as well as on the Portuguese versions of the experimental task, several criteria were implemented to select the professions to use in the experimental study. Firstly, all the words rated with a high number (≥ 50%) of "unknown" responses were immediately excluded to assure the study would not include unfamiliar professions. These included professions such as sericulturist (*sericicultor/sericicultora*), which was rated with 52.4% and 70.6% of "unknown" answers by English and Portuguese participants, respectively. Secondly, we conducted the non-parametric McNemar test on the responses made by participants to each profession to examine if the differences in the proportions of the "female", "male" and "both" responses (two-by-two comparisons) given to every word reached statistical significance. Note that our purpose was to select professions in which the proportion of "both" responses was significantly different from the "female" and "male" responses in English as well as in Portuguese. By doing so, we would be able to assure that the stimuli used in the experimental study consisted of neutral professions, i.e., professions associated on average with both sexual genders equally, thus preventing that the gender stereotypes associated with different professions could affect the results as it might have occurred in previous studies.

Due to their extension, the results of the McNemar tests to each of the 48 words selected to be used in the experimental study conducted in the British English and European Portuguese languages can be found in Appendix 3. In this appendix, words are organised in alphabetical order in English and followed by the *p* values obtained for each of the words when comparing the percentage of responses given to the "both" option relative to the "male" and the "female" options. Note that to assure a balanced distribution in the number of males and females performing a given profession as to avoid the influence of professional gender stereotypes on the results, all the words (professions) selected had to present a number of responses on the "both" option statistically higher than on the "male" and "female" options, and in both languages simultaneously. Three other words whose results reached a marginal statistical level of significance cook (*cozinheiro/cozinheira*), playwright (*dramaturgo/dramaturga*), and investor (*investidor/investidora*) were also selected to integrate this pool to assure the counterbalance of

the stimuli across conditions in the experimental task as we present ahead. Finally, due to a technical error, three additional words were added to the pool of stimuli (upholster [*estofador/estofadora*], joiner [*marceneiro/marceneira*], and seller [*vendedor/vendedora*]), although they were afterwards excluded from the analyses. The total amount, 48 pairs of British English and European Portuguese neutral profession, is displayed in Table 1.

Table 1.

Pairs Selected from the Pilot Study (N = 48) in both British English and European Portuguese Languages to Integrate the Experimental Study

British English	European Portuguese
Acolyte	Acólita / Acólito
Actor	Atriz / Ator
Administrator	Administradora/ Administrador
Anthropologist	Antropóloga / Antropólogo
Archaeologist	Arqueóloga / Arqueólogo
Astronomer	Astrónoma / Astrónomo
Auditor	Auditora / Auditor
Author	Autora / Autor
Broadcaster	Locutora / Locutor
Chemist	Química / Química
Choreographer	Coreógrafa / Coreógrafo
Commissioner	Comissária / Comissário
Composer	Compositora / Compositor
Consultant	Consultora / Consultor
Cook	Cozinheira / Cozinheiro
Driver	Condutora / Condutor
Engineer	Engenheira / Engenheiro
Examiner	Examinadora / Examinador
Filmmaker	Realizadora / Realizador
Geographer	Geógrafa / Geógrafo
Historian	Historiadora / Historiador
Interviewer	Entrevistadora / Entrevistador
Investor	Investidora / Investidor
Jeweller	Joalheira / Joalheiro
Joiner	Marceneira / Marceneiro

Judge	Juíza / Juíz
Lawyer	Advogada / Advogado
Magistrate	Magistrada / Magistrado
Notary	Notária / Notário
Oceanographer	Oceonógrafa / Oceonógrafo
Packer	Embaladora / Embalador
Philologist	Filóloga / Filólogo
Photographer	Fotógrafa / Fotógrafo
Player	Jogadora / Jogador
Playwright	Dramaturga / Dramaturgo
Poet	Poetisa / Poeta
Presenter	Apresentadora / Apresentador
Producer	Produtora / Produtor
Researcher	Investigadora/ Investigador
Seller	Vendedora / Vendedor
Singer	Cantora / Cantor
Supervisor	Supervisora / Supervisor
Swimmer	Nadadora / Nadador
Translator	Tradutora / Tradutor
Upholsterer	Estofadora / Estofador
Warden	Guardiã / Guardião
Writer	Escritora / Escritor
Zoologist	Zoóloga / Zoólogo

Chapter 2 - Experimental Study

Chapter two is concerned with the experimental study developed to test the highlighted hypotheses. Following the structure delineated throughout the previous chapter, the first section of this chapter comprises information regarding the characteristics of the participants, including the British English native speakers as well as the European Portuguese native speakers, followed by a description of the stimuli used throughout the task in each of these languages. Section three describes the procedure adopted for the data collection, describing what was requested of participants in both languages. The last section of the chapter presents and discusses firstly the results obtained from English participants, followed by the results obtained from Portuguese participants. To conclude, the data obtained from the analyses comparing the results of both languages are discussed.

2.1 - Participants

Thirty-three British English native speakers (26 females, M_{age} = 25.6; SD = 1.98; range: 18-30 years old) were recruited through personal networks to perform the British English version of the experimental task. Forty-eight European Portuguese native speakers (24 females; M_{age} = 23.4, SD = 3.90; range: 18-30 years old) were recruited through the platform for experimental studies of the School of Psychology (University of Minho) to perform the European Portuguese version of the experimental study in exchange for academic credits.

All of the participants presented either normal or corrected-to-normal vision. Informed consent was obtained from all participants. This study was approved by the local research ethics committee (CEICSH 011/2021).

2.2 - Materials

The 48 words in British English and European Portuguese selected from the previous pilot study were used as stimuli in the British English and European Portuguese versions of the experimental task. As stated before, these words represent professions that were rated in both languages as “neutral” gender professions, i.e., as professions in which a significantly higher number of participants classified each of them as associated with “both” genders, more so than to the “female” or “male” gender.

Furthermore, these words were also controlled across languages in regards to the psycholinguistic characteristics known to stronglaffect word processing, namely the per million-

word frequency, the word length measured in numbers of letters, and the number of words sharing the same letters in the same positions except one, the N metric as mentioned before. The mean values obtained for each of these measures in each of the languages are presented in Table 3. These measures were taken from the E-Lexicon Project (Balota et al., 2007) for the British English words and from the Procura-PALavras lexical database (P-PAL; Soares et al., 2018) in the case of the European Portuguese words. Note that the values provided in Table 3 for the words in the European Portuguese language were computed over 96 words corresponding to the male and female variation of each of the 48 British English words.

Table 2.

Psycholinguistic Characteristics of the Words Used in the British English and European Portuguese Versions of the Experimental Task, as Obtained from E-Lexicon Project (Balota et al., 2007) and P-PAL (Soares et al., 2018) Lexical Databases, Respectively

Language / Psycholinguistics measures	British English		European Portuguese		*p* values
	M	*SD*	*M*	*SD*	
Word frequency (per million words)	11.1	19.28	12.6	24.21	.73
Length (number of letters)	8.6	2.65	9.0	2.09	.31
Orthographic Neighbourhood (*N*)	1.4	2.09	1.2	1.20	.55

As can be seen, the selected words convey very similar characteristics in both languages. Indeed, the words used present a relatively low number of occurrences per million words in both languages (i.e., they are classified as low-frequent words in each of the languages, $p = .73$). Although Portuguese words were numerically longer than the English words (9.0 vs. 8.7), the difference is not statistically significant ($p = .31$). In regards to the *N* metric, the reverse was observed, although the difference was not statistically significant ($p = .55$). These results showed that the stimuli used in this work were controlled in key variables known to affect word processing (see Balota et al., 2007; Coltheart et al., 1978; Soares et al., 2014, 2015, 2017, 2018, 2019), thus critically excluding these factors as potential explanations of the gender effects in the spatial representations of power observed in previous studies (e.g., Schubert, 2005; Winter et al., 2020).

Additionally, by showing that the words used have similar characteristics across languages, they also allowed us to make direct comparisons of the results obtained in the British English and the European Portuguese language and to test to what extent the morphosyntactic characteristics of a language may shape the influence of gender in the conceptualisation of power.

For further control, eight lists of materials were created in each language to counterbalance the words across the position in which they appeared on the computer screen (up vs. down), the keys used to provide a response (<Q> for up and <M> for down or <P> for up and <Z> for down), and the order by which the female and the male blocks were presented (see details in the procedure section presented ahead). Note that since the professions in English did not include gender marks (e.g., "lawyer"), we followed the procedure used by Winter et al. (2020), adding "female" or "male" before each English profession (e.g., female lawyer/male lawyer) as presented ahead (see Figure 5).

The lists were created in the following way: In List 1A, participants were requested to use keys <Q> for up and <M> for down to provide their responses. Half of the words (n = 24) were presented against the feminine prompt (i.e., participants were requested to detect as fast and accurately as possible the feminine profession) and the other half against the masculine prompt (i.e., participants were requested to detect as fast and accurately as possible the male profession) in two different blocks. In each block, half (n = 12) of the professions displayed the female variation on top, and the male variation on the bottom of the computer screen (e.g., Female Lawyer/Male Lawyer and *Advogada/Advogado*), and the other half (n = 12) exhibited the male variation on top and the female variation on the bottom (Male Presenter/Female Presenter and *Apresentador/ Apresentadora*). In List 1B, the variations equalled the mentioned above. However, the set of keys used was <P>-<Z> instead of <Q>–<M>. In List 2A, the 24 words that in List 1A were displayed against the feminine prompt were associated with the masculine prompt, whilst those that were linked to the masculine prompt were associated with the feminine prompt. List 2B presented the same distribution, although using the keys <P>-<Z> (as in List 1B). The remaining lists (i.e., List 3A, List 3B, and List 4A, List 4B) resulted from counterbalancing the female words presented on top against a feminine prompt and the female words presented on top against a masculine prompt and vice-versa, and associated to the two sets of keys. These lists were randomly assigned to each participant. Nevertheless, a minimum equivalent number of participants per list was secured in each language (minimum of four participants per list).

Six other pairs of professions selected from the pilot study in each language were also used in the training phase that preceded the experimental task to familiarise participants with the task. The results obtained in the training phase were not included in the final data analyses.

2.3 - Procedure

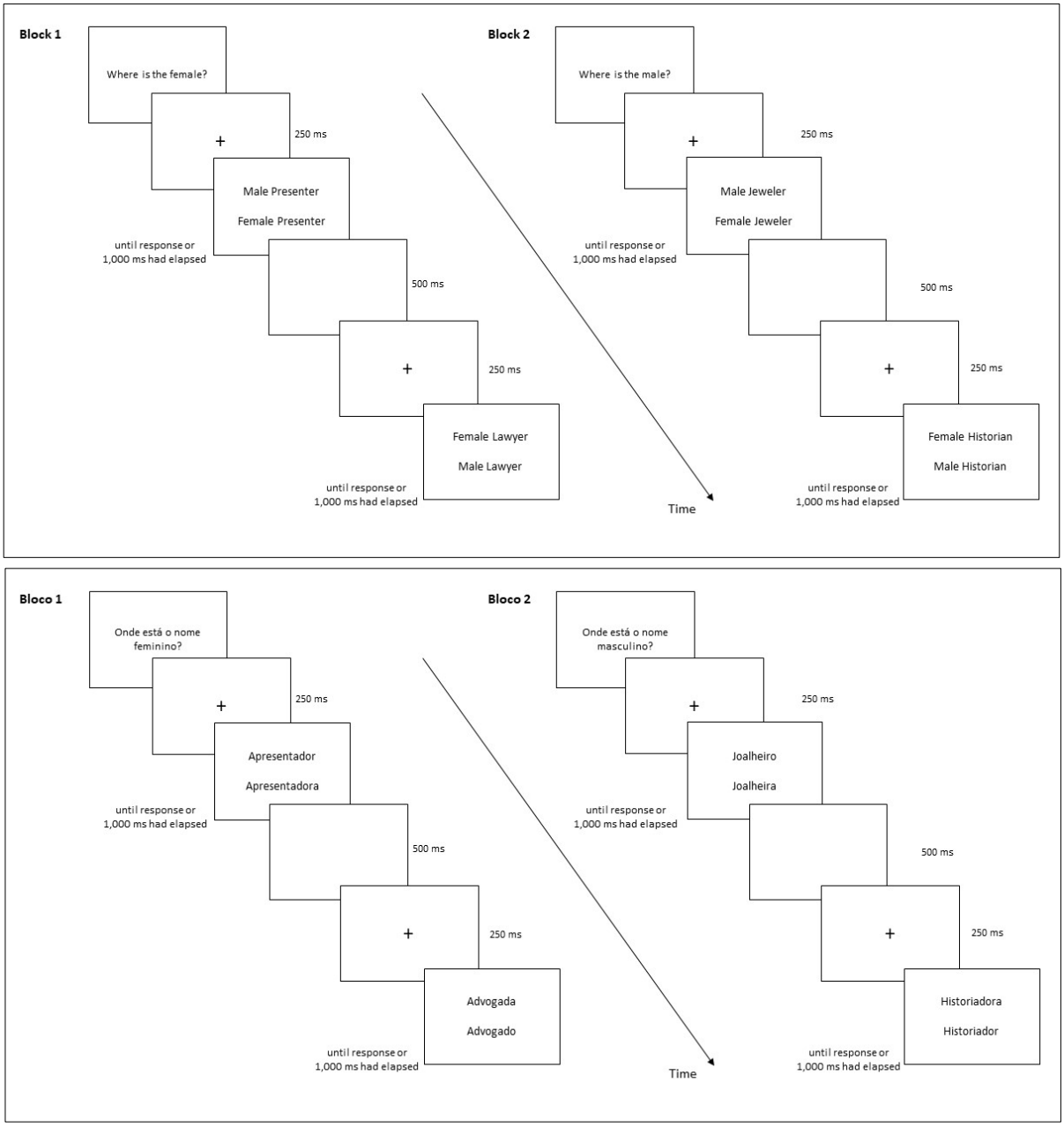
Data were collected online through the distribution of a link to each participant via e-mail. The British English and European Portuguese versions of the experimental task were programmed in the SuperLab™ 6.0 software (remote version), which allowed to control for stimuli presentation and to record participants' responses (latency and accuracy data). In the task, participants were asked to decide as quickly and accurately as possible if the female or the male noun (according to the block) vertically displayed at the centre of the computer screen appeared "up" or "down" by pressing two different keyboard buttons (<Q> for up and <M> for down or <P> for up and <Z> for down according to the list). Participants were also instructed to pay attention to the stimuli because each pair would appear very briefly on the screen. To assure participants were familiarised with the task's requirements, a training phase was presented before the experimental phase began.

Each version of the task (8 per language) comprised 48 trials presented in two blocks of 24 trials each (associated with the female or male prompt). Each trial consisted of a sequence of two events: a fixation cross at the centre of the computer screen for 250 ms; and the pair of stimuli presented in 10-point Arial font and separated vertically by five blank spaces as in Schubert's (2005) experiments until a response or 1,000 ms had elapsed. An inter-stimulus interval (ISI) lasting 500 ms was presented after the subsequent trial began. Figure 5 illustrates examples of two trials in each block in the British English version of the task (top panel) in the European Portuguese versions of the task (bottom panel),

Trials were randomly presented to the participants. When the task was completed, a file was automatically generated and saved on the participant's computer. Participants were asked to send the file to the e-mail address of the research team. Each file was coded with a number attributed to each participant.

Figure 5.

Example of Two Experimental Trials in the "Female" and "Male" Blocks of the British English Version of the Task (Top Panel) and of the European Portuguese Version of the Task (Bottom Panel)



2.4 - Results and Discussion

Reaction times (RTs in milliseconds) and the proportion of errors committed by participants were analysed with linear mixed effects (lme) models in the R software (Bates et al., 2011). There was no averaging of the data before the analyses. In addition, three trials were

excluded in both languages (i.e., upholster [*estofador/estofadora]*, joiner [*marceneiro/marceneira*], seller [*vendedor/vendedora*]) due to the technical error reported in Chapter 1.

To proceed comprehensively, we firstly present and discuss the results obtained in the British English version of the experimental task, followed by the results collected in European Portuguese version of the experimental task. Finally, we present and discuss the results attained when comparing the results in both languages. Thus, the lme analyses reported were conducted with Gender (male | female) and Position (up | down) as within-subject factors, as all participants responded to male and female professions presented up and down for each language separately. In contrast, the lme analyses conducted comparing the results in both languages directly included Language (British English | European Portuguese) as an additional between-subject factor, once participants responded only to the task presented in their native language.

The three sets of lme analyses on the latency data were conducted with participants and items as crossed random intercept and with random slope per subject but not per item (see Barr et al., 2013, and Matuschek et al., 2017). The lme analyses on accuracy data conducted firstly for each language separately and then comparing the results of both languages directly were conducted with logistic function and binomial variance. The lme4 R library (Bates et al, 2011) and the lmerTest R library were used to contrast simple effects with differences of least squares. For the effects that reached statistical significance ($\alpha = .05$), the second degree of freedom of the F statistic was always approximated with Satterthwaite's method. The p values were adjusted with Hochberg's method for all the post-hoc comparisons equal to or below .05 (see Soares et al., 2020, 2021 for similar procedures).

2.4.1 - British English

Table 3 presents the descriptive statistics (means and standard deviations) of the RTs and the proportion of errors committed by the British English participants in the English version of the experimental task in each of the four experimental conditions.

Table 3.

Descriptive Statistics: Mean and Standard Deviation (in Brackets) of the RTs (mms) and Proportion of Errors in the British English Versions of the Task for Male and Female Nouns in the Up and Down Positions

Gender / Position	Male		Female	
	RTs	Errors	RTs	Errors
Up	565 (119.2)	.05 (.22)	538 (116.5)	.05 (.21)
Down	573 (112.9)	.00 (.00)	560 (110.9)	.00 (.00)

The lme analyses on RTs were conducted after response times for incorrect responses were removed from the dataset (2.4% of responses). The results revealed a position main effect, $F(1, 30.560) = 6.0432$, $p = .02$, indicating that British English participants were ~15 ms faster detecting the male and the female variations of the professions when they were presented up than when they were presented down on the computer screen (551.6 ms vs. 566.4 ms, respectively). No other main or interaction effect reached statistical significance.

The results of the lme analysis on the error data also failed to show any significant effect, which can be explained by the fact that participants were highly precise in their responses to the task (the proportion of errors was residual in the up position and inexistent in the down position, see Table 3).

Overall, the results obtained with British English participants using a more implicit task and including a highly controlled set of stimuli failed to support any gender bias on spatial representations of power, as reported by previous studies conducted with English participants (e.g., Winter et al., 2020). In fact, these results only revealed that British English participants were globally faster at recognising the target names up than down regardless of the gender variation of the presented professions. This result can the accounted for if we assumed that words presented up can be more easily processed than words presented down due possibly to the spatial orientation of reading in both languages than involves processing words from left to

right and from top to bottom (see Perea, Comesaña, & Soares, 2012; and Perea, Comesaña, Soares, & Moret-Tatay, 2012 for works showing an upper advantage in the visual word recognition and Soares et al., 2019, 2021 for recent works on the right-asymmetry bias on the visual word recognition of words containing reversal and non-reversal letters).

The absence of gender effects on the spatial representations of power in our data suggests that when the stimuli used were controlled for in several psycholinguist characteristics known to affect processing, including the number of males and females perceived as performing these professions, in a more implicit task than used before, the effect vanishes. However, the obtained results do not allow for the identification of which factor may have influenced the previously proven gender effects on conceptual metaphors of power (i.e., the implicit nature of the task, the controlled set of stimuli, the usage of neutral professions, or some possible combination of such factors). Hence, future studies should focus on answering such questions in order to draw a clear connection between the influence of gender and the representations of power.

2.4.2 - European Portuguese

Table 4 presents the descriptive statistics (means and standard deviations) of the RTs and proportion of errors committed by the European Portuguese participants in the Portuguese version of the experimental task in each of the four experimental conditions.

Table 4.

Descriptive Statistics: Mean and Standard Deviation (in Brackets) of the RTs (mms) and Proportion of Errors in the European Portuguese Version of the Task for Male and Female Nouns at the Up and Down Positions

Gender / Position	Male		Female	
	RTs	Error	RT	Errors
Up	610 (104.2)	.05 (.21)	609 (122.5)	.04 (.20)
Down	648 (120.4)	.00 (.00)	625 (122.3)	.00 (.00)

Before conducting the lme analyses on RTs, incorrect responses were removed from the dataset (2.27% of the responses) as with the British English data. The results showed a position main effect, $F(1, 46.718) = 22.4497$, $p < .001$, indicating that Portuguese participants were ~27 ms faster finding the male and the female variations of the professions when they were presented up than down (609.5 ms vs 636.5 ms, respectively) as in the case of the British English participants. However, the two-fold gender * position effect reached statistical significance, $F(1, 80.970) = 5.1518$, $p = .026$. The pos-hoc tests for planned comparisons revealed that Portuguese participants were ~23 ms faster finding the female than the male variation of the professions when they were presented down (p = .009). In the up position, gender differences failed to reach statistical significance.

The results of the lme analysis conducted on the error data failed to show any main or interaction effects, as in the case of the previous experiment, due probably to the fact that Portuguese participants, as English participants, were highly precise in their responses to the task (the proportion of errors is residual in the up position and inexistent in the down position, see Table 4).

To the best of our knowledge, these results are the first reporting a gender bias in the representation of power with European Portuguese native speakers. Nevertheless, it is worth noting that against what was observed by Winter et al. (2020), our data revealed that the asymmetry of the gender in the spatial representation of power was observed in the down rather than in the up position, as European Portuguese participants were faster at identifying a female variation of a profession when associated with the position of less power (i.e., down) and not faster at identifying a male profession when associated with the position of more power (i.e., up).

Although a direct comparison between our experimental task and the experimental task described in Winter et al. (2020) is not entirely recommended due to the differences regarding the nature of the task and the stimuli used, a comparison between the results obtained here from the task performed by the British English and the European Portuguese native speakers points towards important differences. The strict control imposed to the stimuli (similar across language) and the usage of the same task's design led us to hypothesise that the observed differences are possibly due to the morphological differences between the languages. These differences will be dissected throughout the following section, however the constant division of female and male grammatical gender present in Portuguese can arguably cause speakers to be intrinsically more

sensitive to gender distinctions. The following section will reference the results obtained when both languages were analysed in the same model.

2.4.3 – British English and European Portuguese

The results of the lme analyses conducted on the RT data, including Language as an additional between-subject factor to allow a direct comparison of the results obtained by the British English and the European Portuguese participants, revealed a language main effect, $F(1, 78.92) = 16.4839$, $p < .001$, showing that English British participants were globally ~64 ms faster than European Portuguese participants responding to the task regardless of the experimental conditions (559.2 vs 623.1 ms).

Even though this language effect was not expected once the English and the Portuguese words used were controlled for in several psycholinguistic variables known to affect word processing as previously addressed, it is necessary to highlight that due to the morphological differences between the languages, European Portuguese participants needed to reach the end of the presented words to identify the female/male variation of the profession (through the gender particle accessible at the end of each word, e.g., *medico/ médica*). On the contrary, British English participants only had to read the first part of the word to make a response once the gender information was available at the beginning through the presentation of either female/male before the profession (e.g., male doctor/ female doctor). This difference can justify the differences in response times between English and Portuguese participants.

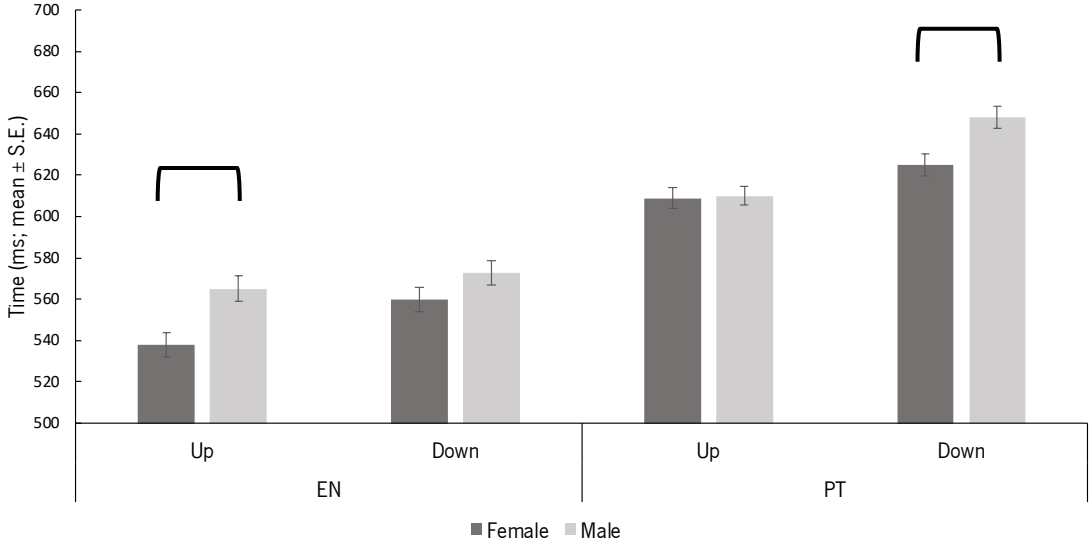
Furthermore, although a gender main effect was not observed in the analysis conducted separately in each of the languages, a gender main effect, $F(1, 81.39) = 6.6663$, $p = .011$ was observed when both data were integrated into the same mixed model due probably to increased statistical power. This effect showed that regardless of the language and of the position, participants were ~15 ms faster at detecting the female variation rather than the male variation of the professions (589.6 vs 604.8 ms). Moreover, results have also revealed a position main effect, $F(1, 81.10) = 21.5058$, $p < .001$, indicating that participants from both languages were ~22 ms faster at detecting both the male and the female variations of the professions when they were presented up rather than when they appeared down (586.3 vs 607.8). This effect seems to highlight what has been formerly observed in both languages separately, illustrating the participants' tendency to process more easily the stimuli presented up than down due possibly to

the spatial orientation of reading in both languages (see Perea, Comesaña, & Soares, 2012; Perea, Comesaña, Soares, & Moret-Tatay, 2012; Soares et al., 2019, 2021).

Notably, the three-fold language * gender * position effect reached statistical significance, $F(1, 2956.75) = 10.7414$, $p = .001$. Figure 6 depicts the results obtained from participants in both languages and in each experimental condition to facilitate the understanding of the effect.

Figure 6.

Reaction Times in English and Portuguese Versions of the Task for the Male and Female Variations of the Professions Presented in the Up and Down Positions (Statistical Significance in Each Language Emphasised by Brackets)



As can be observed in Figure 6, the three-fold interaction effect revealed that although British English participants were globally faster at detecting female nouns regardless of the position they appeared on the computer screen, the differences between male and female nouns have only reached statistical significance in the up position. In here, participants were ~27 ms faster at detecting female rather than male nouns ($p = .010$) appearing up on the screen. On the down position these differences were not significant. Conversely, in European Portuguese, gender differences were rather observed in the down position, as participants were ~23 ms faster at detecting the female rather than the male variation of the professions ($p = .010$) when presented down. On the up position, the differences did not reach statistical significance.

In addition, the interaction effect also revealed that, although the difference across positions for female nouns was significant both for British English ($p = .002$) and European

Portuguese participants ($p = .035$), showing in both cases that participants from both languages were faster at detecting female nouns up than down, for the male nouns the difference only reached statistical significance for European Portuguese participants ($p < .001$). These results point towards differences in the way British English and European Portuguese participants appear to process gender in relation to a spatial representation of power. Indeed, when using a more implicit task with a set of highly controlled and neutral stimuli, British English participants were quicker at identifying a female rather than a male variation of the professions in the up position, which is inconsistent with previous studies showing the reverse. Specifically, in the study conducted by Winter et al. (2020) with English participants, the authors also reported an interaction between the hierarchy condition (powerful/powerless) and the gender of the nouns (professions) used (female/male), showing faster response times when the powerful was associated with the male gender presented up. In contrast, in the down position participants showed faster response times when the powerless was associated with the female gender presented down.

Thus, the fact that in our experimental study we have resorted to a more implicit task in which the reference to power issues is not explicitly activated, and used a highly controlled set of stimuli in terms of psycholinguistic variables of frequency, extension and neighbourhood, as well as in their social gender representations of females and males in these professions, may be at the basis of these differences in results. Hence, it is possible to conjure that the previously observed gender effects on spatial metaphors of power in British English participants arise when power asymmetries that can also convey gender stereotypes in professions are explicitly present. However, this is not the case in the Portuguese language since the results obtained from using precisely the same task with equivalent materials portrayed a significant interaction between gender and a spatial position, with participants being faster at identifying female than male professions on a down position. This result, together with the fact that European Portuguese participants have also revealed slower reaction times to male professions presented down than up, is in accordance with the metaphor congruent position suggesting an additional cost for European Portuguese participants to associate a masculine noun with a down position or a position of less power.

Furthermore, it is also possible to argue that the differences observed between the Portuguese and English results can be accounted for, taking into consideration the morphological differences between the two languages. By not having a clear grammatical gender distinction

frequently present, it can be argued that the British English language allows speakers not to focus on this characteristic. In contrast, by being implicitly exposed to grammatical gender, European Portuguese speakers are perhaps more likely to create and act according to this gender distinction. In fact, what our experimental study has revealed is that in earlier processing stages, and even without the previously demarked power asymmetries (like in Schubert, 2005 and Winter et al., 2020), Portuguese participants significantly distinguish between female and male gender in a position of less power (down position).

Finally, and connecting the results of our study with the theoretical framework in which this dissertation is supported, Schubert (2005) uncovered that the usage of a spatial dimension to detail power reveals, more than a matter of speaking, a matter of thinking. By using expressions conveying a vertical scale to discuss power, people attribute a connotation of powerful to a higher position and powerless to a lower position. Furthermore, this conceptualisation of power appears to be influenced when the concept of gender is added, creating disparate results which reflect an interaction between a spatial position and one specific gender (Winter et al., 2020). In our experimental study, we have attested for this association only in Portuguese, and when the down position was analysed.

Hence, and given the nature of our task, it is possible that even with a more implicit task and a neutral set of stimuli, the gender bias is present, although it is still not possible to strictly delimitate the extent to which the concept of power and the concept of gender influence one another.

Conclusion

In this dissertation, we aimed to extend the previously conducted research on conceptual metaphors, particularly on the influence of gender in spatial representations of power. As defined by Lakoff and Johnson in *Metaphors we live by* (1980), Conceptual Metaphors are ways of conveying one concept through another. Based on this view, which allowed metaphors to be considered as elements of the spoken language, researchers began to focus on how figurative speech, namely metaphors, could influence the way speakers thought about a concept.

According to the ramifications of the Conceptual Metaphor Theory, figurative language such as metaphorical language, metonymy and synesthesia are fairly common in everyday speech, with the lines between each phenomenon becoming increasingly less distinct. In regards to the concept of power, it is common to use a spatial representation to convey power, in which more power is normally connected to a superior position, and less power corresponds to an inferior position (see Lakoff & Johnson, 1989).

Although several studies have been developed adopting different approaches, we have opted for a more experimental approach that allowed for the examination of participants' processing, as used in recent studies namely in Schubert (2005) and Winter et al. (2020). Both studies set out to test this association between power and spatial orientation, by displaying pairs of words, powerful/powerless, vertically on a screen for participants to find either the powerful or the powerless. In Winter et al. (2020), besides its power dimension, the pairs included a gender variation with the words female/male appearing prior to each profession. Results revealed that there was a clear association between a powerful group and the top position and a powerless group and the down position (Schubert, 2005), and that participants were quicker to identify the powerful position being male on the top position and the female variation on the down and powerless position (Winter et al., 2020).

Concentrating on both studies, we designed our experimental study focusing on three fundamental differences. Firstly, our study conveyed a more implicit paradigm, with participants not being explicitly asked to judge each pair according to a powerful/powerless dimension. Instead, our task consisted of asking participants to find either the female or the male variation from the pairs displayed vertically on the screen. Secondly, we used a more controlled set of stimuli in which the same neutral professions (i.e., professions that were not more easily

associated with one of the genders) and controlled in accordance to their psycholinguistic characteristics were paired, varying solely in gender. Thirdly, our experimental study was the first, to our knowledge, to include the same experiment in a second language (European Portuguese) in order to compare the results obtained in British English.

The results obtained with the British English participants failed to convey a gender effect on the spatial representation of power, as it had been formerly reported in this language. In fact, the only effect reaching statistical significance when the English data were analysed separately from the Portuguese data was a position main effect. This effect shows that participants were quicker to respond when the correct response was presented up than down, regardless of the gender. As aforementioned, this result can be accounted for if we assume that words presented up were more easily processed than words presented down due possibly to the spatial orientation of reading in the English (as well as in the European Portuguese) language (see Perea, Comesaña, & Soares, 2012; Perea, Comesaña, Soares, & Moret-Tatay, 2012; Soares et al., 2019, 2021).

The absence of a gender effect in the English data did not support Winter et al. (2020) results. These disparities can arise from differences in the task used since in our work participants were not explicitly requested to judge which profession had more/less power as in Winter et al. (2020) and Schubert (2005) studies. Furthermore, the absence of gender effects on the spatial representations of power in the English data of our study also suggest that when the stimuli used were controlled for in several psycholinguist variables known to affect processing, including the number males and females perceived as performing these professions, the effect vanished because it is possibly driven by any of these factors. Thus, it is possible to conjecture that in the English language the effect can be found only when participants were explicitly confronted with power asymmetries that additionally conveyed gender professional asymmetries.

Moreover, and concerning the results in Portuguese, these lead to a different scenario as a significant gender * position effect was observed. Hence, results showed that European Portuguese participants were faster finding the female than the male variation of a profession when presented down or, in other words, in a position previously proven to be associated with powerlessness (see Schubert, 2005). Although it is not clear why in Portuguese the gender bias effect was only registered in a down position and not replicated in the up position too, one plausible explanation seems to be connected to the task's design. As it has been stated, at the

top position, reaction times were always shorter (possibly because participants read the top word first and acted accordingly). Hence, with reaction times being so short, it is plausible to affirm that any differences that may have occurred could not reach statistical significance.

However, the joint analysis of the data that allows for a direct comparison of the results shows that the triple interaction emerged as statistically significant, revealing gender effects in the spatial representation of power in both languages, but in opposite directions. Indeed, although in Portuguese these differences were revealed, as we have established, in the down position with participants being faster to identify female names than male names in this position, in English the results showed that gender differences were observed in the up position, but where, interestingly, participants were quicker with female than male names. Although the results obtained in Portuguese can be explained by the fact that processing is easier in the up position than down due to some language bias, as mentioned before, the fact that this same result was observed in the up position in English makes this explanation less plausible.

Therefore, another possible explanation for the collected results in English is concerned with the participants' gender. In fact, although in Portuguese we managed to balance the sample in terms of gender (conducting the task with 24 female participants and 24 male participants), for the English version of the task, this was not possible (in English the sample was made of 26 female participants and 7 male participants). Hence, we conducted a further analysis in which the participants' gender was added as a variable to examine if such characteristic could in any way influence, and perhaps explain, the collected results in English. In fact, what we have found is that an effect of the gender of the participants was observed since there was a triple sex*language*gender interaction ($F(1, 73.67) = 4.0384$, $p = .048$). This interaction shows that, in the English language, while male participants were equally faster to respond to female and male variations, female participants were faster to respond to the female variation than the male variation of a profession ($p = .014$). Hence, this may explain the main results collected in English, given the asymmetry of gender distribution in the sample.

Furthermore, the difference between the two languages are also pertinent when analysing the collected results. Indeed, whereas the gender in Portuguese was implicitly represented at the end of the profession, in English the gender factor stood out because it was planted before the profession. When designing the study, we explored several options to erase these differences, namely the possibility of placing the gender (female/male) after the profession

and in parentheses on the English versions of the task. However, we believed that this would draw even more attention to the female/male word, causing participants to ignore the profession completely. Hence, we decided to keep the gender before the word, as it would be placed in correct spoken and written English. However, by doing so, we were not able to erase the differences between the gender portrayal in English and in Portuguese, partly because these differences exist between these languages.

However, it is also plausible to argue that the differences in results exist because the language characteristics of English and Portuguese shape implicit differences when speakers of both languages think about gender. Whilst grammatical gender is a constant demarcation in Portuguese, characterising subjects through variations in verbs, nouns and even in particles such as pronouns and determiners, this is not the case in English, a language in which the gender characteristics can be omitted almost completely. Hence, it is conceivable to affirm that these demarcations do cause native speakers of European Portuguese to identify these distinctions more thoroughly, whereas, for native speakers of British English, such distinctions are more diluted. This distinction is fundamental since it brings awareness to the automatic cognitive processes that happen even with implicit representations of power.

Moreover, the automatic association of the female gender with a position of less power in Portuguese can be seen as a consequence of a society in which physical strength is still held as a synonym of power and where male dominance and patriarchy effects are still very present, hence justifying the intrinsic reactions our study has conveyed. However, and although these assumptions are valid and raise interesting questions, it is also imperative to note that further investigation is still required.

Furthermore, we also recognise that the usage of neutral professions in which men and women may share the same status and power may have radically altered the tasks' purpose, causing results to capture the phenomenon of gender processing, but not its interaction with power asymmetry. Hence, in our opinion, one significant aspect for future research is to delimit the influence of gender in representations of power clearly. As we explored at the beginning of this dissertation, it is now possible to encapsulate figurative speech without delimitating the influence that cognitive processes have on one another. Thus, this fluidity contributes to the unclear role concepts can have on each other. However, it is our belief that a clear understanding

of how the concept of gender influences the way participants think of power would be pertinent, especially in implicit tasks.

To conclude, by determining the occurrence and the extent to which this gender bias is automatically present, we, as individuals and we as a society, can grow more aware and accept that a gender bias is automatically present when thinking of power, even if implicitly. This notion can lead our thoughts, and ultimately our actions, to be more carefully observed, so we ensure that what is right is what prevails, regardless of our implicit and automatic reactions.

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Appendixes

Appendix 1. Complete list of words used in the pilot study's British English and European Portuguese versions

Coded	British English	European Portuguese
1	Acolyte	Acólita / Acólito
2	Actor	Atriz / Ator
3	Administrator	Administradora / Administrador
4	Anthropologist	Antropólogo / Antropóloga
5	Archaeologist	Arqueóloga / Arqueólogo
6	Architect	Arquiteto / Arquiteta
7	Astronomer	Astrónomo / Astrónoma
8	Auditor	Auditor / Auditora
9	Author	Autora / Autor
10	Baker	Padeira / Padeiro
11	Barber	Barbeiro / Barbeira
12	Beautician	Maquilhadora / Maquilhador
13	Biologist	Biólogo / Bióloga
14	Botanist	Botânico / Botânica
15	Bricklayer	Pedreiro / Pedreira
16	Broadcaster	Locutor / Locutora
17	Broker	Corretor / Corretora
18	Butcher	Açougueira / Açougueiro
19	Captain	Capitão / Capitã
20	Carpenter	Carpinteira / Carpinteiro
21	Cashier	Caixeira / Caixeiro
22	Chambermaid	Camareira / Camareiro
23	Chemist	Químico / Química
24	Choreographer	Coreógrafa / Coreógrafo
25	Coach	Treinador / Treinadora
26	Collector	Cobrador / Cobradora
27	Commissioner	Comissário / Comissária
28	Composer	Compositora / Compositor
29	Concierge	Porteiro / Porteira
30	Confectioner	Confeiteiro / Confeiteira
31	Consultant	Consultor / Consultora
32	Cook	Cozinheiro / Cozinheira
33	Curator	Curadora / Curador
34	Dancer	Bailarina / Bailarino
35	Dean	Reitora / Reitor
36	Decorator	Decorador / Decoradora
37	Director	Diretor / Diretora
38	Dispatcher	Expedidora / Expedidor
39	Diver	Mergulhadora / Mergulhador

40	Doctor	Médico / Médica
41	Driver	Condutora / Condutor
42	Educator	Educador / Educadora
43	Embalmer	Embalsamador / Embalsamadora
44	Embroiderer	Bordador / Bordadora
45	Encoder	Codificador / Codificadora
46	Engineer	Engenheiro / Engenheira
47	Examiner	Examinadora / Examinador
48	Farmer	Agricultora / Agricultor
49	Filmmaker	Realizadora / Realizador
50	Florist	Floricultora / Floricultor
51	Gardener	Jardineiro / Jardineira
52	Geographer	Geógrafa / Geógrafo
53	Glazier	Vidraceiro / Vidraceira
54	Greengrocer	Verdureira / Verdureiro
55	Hairdresser	Cabeleireira / Cabeleireiro
56	Hatter	Chapeleira / Chapeleiro
57	Historian	Historiadora / Historiador
58	Hunter	Caçador / Caçadora
59	Inspector	Inspetor / Inspetora
60	Instructor	Instrutor / Instrutora
61	Interviewer	Entrevistador / Entrevistadora
62	Investor	Investidora / Investidor
63	Jeweller	Joalheira / Joalheiro
64	Joiner	Marceneiro / Marceneira
65	Judge	Juíza / Juíz
66	Lawyer	Advogada / Advogado
67	Librarian	Bibliotecária / Bibliotecário
68	Locksmith	Serralheiro / Serralheira
69	Magistrate	Magistrada / Magistrado
70	Mechanic	Mecânica / Mecânico
71	Miner	Mineira / Mineiro
72	Minister	Ministro / Ministra
73	Notary	Notária / Notário
74	Nurse	Enfermeiro / Enfermeira
75	Obstetrician	Parteiro / Parteira
76	Oceanographer	Oceonógrafo / Oceonógrafa
77	Oenologist	Enólogo / Enóloga
78	Packer	Embalador / Embaladora
79	Painter	Pintora / Pintor
80	Paramedic	Paramédica / Paramédico
81	Patissier	Pasteleira / Pasteleiro
82	Paver	Calceteira / Calceteiro
83	Pharmacist	Farmacêutico / Farmacêutica
84	Philologist	Filólogo / Filóloga
85	Philosopher	Filósofa / Filósofo

86	Photographer	Fotógrafo / Fotógrafa
87	Plasterer	Estucador / Estucadora
88	Player	Jogador / Jogadora
89	Playwright	Dramaturga / Dramaturgo
90	Plumber	Canalizadora / Canalizador
91	Poet	Poetisa / Poeta
92	Polisher	Polidora / Polidor
93	Potter	Oleiro / Oleira
94	Presenter	Apresentador / Apresentadora
95	Producer	Produtora / Produtor
96	Professor	Professor / Professora
97	Programmer	Programador / Programadora
98	Psychologist	Psicóloga / Psicólogo
99	Referee	Árbitro / Árbitra
100	Researcher	Investigadora / Investigador
101	Sailor	Marinheiro / Marinheira
102	Sculptor	Escultora / Escultor
103	Secretary	Secretário / Secretária
104	Seller	Vendedora / Vendedor
105	Sericulturist	Sericicultor / Sericicultora
106	Singer	Cantora / Cantor
107	Sociologist	Socióloga / Sociólogo
108	Stenographer	Estenógrafa / Estenógrafo
109	Supervisor	Supervisor / Supervisora
110	Surgeon	Cirurgiã / Cirurgião
111	Swimmer	Nadadora / Nadador
112	Tiler	Ladrilhador / Ladrilhadora
113	Topographer	Topógrafo / Topógrafa
114	Trainer	Formador / Formadora
115	Translator	Tradutora / Tradutor
116	Tutor	Tutora / Tutor
117	Typist	Dactilógrafo / Dactilógrafa
118	Upholsterer	Estofador / Estofadora
119	Veterinarian	Veterinária / Veterinário
120	Warden	Guardiã / Guardião
121	Writer	Escritora / Escritor
122	Zoologist	Zoólogo / Zoóloga

Appendix 2. Professions coded 1 to 122 displaying the mean percentage of the responses obtained for each option (unknown profession, male profession, female profession, and both) in British English and in European Portuguese

	British English				European Portuguese			
Coded	%UNK	%M	%F	%Both	%UNK	%M	%F	%Both
1	33.3	7.1	7.1	85.7	17.7	28.6	1.8	69.6
2	0.0	21.4	7.1	71.4	0.0	0.0	0.0	100.0
3	0.0	31.0	4.8	64.3	0.0	14.7	1.5	83.8
4	14,.3	8.3	13.9	77.8	11.8	11.7	5.0	83.3
5	0.0	19.1	9.5	71.4	1.5	7.5	0.0	92.5
6	4.8	37.5	7.5	55.0	0.0	14.7	0.0	85.3
7	4.8	25.0	2.5	72.5	0.0	29.4	1.5	69.1
8	2.4	24.4	12.2	63.4	14.7	22.4	0.0	77.6
9	2.4	7.3	14.6	78.1	0.0	1.5	0.0	98.5
10	0.0	40.5	14.3	45.2	0.0	36.8	0.0	63.2
11	0.0	61.9	2.4	35.7	0.0	66.2	0.0	33.8
12	0.0	4.8	76.2	19.1	0.0	0.0	55.9	44.1
13	2.4	31.7	7.3	61.0	1.5	3.0	3.0	94.0
14	0.0	4.8	50.0	45.2	5.9	6.3	23.4	70.3
15	2.4	80.5	0.0	19.5	2.9	72.7	0.0	27.3
16	0.0	11.9	7.1	81.0	2.9	10.6	6.1	83.3
17	4.8	45.0	0.0	55.0	8.7	14.3	0.0	85.7
18	0.0	69.1	2.4	28.6	47.1	44.4	0.0	55.6
19	4.8	67.5	2.5	30.0	1.5	38.8	0.0	61.2
20	4.8	67.5	0.0	32.5	0.0	69.1	0.0	30.9
21	0.0	4.8	50.0	45.2	19.1	5.5	14.6	80.0
22	14.3	16.7	38.9	44.4	22.1	3.8	30.2	66.0
23	4.8	20.0	12.5	67.5	0.0	16.2	2.9	80.9
24	0.0	14.3	26.2	59.5	0.0	2.9	20.6	76.5
25	0.0	38.1	2.4	59.5	0.0	26.5	8.8	64.7
26	0.0	19.1	11.9	69.1	14.7	39.7	1.7	58.6
27	9.5	26.3	13.2	60.5	5.9	10.9	15.6	73.4
28	0.0	23.8	16.7	59.5	0.0	11.8	0.0	88.2
29	14.3	27.8	16.7	55.6	0.0	39.7	2.9	57.4
30	9.5	2.6	39.5	57.9	5.9	9.4	26.6	64.1
31	0.0	23.8	4.8	71.4	4.4	6.2	4.6	89.2
32	0.0	7.1	31.0	61.9	0.0	8.8	7.4	83.8
33	4.8	2.5	52.5	45.0	22.1	15.1	5.7	79.3
34	2.4	9.8	48.8	41.5	0.0	0.0	33.8	66.2
35	2.4	36.6	22.0	41.5	0.0	32.4	0.0	67.7

36	0.0	14.3	50.0	35.7	0.0	11.8	35.3	52.9
37	2.4	39.0	4.9	56.1	0.0	13.2	0.0	86.8
38	14.3	30.6	13.9	55.6	26.5	22.0	2.0	76.0
39	4.8	35.0	2.5	62.5	0.0	23.5	0.0	76.5
40	4.8	52.5	0.0	47.5	0.0	1.5	1.5	97.1
41	0.0	28.6	7.1	64.3	0.0	26.5	0.0	73.5
42	0.0	4.8	59.5	35.7	0.0	0.0	38.2	61.8
43	11.9	51.4	0.0	48.7	11.8	23.3	10.0	66.7
44	0.0	0.0	59.5	40.5	10.3	3.3	67.2	29.5
45	4.8	35.0	5.0	60.0	29.4	33.3	6.3	60.4
46	2.4	22.0	14.6	63.4	0.0	27.9	0.0	72.1
47	4.8	12.5	5.0	82.5	4.4	15.4	3.1	81.5
48	0.0	59.5	2.4	38.1	0.0	41.2	0.0	58.8
49	2.4	26.8	7.3	65.9	0.0	35.3	0.0	64.7
50	0.0	4.8	59.5	35.7	8.8	3.2	35.5	61.3
51	0.0	59.5	0.0	40.5	0.0	54.4	0.0	45.6
52	2.4	7.3	26.8	65.9	2.9	10.6	1.5	87.9
53	19.1	23.5	14.7	61.8	10.3	57.4	0.0	42.6
54	7.1	5.1	51.3	43.6	67.7	4.6	13.6	81.8
55	0.0	2.4	69.1	28.6	0.0	8.8	36.8	54.4
56	14.3	69.4	0.0	30.6	13.2	50.9	1.7	47.5
57	0.0	16.7	11.9	71.4	2.9	22.7	1.5	75.8
58	2.4	63.4	0.0	36.6	1.5	61.2	0.0	38.8
59	0.0	40.5	2.4	57.1	0.0	22.1	0.0	77.9
60	7.1	30.8	10.3	59.0	0.0	10.3	1.5	88.2
61	0.0	7.1	23.8	69.1	0.0	2.9	4.4	92.7
62	0.0	26.2	19.1	54.8	2.9	24.2	3.0	72.7
63	4.8	12.5	27.5	60.0	2.9	24.2	3.0	72.7
64	14.3	22.2	11.1	66.7	14.7	51.7	0.0	48.3
65	7.1	18.0	2.6	79.5	0.0	20.6	0.0	79.4
66	2.4	24.4	2.4	73.2	0.0	4.4	4.4	91.2
67	0.0	0.0	69.1	31.0	0.0	0.0	38.2	61.8
68	2.4	51.2	2.4	46.3	0.0	70.6	1.5	27.9
69	4.8	17.5	2.5	80.0	8.8	22.6	1.6	75.8
70	0.0	64.3	2.4	33.3	0.0	72.1	0.0	27.9
71	0.0	76.2	2.4	21.4	0.0	76.5	0.0	23.5
72	2.4	36.6	4.9	58.5	0.0	14.7	0.0	85.3
73	9.5	15.8	13.2	71.1	16.2	15.8	3.5	80.7
74	4.8	2.5	50.0	47.5	0.0	7.4	19.1	73.5
75	4.8	2.5	60.0	37.5	1.5	16.4	38.8	44.8
76	33.3	10.7	0.0	89.3	25.0	9.8	2.0	88.2

77	19.1	47.1	2.9	50.0	26.5	38.0	2.0	60.0
78	19.1	8.8	14.7	76.5	2.9	15.2	6.1	78.8
79	0.0	40.5	9.5	50.0	0.0	29.4	0.0	70.6
80	0.0	7.1	45.2	47.6	0.0	33.8	1.5	64.7
81	0.0	7.1	35.7	57.1	0.0	19.1	7.4	73.5
82	4.8	82.5	0.0	17.5	0.0	75.0	0.0	25.0
83	0.0	4.8	45.2	50.0	0.0	13.2	7.4	79.4
84	23.8	9.4	18.8	71.9	35.3	15.9	4.6	79.6
85	0.0	47.6	7.1	45.2	0.0	32.4	0.0	67.7
86	0.0	14.3	16.7	69.1	0.0	13.2	2.9	83.8
87	0.0	73.8	0.0	26.2	23.5	53.9	3.9	42.3
88	2.4	31.7	2.4	65.9	1.5	20.9	6.0	73.1
89	2.4	29.3	12.2	58.5	2.9	12.1	1.5	86.4
90	2.4	53.7	2.4	43.9	0.0	73.5	0.0	26.5
91	2.4	19.5	12.2	68.3	0.0	11.8	0.0	88.2
92	4.8	55.0	2.5	42.5	7.4	58.7	0.0	41.3
93	2.4	61.0	0.0	39.0	11.8	46.7	3.3	50.0
94	2.4	19.5	14.6	65.9	0.0	0.0	2.9	97.1
95	0.0	26.2	9.5	64.3	2.9	24.2	0.0	75.8
96	2.4	4.9	39.0	56.1	0.0	1.5	8.8	89.7
97	0.0	57.1	0.0	42.9	1.5	47.8	0.0	52.2
98	2.4	2.4	51.2	46.3	0.0	0.0	25.0	75.0
99	4.8	52.5	0.0	47.5	0.0	54.4	0.0	45.6
100	0.0	11.9	7.1	81.0	0.0	7.4	1.5	91.2
101	0.0	66.7	4.8	28.6	1.5	55.2	0.0	44.8
102	4.8	32.5	15.0	52.5	1.5	22.4	3.0	74.6
103	0.0	0.0	61.9	38.1	0.0	1.5	42.7	55.9
104	4.8	2.5	37.5	60.0	1.5	3.0	10.5	86.6
105	0.0	10.0	35.0	55.0	70.6	15.0	0.0	85.0
106	2.4	2.4	19.5	78.1	0.0	0.0	1.5	98.5
107	0.0	9.5	35.7	54.8	7.4	1.6	11.1	87.3
108	16.7	2.9	57.1	40.0	51.5	0.0	15.2	84.9
109	0.0	26.2	11.9	61.9	0.0	8.8	2.9	88.2
110	4.8	57.5	2.5	40.0	0.0	26.5	0.0	73.5
111	2.4	14.6	12.2	73.2	0.0	5.9	1.5	92.7
112	7.1	61.5	0.0	38.5	55.9	70.0	0.0	30.0
113	28.6	13.3	16.7	70.0	29.4	18.8	4.2	77.1
114	0.0	38.1	9.5	52.4	1.5	3.0	6.0	91.0
115	0.0	14.3	23.8	61.9	1.5	0.0	10.5	89.6
116	0.0	16.7	35.7	47.6	0.0	2.9	17.7	79.4
117	2.4	0.0	39.0	61.0	45.6	2.7	27.0	70.3

118	21.4	9.1	15.2	75.8	5.9	50.0	1.6	48.4
119	0.0	0.0	52.4	47.6	0.0	0.0	13.2	86.8
120	14.3	22.2	11.1	66.7	19.1	18.2	1.8	80.0
121	0.0	7.1	19.1	73.8	0.0	2.9	1.5	95.6
122	4.8	20.0	12.5	67.5	4.4	3.1	4.6	92.3

Legend:

%UNK – Percentage of "Unknown Profession" option chosen by participants;

%M - Percentage of "Male Profession" option chosen by participants;

%F - Percentage of "Female Profession" option chosen by participants;

%Both - Percentage of "Both" option chosen by participants.

Appendix 3. *p* values for the 48 professions included in the experiments both in British English and European Portuguese

	British English		European Portuguese	
Professions	Male-Both	Female-Both	Male-Both	Female-both
Acolyte	$p < .001$	$p < .001$	$p = .003$	$p < .001$
Actor	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Administrator	$p < .001$	$p = .40$	$p < .001$	$p < .001$
Anthropologist	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Archaeologist	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Astronomer	$p = .004$	$p < .001$	$p < .001$	$p < .001$
Auditor	$p = .012$	$p < .001$	$p < .001$	$p < .001$
Author	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Broadcaster	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Chemist	$p = .002$	$p < .001$	$p < .001$	$p < .001$
Choreographer	$p < .001$	$p = .030$	$p <.001$	$p < .001$
Commissioner	$p = .037$	$p < .001$	$p < .001$	$p < .001$
Composer	$p = .018$	$p = .003$	$p < .001$	$p < .001$
Consultant	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Cook	$p < .001$	$p = .055$	$p < .001$	$p < .001$
Driver	$p = .025$	$p < .001$	$p < .001$	$p < .001$
Engineer	$p = .007$	$p < .001$	$p < .001$	$p < .001$
Examiner	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Filmmaker	$p = .015$	$p < .001$	$p =. 021$	$p < .001$
Geographer	$p < .001$	$p = .015$	$p < .001$	$p < .001$
Guardian	$p =.008$	$p < .001$	$p < .001$	$p < .001$
Historian	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Interviewer	$p < .001$	$p = .004$	$p < .001$	$p < .001$
Investor	$p = .059$	$p = .012$	$p < .001$	$p < .001$
Jellewer	$p < .001$	$p = .043$	$p < .001$	$p < .001$
Joiner	$p = .008$	$p < .001$	$p = .896$	$p < .001$
Judge	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Lawyer	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Magistrate	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Notary	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Oceanographer	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Packer	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Philologist	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Photographer	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Player	$p = .040$	$p < .001$	$p < .001$	$p < .001$
Playwright	$p = .067$	$p < .001$	$p < .001$	$p < .001$
Poet	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Presenter	$p = .002$	$p < .001$	$p < .001$	$p < .001$

Producer	$p = .015$	$p < .001$	$p < .001$	$p < .001$
Researcher	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Seller	$p < .001$	$p = .200$	$p < .001$	$p < .001$
Singer	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Supervisor	$p = .021$	$p < .001$	$p < .001$	$p < .001$
Swimmer	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Translator	$p < .001$	$p = .012$	$p < .001$	$p < .001$
Upholster	$p < .001$	$p < .001$	$p = 1$	$p < .001$
Writer	$p < .001$	$p < .001$	$p < .001$	$p < .001$
Zoologist	$p = .002$	$p < .001$	$p <.001$	$p < .001$

Appendix 4. Project CEICSH 011/2021 - Comissão de Ética para a Investigação em Ciências Sociais e Humanas

Universidade do Minho

Conselho de Ética

Comissão de Ética para a Investigação em Ciências Sociais e Humanas

Identificação do documento: CEICSH 011/2021

Relator: Cristina Maria Moreira Flores

Título do projeto: *Análise Comparativa da Influência de Género nas Metáforas Concetuais em Português e em Inglês*

Equipa de Investigação: Inês de Jesus Rodrigues Mateus (IR), Mestrado em Língua, Literatura e Cultura Inglesas, Instituto de Letras e Ciências Humanas, Universidade do Minho; Ana Paula de Carvalho Soares (Orientadora), Escola de Psicologia, Universidade do Minho; Isabel Cristina da Costa Ermida e José de Sousa Teixeira (Orientadores), Instituto de Letras e Ciências Humanas, Universidade do Minho

PARECER

A Comissão de Ética para a Investigação em Ciências Sociais e Humanas (CEICSH) analisou o processo relativo ao projeto de investigação acima identificado, intitulado *Análise Comparativa da Influência de Género nas Metáforas Concetuais em Português e em Inglês.*

Os documentos apresentados revelam que o projeto obedece aos requisitos exigidos para as boas práticas na investigação com humanos, em conformidade com as normas nacionais e internacionais que regulam a investigaçãoem Ciências Sociais e Humanas.

Face ao exposto, a Comissão de Ética para a Investigação em Ciências Sociais e Humanas (CEICSH) nada tem a opor à realização do projeto nos termos apresentados no Formulário de Identificação e Caracterização do Projeto, que se anexa, emitindo o seu parecer favorável, que foi aprovado por unanimidade pelos seus membros.

Braga, 20 Janeiro 2021.

O Presidente da CEICSH

(Acílio Estanqueiro Roch