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THE MORALITY OF POLITICAL SPEECH IN PARLIAMENTARY DEBATES

An analysis of parliamentary party dynamics,
based on what they say and how they say it

Mafalda Patação Zúquete

Dissertation presented as partial requirement for
obtaining the Master's degree in Data Science and
Advanced Analytics, Major in Data Science

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Co-supervisors: Flávio L. Pinheiro and Diana Orghian

November, 2021

*To my family, for reminding me that there really isn't
anywhere like home.*

ACKNOWLEDGEMENTS

As the saying goes, it takes a village, and to that village I owe my thanks. First and foremost, I would like to credit my supervisors, Flávio Pinheiro and Diana Orghian, for taking my insane ideas in stride and encouraging me to take them even further.

And to my family, friends, and loved ones, this year was not easy and I am sure I would not have been able to thrive like I have without their infallible encouragement and help. It is a privilege to have you all in my life and as my support system. A special thanks to my dad, who proof-read my work more times than I can count and is a \LaTeX wizard; my mom, who made my dad read my work and never failed to be here for me; and my sister, who was my dance partner this past year and a valued companion.

“Before everything, before even humans, there were stories.... It was the first thing and it will be the last.” (Joseph Fink and Jeffrey Cranor)

ABSTRACT

Moral Foundations Theory (MFT) is an area of study with multiple and varied applications, including political science. Indeed, many studies have denoted that part of the reason for the deepening divide between American liberals and conservatives is due to the fact that both of these groups rely on fundamentally different moral principles.

While this research has started to pan outside of the United States of America, it has yet to be applied to the context of the Portuguese republic, which differs from the American political reality. Portugal's democracy is built on top of a multi-party system, and conventional wisdom divides it into a right and left wing, rather than liberal and conservative.

As such, we developed a Moral Foundations Dictionary (MFD) in European Portuguese and analyzed 10 years' worth of transcripts from parliamentary sessions through the prism of MFT, in an effort to find out which are the parliamentary dynamics in Portuguese political speech.

Indeed, we found evidence that the Portuguese political parties place themselves on a right/left wing spectrum when looked at through the lens of MFT, but also that there appears to be a government/opposition dichotomy at play, which could affect party dynamics.

Keywords: Moral Foundations Theory, Moral Foundations Dictionary, Politics, Liberals, Conservatives, Text Mining

RESUMO

A Teoria dos Fundamentos Morais é uma área de estudo com múltiplas e variadas aplicações, incluindo no campo da ciência política. De facto, vários estudos notaram que parte da razão pela qual a divisão entre liberais e conservadores nos Estados Unidos da América (EUA) se tem vindo a aprofundar deve-se ao facto de que estes grupos têm por base princípios morais fundamentalmente diferentes.

Embora esta pesquisa se tenha começado a expandir para além dos EUA, tem ainda de ser aplicada no contexto da república portuguesa, que difere da realidade política americana. A democracia portuguesa baseia-se num sistema multipartidário e a convenção geral dita que os partidos se dividem como sendo de direita ou esquerda, em vez de liberais ou conservadores.

Deste modo, desenvolvemos um Dicionário de Fundamentos Morais em português europeu e analisámos 10 anos de transcrições do diário da assembleia da república pelo prima da Teoria dos Fundamentos Morais, numa tentativa de descobrir as dinâmicas parlamentares do discurso moral português.

De facto, descobrimos evidências de que os partidos políticos portugueses se encontram num eixo direita/esquerda quando são analisados pela lente da Teoria dos Fundamentos Morais, mas também aparenta existir uma dinâmica governo/oposição, que afeta também a forma como os partidos se relacionam.

Palavras-chave: Teoria dos Fundamentos Morais, Dicionário dos Fundamentos Morais, Política, Liberais, Conservadores, Text Mining

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ACRONYMS

ANOVA	analysis of variance xiii, xix, 19, 32, 38, 39
AR	Assembleia da República (Assembly of the Republic) 43
Bd	bachelor's degree 35
Be	basic education 33
BE	Bloco de Esquerda (Left Block) 3, 4, 47, 48, 52, 54, 55, 59, 60
BRA	Brazil 33, 35
CDS-PP	CDS-Partido Popular (People's Party) 4, 43, 47, 48, 53, 54, 59, 60
CH	CHEGA (Enough) 47, 52, 53, 54, 55, 59, 60
CR	Cristina Rodrigues 47
CRPC	Corpus de Referência do Português Contemporâneo (Reference Corpus for Contemporary Portuguese) 31
DAR	Diário da Assembleia da República (Diary of the Assembly of the Republic) xv, 5, 41, 42, 63
DBSCAN	density-based spatial clustering of applications with noise xvii, 25, 44, 60, 103, 104
DDR	Distributed Dictionary Representation 3, 19
E	employed 33
EUA	Estados Unidos da América xi
F	female 33, 34
FN	false negative 27
FP	false positive 27
GDP	gross domestic product 18

HS	high school 33, 35
IL	Iniciativa Liberal (Liberal Initiative) 3, 47, 53, 54, 59, 60
JKM	Joacine Katar Moreira 45
L	Livre (Free) 45
LIWC	Linguistic Inquiry and Word Count xiii, 2, 20, 39, 63
M	male 33, 34
Md	master's degree 33, 35
MDS	multi-dimensional scaling xiii, 24, 44, 45, 57, 63
MFD	Moral Foundations Dictionary ix, xiv, xv, xix, 2, 3, 4, 5, 11, 19, 20, 29, 30, 31, 33, 35, 36, 37, 38, 39, 40, 41, 44, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 64, 65, 99, 100
MFQ	Moral Foundations Questionnaire xix, 11, 14, 15, 32, 33, 40
MFT	Moral Foundations Theory ix, xiii, 1, 2, 3, 5, 7, 8, 9, 11, 13, 14, 15, 16, 17, 18, 19, 29, 63, 64
MFTC	Moral Foundations Twitter Corpus 3, 19
MLE	maximum likelihood estimate 21
MOZ	Mozambique 33
MP	Member of Parliament xvi, xvii, 42, 43, 44, 45, 47, 48, 49, 50, 52, 53, 54, 55, 58, 59, 60, 61, 64, 105, 106, 107
NR	rather not respond 33
O	other 33, 35
PaF	Portugal à Frente (Portugal at the Forefront) 4
PAN	Pessoas-Animais-Natureza (People-Animals-Nature) 47, 48, 52, 54, 59, 60
PCP	Partido Comunista Português (Portuguese Communist Party) 3, 4, 45, 47, 48, 53, 54, 58, 59, 60
PEV	Partido Ecologista "Os Verdes" (Ecologist Party "the Greens") 47, 48, 52, 54, 58, 59
PhD	doctorate's degree 33
PRT	Portugal 33, 35
PS	Partido Socialista (Socialist Party) 4, 43, 45, 47, 48, 49, 53, 54, 58, 59, 60, 63
PSD	Partido Social Democrata (Social-Democratic Party) 4, 43, 47, 48, 49, 53, 54, 58, 59, 60, 63

PTP	Paulo Trigo Pereira 49
R	retired 33
SE	self-employed 33
STP	S. Tomé and Príncipe 33
STU	full-time student 33
TP	true positive 27
U	unemployed 33
US	United States (of America) 2

INTRODUCTION

1.1 Motivation

Polarization is a fact in modern day politics in Western society. From the former president of the United States of America, George W. Bush, stating “Either you are with us or you are with the terrorists” (Bush, 2001) on the aftermath of the 9/11 attacks, to chants of “All cops are bastards” (Poulter, 2020) in the Black Lives Matter protests that followed the killing of George Floyd by a police officer, this binary ideology can be found across the political spectrum regarding all sort of political and social issues and grievances.

While it could be argued that some issues are beyond the realm of nuance and discussion, such as the genocides led by the Nazis during World War II, can all arguments be settled by a categorical classification of “right” and “wrong”? And, if so, what does that say about the people in the “wrong”?

This line of thinking raises questions about what morality is, and how can we define it. Haidt and Joseph (2004) pondered how there are moralities as disparate as those of Nazis and Quakers but, when taking a deeper look at the quotidian of people in different cultures, one could find common elements connecting them. As an answer to this question, they hypothesized that there is an innate and intuitive element to ethics. This rationale evolved into what is now known as Moral Foundations Theory (MFT), which claims that human morality is rooted in five different foundations: Care/Harm, Fairness/Cheating, Loyalty/Betrayal, Authority/Subversion, and Sanctity/Degradation (Graham et al., 2013). Sanctity is also commonly referred to as Purity in the literature, and Loyalty as Ingroup (Graham, Haidt, & Nosek, 2009).

Indeed, it would be hard to make the case that some people actively fight for something they believe is not correct. Unlike fights against social norms and traditions, this would mean that someone would go out of their way to defend something that goes against their belief system, seemingly defying logical sense. This must mean that those who, according to one set of morals, act immorally, must be led by different core principles. Now, those tenets could be disputed, and there can be disagreements about

them, but they must exist.

This could be extrapolated to politics. After all, what are political speeches but appeals to the voters' deeper sense of morality? Campaign promises outline a candidate's priorities and red lines, trying to align themselves with their electorate's hopes and expectations, often dictated by their morals.

While not being a political theory, MFT has been used in an attempt to understand political dynamics, especially focused on the liberal/conservative dichotomy that is present on American politics. Haidt and Graham (2007) found that Liberal morality is mostly focused on Care/Harm and Fairness/Cheating foundations, and Conservative morality is based on all five foundations. Graham et al. (2009) reached a similar conclusion by performing four different studies. One of those studies consisted in the creation of a Moral Foundations Dictionary (MFD) and using the Linguistic Inquiry and Word Count (LIWC) program (Pennebaker, Boyd, Jordan, & Blackburn, 2015) to calculate the percentage of moral words used in religious sermons that were labeled either "Liberal" or "Conservative". This translates into liberals giving more importance to care and fairness than conservatives do and, consequently, regarding conservatives as immoral for not expressing their morality in the same way, and vice versa. However, is this dichotomy present over time? And does it translate to other political contexts?

Parker, Sahdra, and Ondaatje (2019) attempted to find whether this liberal/conservative division would apply to Australian politics. They looked at prime-minister speeches from 1945 to 2015, which were categorized as either conservative or liberal based on the party of the respective prime-minister. When using the same methodology as Graham et al. (2009), that is, when simply considering the ratios of foundation words over the total number of words in the speeches, they reached conclusions similar to the ones by Graham et al. (2009). However, Parker et al. (2019) decided to take their analysis further by calculating the weighed log-odds of each Moral Foundation and grouping the speeches by prime-minister rather than by political party. This approach revealed that individual differences were a better predictor of the use of moral language in the prime-minister's speech than their political party, as well as the social and economic context.

Still, when Parker et al. (2019) used the MFD to study the political scenario of Australia they had an advantage in the fact that the United States (of America) (US) and Australia share a common language. This means that someone attempting to perform similar work in a non-English context would need to develop a new MFD. Matsuo, Sasahara, Taguchi, and Karasawa (2019) created a semi-automatic methodology to translate the original MFD to Japanese and confirm its validity, and Carvalho, Okuno, Baroni, and Guedes (2020) also proposed a way to translate the MFD to Brazilian Portuguese, relying more on experts and annotators.

However, using the MFD in tandem with LIWC has its limitations, as word count methods are not usually the most accurate when referring to text classification models.

With the purpose of developing more complex and accurate models to classify the underlying morality in texts, fully annotated corpora were developed to allow for supervised learning when it came to Moral Foundations in speech. Notably, the corpus created by Hoover et al. (2020), known as the Moral Foundations Twitter Corpus (MFTC), has been the subject of multiple studies, as it allows for a liberal/conservative dichotomy. Algorithm-wise, Araque, Gatti, and Kalimeri (2020) proposed *MoralStrength*, an extension of the MFD using *WordNet* synsets¹, and paired this expanded algorithm with more complex algorithms, such as logistic regression. Also, Garten et al. (2018) created a Distributed Dictionary Representation (DDR) of the original MFD and found that it too performed better than the original MFD approach, as it did not focus only on morphological similarity between words, but semantic relations.

Looking at Twitter data in a different way, Dehghani et al. (2016) saw that tweets that had similar purity loadings tended to be closer with regards to node distance in the twitter network, but that conclusion was not verified for the other four moral foundations. Kaur and Sasahara (2016) used a similar encoding for the data, but instead tried to find which moral foundations showed up more often in Twitter conversations regarding abortion, homosexuality, immigration, religion, and immorality in general, concluding that Care was the foundation that was mentioned more often across topics, but Purity is the most distinctive foundation. Both these methods had as their main idea the transformation of tweets into vectors. Then, Dehghani et al. (2016) measured the cosine distance between the tweet vectors and the vectors of moral terms, and Kaur and Sasahara (2016) calculated the cosine distance between the representation of each of the topics and the abstraction of each moral foundation.

1.2 Problem

How could this research be applied to the Portuguese context? When it comes to Portugal and the relationship between Portuguese society and MFT, there does not appear to be, to the best of the authors knowledge, any research.

Furthermore, all previous research on how politics intersect with morality appear to be focused on the differences between conservatives and liberals, but the Portuguese political context does not show such a division, but rather a right/left-wing split, with some traditionally conservative and liberal ideals showing up across the range. Left-wing parties, such as Bloco de Esquerda (Left Block) (BE) and Partido Comunista Português (Portuguese Communist Party) (PCP), are usually considered close on the political spectrum, but one is commonly described as socially liberal (BE) and the other is known for its socially conservative views (PCP). On the same vein, a new party, Iniciativa Liberal (Liberal Initiative) (IL) has risen to relevance on the claim

¹Sets of synonyms

that there is no true liberalism in Portuguese politics and, much to their chagrin, are commonly grouped with the right-wing parties (Lusa, 2019).

Will the Portuguese political spectrum show a left/right-wing split resembling the liberal/conservative one? Or will a government/opposition divide be more present? Additionally, does context and time affect the political discourse of the political parties in Portugal?

Muñoz (2020) performed an analysis of the voting records of the different parties that elected representatives in the legislative elections in 2019 and found that a right/left-wing division was indeed present in current Portuguese politics.

Moreover, the question of bipartisanship does not have a well-defined answer when it comes to the Portuguese reality. While the winners of all legislative elections have been either Partido Socialista (Socialist Party) (PS) (center-left) or Partido Social Democrata (Social-Democratic Party) (PSD) (center-right), these parties often held minority governments supported by parliamentary coalitions and/or deals to guarantee their ability to form a government. For instance, in the recent 2015 elections, the winning party was the coalition Portugal à Frente (Portugal at the Forefront) (PaF), formed by PSD and the CDS-Partido Popular (People’s Party) (CDS-PP), but they did not reunite the necessary parliamentary majority to form a government. Instead, PS proposed a minority government after securing a parliamentary deal with BE and PCP, with the intent of forming a left-wing government. The resulting PS minority government, with the support of the more extreme left-wing parties, was colloquially referred by right-wing parties as the *Geringonça*², and illustrates the fluidity that is present in the Portuguese political system.

1.3 Contribution

We propose the creation of an MFD in European Portuguese, its validation, and an analysis of the Portuguese political context based on the information that can be gathered by applying the MFD to the transcripts of the Diary of the Assembly of the Republic from 2011 to 2021.

In order to perform this research, we started by creating the European Portuguese MFD, based on the work of Graham et al. (2009). The chosen methodology was very similar to the semi-automatic approach that Matsuo et al. (2019) used to develop an MFD in Japanese. Despite Carvalho et al. (2020) creating an MFD for Brazilian Portuguese, we decided that the differences between European and Brazilian Portuguese are relevant enough to warrant the development of a dictionary that would focus on the European context. Furthermore, their methodology relied heavily on annotators and experts, hence why we chose to follow the work of Matsuo et al. (2019) more closely.

²In English the *Contraption*

In order to validate our MFD, we used a survey to study how the respondents would use MFD words when asked to describe situations related to the moral foundations. This test allowed us to understand how our initial MFD was misclassifying words in the Ingroup set as Authority, and thus we applied relevant corrections.

Then, we collected all the transcripts of the parliamentary debates from 2011 to 2021 to apply our dictionary to and try to understand the Portuguese political spectrum through the lens of morality. Within this more dynamic scenario, where eleven parties elected members to be part of the assembly on the latest election, and alliances between parties are common, it would be complicated to predict which parties tend to appeal to each morality in their speech. For that reason, our analysis was mostly exploratory, in order to find which parties have similar discourse when it comes to the morality vocabulary.

From this analysis, we glimpsed two dimensions that we found relevant: the parties roughly reproduced our common understanding of the right/left-wing spectrum of parliaments, and we also saw a government/opposition split, where the first dimension was the most relevant when it came to differentiating the parties.

1.4 Structure

In Chapter 2 we take a deep dive into the literature necessary to understand the work we developed in the following chapters. This includes a detailed overview of MFT, its multiple applications as a tool to understand society, as well as all the algorithms that were used in our research.

Chapter 3 details the process of creating a European Portuguese MFD, following an adaptation of the methodology published by Matsuo et al. (2019), as well as its validation.

Then, in Chapter 4 we use our European Portuguese MFD to try to gauge some political insights from analyzing the *Diário da Assembleia da República* (Diary of the Assembly of the Republic) (DAR) transcripts, using three different methods: one that follows the work of Graham et al. (2009) very closely, one inspired by Parker et al. (2019)'s approach, and a new way of encoding data that we developed.

We present our conclusions in Chapter 5, as we noticed how, speech-wise, the Portuguese parties positioned themselves along a right/left-wing spectrum that resembled the dynamics that the Portuguese public is familiar with, but there was also a government/opposition dynamic at play which was quite interesting to note. We also go over the limitations of our research and how it could be expanded in future work.

LITERATURE REVIEW

2.1 Moral Foundations Theory (MFT)

Moral Foundations Theory (MFT) is a paradigm in psychology that got its origins on a paper by Haidt and Graham (2007). Later, Graham et al. (2013) solidified their claims, as their work made the case for a pluralist view of morality.

The first step was specifying where morality came from. According to MFT, morality is an innate concept to humans; however, it is not immune to external environmental influences. Specifically, upon birth, people have a “first draft” of morality, which gets revised via cultural learning throughout our lives, but more meaningfully during childhood.

Now, it is not possible to glimpse a first draft by considering a finished product, in this case, an adult; but, by studying people across cultures, it could be possible to infer some of the building blocks that appear to be common.

These shared bases suggest that there is an evolutionary dimension to morality, and that “the human mind is organized in advance of experience” (Graham et al., 2013), readying itself to learn values, norms, and behaviors that give humans a better chance at survival.

With this, it could be said that moral foundations do not necessarily reflect finished moralities, but instead, they limit how morality develops and builds which, in turn, is also strongly informed by culture and context.

Graham et al. (2013) propose then five different moral foundations that they considered that answered multiple evolutionary challenges. These foundations were the ones for which there was more evidence at the current moment. However, the authors did not discard the possibility that more moral foundations are indeed part of the human psyche.

In spite of that, they did define specific criteria for foundationhood, allowing for future foundations to be considered if they meet these benchmarks. The criteria for foundationhood as defined by Graham et al. (2013) are:

1. **A common concern in third-party normative judgments:** that is, if moral

concerns and issues incite conversation, debate, or even gossip around them, it means that they have a better case for foundationhood;

2. **Automatic affective evaluations:** that is, a moral issue could be said to be related to a moral foundation if it elicits reactions quickly and easily, alluding to the intuitive nature of morality;
3. **Culturally widespread:** just because a moral behavior is broadly observed in the adult phenotype, that does not imply that it is innate. Instead, in order to consider a moral expression or concern to be innate, it should be expressed somehow across human cultures, making the case for foundationhood stronger the more diverse the societies are;
4. **Evidence of innate preparedness:** similar to the previous criteria, here we can not simply infer innateness from commonness. Alternatively, if a behavior or ability is found either in non-human primates or in children before they have been taught the relevant context, then the case for innateness becomes more robust;
5. **Evolutionary model demonstrates adaptive advantage:** that is, an evolutionary need must be met by the moral concern in order to justify its standing as a moral foundation.

From this set of rules emerged the five moral foundations currently considered by MFT, directly transcribed from the work of Haidt (2012):

- **Care/Harm:** evolved in response to the adaptive challenge of caring for vulnerable children. It makes us sensitive to signs of suffering and need; it makes us despise cruelty and want to care for those who are suffering;
- **Fairness/Cheating:** evolved in response to the adaptive challenge of reaping the rewards of cooperation without getting exploited. It makes us sensitive to indications that another person is likely to be a good (or bad) partner for collaboration and reciprocal altruism. It makes us want to shun or punish cheaters.
- **Loyalty/Betrayal:** evolved in response to the adaptive challenge of forming and maintaining coalitions. It makes us sensitive to signs that another person is (or is not) a team player. It makes us trust and reward such people, and it makes us want to hurt, ostracize, or even kill those who betray us or our group.
- **Authority/Subversion:** evolved in response to the adaptive challenge of forging relationships that will benefit us within social hierarchies. It makes us sensitive to signs of rank or status, and to signs that other people are (or are not) behaving properly, given their position.

- **Sanctity/Degradation:** evolved initially in response to the adaptive challenge of the omnivore's dilemma¹, and then to the broader challenge of living in a world of pathogens and parasites. It includes the behavioral immune system, which can make us wary of a diverse array of symbolic objects and threats. It makes it possible for people to invest objects with irrational and extreme values – both positive and negative – which are important for binding groups together.

Note that, in the literature, the moral foundations of Harm/Care and Fairness/Reciprocity are often referred to as the “individualizing” foundations, and the other three foundations are considered the “binding” foundations, as the latter describe dynamics that occur mostly at the group level and the former are primarily focused on individual concerns.

MFT is not a theory of political psychology but of cultural psychology. However, through the work of Graham et al. (2009) a link between MFT and the American conservative/liberal divide was established, and thus, this paradigm gained political relevance. Still, the political spectrums, even one with such an established gap such as the American, exceed this liberal/conservative dichotomy, and both fitting all people into either the liberal/conservative box and determining their set of morals is a reductive practice. Indeed, MFT also shows strong connections with personality and ideological opinions, such as abortion, the death penalty, or sanctity of the flag. Cross culturally, the differences in which moral foundations are valued are not as strong as the variations within cultures, where the relationship between moral foundations and political ideology expresses itself in a more expressive way.

Morality, just as culture, is not static and will continue to develop as long as people engage in moral discourse. As such, virtue terms will evolve as people find new ways to describe how the world operates in contrast to culturally normative ideals. Moreover, some new moral foundations may even be considered, such as Liberty/Oppression, despite there not being enough evidence for foundationhood at this stage.

2.2 Relevant Applications of MFT

2.2.1 Ideology

The relationship between ideology and MFT has been explored thoroughly over the years and with increasing degrees of nuance.

¹“Omnivores, such as rats and humans, faced with an enormous number of potential foods, must choose wisely. They are always in danger of eating something harmful or eating too much of a good thing.” (Rozin, 1976)

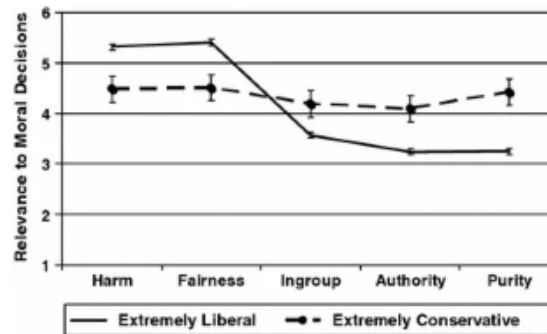


Figure 2.1: Moral relevance by foundation for extreme liberals and conservatives. 1 = not relevant at all, 6 = always relevant (taken from Haidt and Graham (2007))

2.2.1.1 The liberal/conservative divide

Haidt and Graham (2007) compared how self-identification on a political scale related with the results of a survey on moral foundations. From this, they found that American liberals mostly value the foundations of Harm/Care and Fairness/Cheating, where American conservatives show a more consistent support of all moral foundations (Figure 2.1), suggesting that the reason why liberals often see conservatives as immoral is not only because conservatives rely on moral foundations that liberals do not see as relevant, but also because Harm/Care and Fairness/Cheating represent roughly half of the morality of liberals, and only a fifth of the morality of conservatives, making them appear less moral to liberals.

Haidt and Graham (2007) also noted that there appears to be a liberal tendency in social psychology that has led the study of morality to focus mostly on the individualizing foundations (Harm/Care and Fairness/Cheating). To support their claim, they looked at the abstracts of *Social Justice Research*, a social psychology journal with a focus on social justice, and found that most of them mentioned dimensions of Harm/Care and Fairness/Cheating, but not the other three moral foundations. A similar conclusion was reached when the abstracts came from the *Journal of Personality and Social Psychology*, reinforcing how these journals seem to only represent a subset of human morality and recognizing how awareness of the binding moral foundations (Loyalty/Betrayal, Authority/Subversion, and Sanctity/Degradation) could open the door for further discussion.

Additionally, when McAdams et al. (2008) studied how participants in a study described their own faith through the use of independent annotators, they also found the prevalence of Harm/Care and Fairness/Reciprocity in liberals and uniform values across all moral foundations for conservatives, where women showed higher scores than men for Harm/Care, regardless of ideology.

Graham et al. (2009) further explored the liberal/conservative spectrum by testing how self-identification on a liberal/conservative scale correlated with different aspects of moral foundations. Their first test was related to the relevance of moral foundations,

that is, what are the most relevant moral foundations when deciding what is right and wrong; the second one focused on implicit ideology, where the authors presented the survey participants with a foundation-related prompt and they either agreed or disagreed; thirdly, Graham et al. (2009) looked at moral trade-offs, as in, what would the participant do given a controversial prompt; and finally the authors analyzed sermons from liberal and conservative Christian churches using a dictionary of their creation, the Moral Foundations Dictionary (MFD). All of these tests yielded the same dichotomy that had been seen previously.

Given how defined the moral profiles of liberals and conservatives appeared to be, Graham, Nosek, and Haidt (2012) decided to study how accurate are the moral stereotypes of liberals and conservatives and how they differ from their actual moral profiles. The way that participants saw “typical” liberals and conservatives ended up being even more polarized than the actual differences that were found between the groups.

Here, conservatives were the most accurate at estimating both sides’ individualizing foundations, while liberals substantially underestimated the Harm/Care and Fairness/Reciprocity concerns of conservatives. Moderates and conservatives also undervalued conservatives’ preoccupation with the individualizing moral foundations, but not to such an extreme extent. When it came to evaluating their own individualizing foundations, liberals overestimated how prominent these foundations were on their own moral profile, and conservatives and moderates underestimated them. Still, conservatives and moderates had a more accurate view of liberals than liberals themselves.

On the other hand, moderates showed more accuracy when it came to evaluating the binding moral foundations, and liberals were the least accurate. Concerns related to these moral foundations were overestimated by all groups when describing the typical conservative, with liberals overshooting the most; and, when it came to evaluating the binding moral foundation of liberals, all groups underestimated the real value, with liberals once again exhibiting the most inaccurate prediction.

From this, it could be said that liberals tend to exaggerate the differences between liberals and conservatives the most, but all groups show some degree of hyperbole when it comes to characterizing any political group, even their own. However, this study also showed that all political groups are aware of the moral differences between them, as they consistently predicted that liberals were more focused on the individualizing foundations than conservatives, and so on.

2.2.1.2 Beyond liberals and conservatives

Haidt, Graham, and Joseph (2009) complicated the liberal/conservative further by clustering participants based on their Moral Foundations Questionnaire (MFQ) score

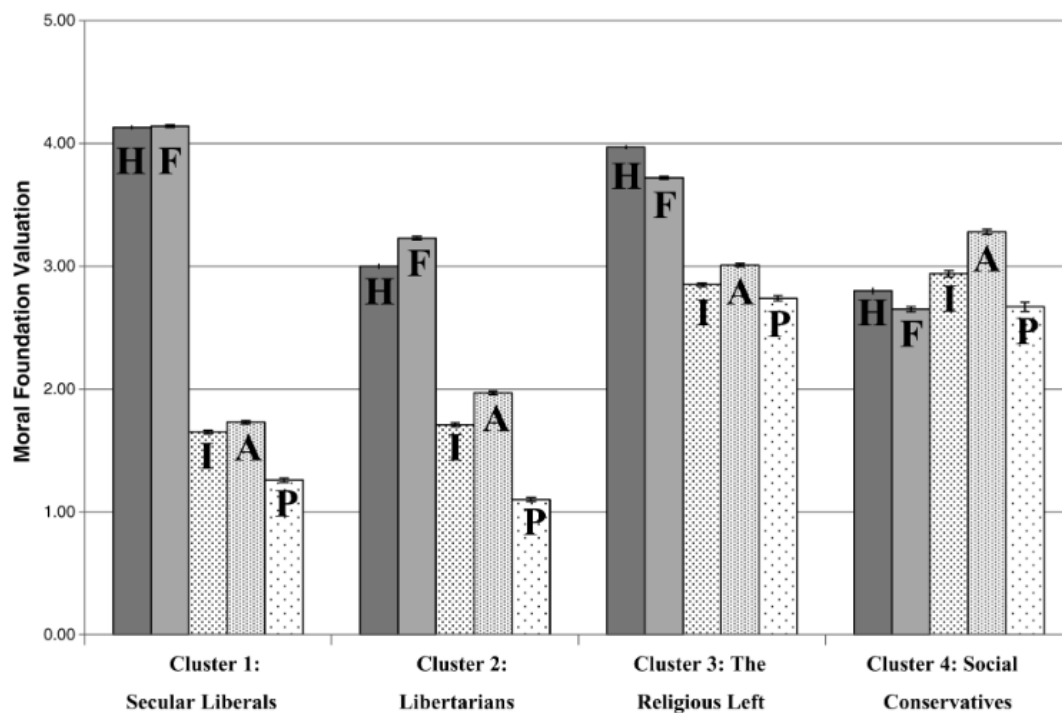


Figure 2.2: Moral foundation patterns in four clusters. Note. H = Harm; F = Fairness; I = Ingroup; A = Authority; P = Purity. Total sample sizes for each cluster are as follows: 5,946 (Cluster 1), 5,931 (Cluster 2), 6,397 (Cluster 3), 2,688 (Cluster 4). Error bars represent ± 2 S.E. (taken from Haidt, Graham, and Joseph (2009))

and characterizing them based on Openness to Experience, Right-Wing Authoritarianism, Social Dominance Orientation, and demographic traits. From this they got four clusters, that they defined as: secular liberals, libertarians, religious leftists, and social conservatives, suggesting that there is more to political ideology than the one-dimensional left/right wing axis (Figure 2.2).

Secular liberals follow the moral profile we have mentioned thus far, with higher values of Harm/Care and Fairness/Reciprocity, and lower values on all other moral foundations. Haidt et al. (2009) propose that the narrative behind this line of thinking comes out of a recognition that society was built on bad structures, which have been dismantled over the years, due to the human aspiration to create a more just and equal world, while recognizing that these power dynamics are still present and need to be fought.

Libertarians show the same values for the binding foundations as secular liberals do, which makes sense considering how libertarianism is connected to high levels of individualism, but they also evidence low values with regards to Harm/Care and Fairness/Reciprocity, likely because these moral foundations are often tied to politics on welfare and social support, which also contrast with individualism.

The other “new” group that was found by clustering the survey participants was

that of religious leftists. While religious leftists are similar to secular liberals with regards to their values of Harm/Fairness, they do not show their disregard for the other three foundations. According to Haidt et al. (2009), the religious left sees the conservatives as having forgotten the justice aspect of religion and solely focusing on sexual and cultural issues, but also criticizes how the secular left ignores principles such as the “sacredness of human life” or “strong family values”.

Finally, the social conservatives fit the profile that has previously been determined for conservatives, where they place similar importance to all moral foundations, but their emphasis on Harm/Care and Fairness/Reciprocity is not as prevalent as it is for liberals, both religious or secular, and their focus on the binding moral foundations is higher than that of the religious left, likely due to their focus on patriotism (Loyalty/Betrayal), traditional societal roles (Authority/Subversion), and sexual morality (Sanctity/Degradation).

Politically, the Republican party binds the social conservatives with the libertarians, as the latter see the liberals’ focus on the individualizing foundations as having brought heavy-handed regulations and intervention on business, and so they match with the economic ideals of the Republican party, which also caters to social conservatives by providing a critique of a society that is going downhill due to a missing focus on the binding foundations.

While some of these approaches looked further than the simple liberal/conservative distinction, the work of Iyer, Graham, Koleva, Ditto, and Haidt (2010) dived into the differences between two groups of liberals: Clinton and Obama supporters during the 2008 Democratic primaries. Though supporters of both candidates considered themselves equally liberal, those who backed Clinton appeared to have a moral profile that more closely resembled that of conservatives, evidencing higher values with regards to the binding moral foundations, which translated to a focus on being a good group member, favoring tradition, and supporting the social order, as Clinton was the more “establishment” candidate. In contrast, Obama supporters seemed to favor the foundations that related to treating individuals well, that is, the individualizing foundations.

Breaking away from looking at liberals and conservatives, Iyer, Koleva, Graham, Ditto, and Haidt (2012) took a closer look at libertarians. These results did not differ much from the moral profile that Haidt et al. (2009) defined for libertarians, with similar values of Fairness/Reciprocity to conservatives, similar values of Loyalty/Betrayal, Authority/Subversion, and Sanctity/Degradation to liberals, and lower values of Harm/Care than conservatives (significantly lower than liberals).

This apparent lack of morality from libertarians could be explained by a self-reported lack of their core values in these studies, namely liberty, autonomy, or freedom. When questions pertaining to liberty were added to Iyer et al. (2012)’s study, they found that indeed libertarians value freedom more strongly and consistently than liberals and conservatives and discard all other moral foundations.

In order to understand how heterogeneous groups within each political end would be, Weber and Federico (2013) asked participants to self-identify on the liberal/conservative spectrum, to rank their positions on a list of political preferences, and to fill out the MFQ.

From performing Latent Class Analysis (LCA) on nineteen political preferences, Weber and Federico (2013) defined six groups that they defined as: consistent liberals, libertarians, social conservatives, moderates, consistent conservatives, and inconsistent liberals; where the most common class among self-identified liberals is the consistent liberals class, but for both moderates and conservatives is the moderate class. Five out of these six classes place themselves, on average, to the right of the ideological midpoint, despite stark differences on policy opinion, exhibiting greater heterogeneity within the self-identified conservatives.

Note that the odds of a strong liberal (extreme on self-identification scale) belonging to the consistent liberal class are much higher than the odds of a strong conservative being placed in any of the “conservative” classes.

When analyzing the moral profiles of these classes there is substantial variation across them, even among classes where the participants had similar scores on the self-identification scale. For example, both libertarians and inconsistent liberals self-identified as conservatives, but showed moral profiles that more closely resembled that of liberals when it came to their support of the individualizing moral foundations. This heterogeneity at the right end of the spectrum could be explained by the fact that conservatives rely on a broader set of moral foundations.

Regarding international politics, Parker et al. (2019) took a different approach to the study of moral foundations in text, yielding results that diverged from the classic liberal/conservative profiles that we have discussed, as the moral words with the highest weighted log-odds between conservatives and liberals did not appear to follow any defined pattern.

2.2.1.3 Ideological conflicts and MFT

Van Leeuwen and Park (2009) proposed that the liberal/conservative dichotomy is influenced by perceptions of social danger. Indeed, perceptions of social danger are predictors of morality, as higher perceptions of social danger correspond to higher emphasis on the binding moral foundations which, in turn, predict conservatism and political orientation.

From the work of Joseph, Graham, and Haidt (2009) we also got that American liberals are more likely to value pluralism, that is, liberals are expected to think about issues in more complex ways, which activates conflicting values of similar importance. However, this phenomenon is only visible when there is a clash between individualizing foundations. When there is a conflict between an individualizing foundation and a binding foundation, conservatives showed higher levels complexity and conflict.

Still on the topic of ideology, Koleva, Graham, Iyer, Ditto, and Haidt (2012) investigated how the moral foundations related to the “culture war” between American liberals and conservatives. Their first study examined whether the foundations predicted culture war sentiments, while also testing significance for demographic variables, religious attendance, interest in politics, and political ideology. They found that Sanctity/Degradation was the moral foundation that best predicted of disapproval on culture war issues, namely when it came to issues related to sexuality, relationships and marriage, and the sanctity of life, as well as gambling. The effect of Sanctity/Degradation on these predictions was considerably higher than that of the other moral foundations, for most issues, but Harm/Care was the strongest predictors of disapproval of medical testing on animals, and the second strongest (after ideology) for disapproval of the death penalty. Fairness/Reciprocity, Authority/Subversion, and Loyalty/Betrayal were significantly associated with multiple issues but were not the top predictors for any of them, though Loyalty/Betrayal was the second strongest moral foundation predictor, after Sanctity/Degradation, on the issue of flag burning.

Additionally, for most of the culture war issues, the strongest unique predictor was a sub-scale of the MFQ (often Sanctity/Degradation) rather than political ideology, interest in politics, religious attendance, or any demographic variable. In contrast, Fairness/Reciprocity and Authority/Subversion were both weak predictors. Koleva et al. (2012) conjecture that this happens because these moral foundations are already translated in ideological self-placement. Yet, on issues such as abortion, euthanasia, or same-sex relationships, the moral foundations that would often be associated with these topics, such as Harm/Care or Fairness/Reciprocity, were not the top predictor, which was Sanctity/Degradation.

Due to the heavy influence of Sanctity/Degradation on predicting disapproval of culture war issues, this study was taken further by looking at issues that would not relate to Sanctity/Degradation, directly or indirectly. Again, Fairness/Reciprocity and Authority/Subversion were not strong predictors for any of the topics, but the individual’s moral profile predicted political attitudes considerably better than the non-moral foundation variables considered. Indeed, all of the issues were significantly associated with two or more moral foundations, which predicted more unique variance than demographic data or political interest, while ideology explained the most variance. These results suggest that stands on politically divisive issues tend to fall along ideological lines, while the MFQ scores reveal the motives behind those positions. Still, the advantage of looking at the culture war through the moral foundations lens is that it allows the detection of multiple, and potentially conflicting, motives at work. Besides, adding Right-Wing Authoritarianism or Social Dominance Orientation to the analysis did not eliminate the foundation effects, though Right-Wing Authoritarianism was a powerful predictor for many issues.

From Koleva et al. (2012)’s work, it could be gathered that, if a researcher is mostly interested in predicting position on hot-button issues and could only access

one measure, then political orientation or Right-Wing Authoritarianism would be the best choice. However, if they are looking to understand the underlying psychological motivations behind these positions, using MFT may help, as the moral foundations model provides insights into political positions that go beyond demographics, ideology, or sociopolitical attitudes (Right-Wing Authoritarianism and Social Dominance Orientation).

2.2.2 Other

Besides ideology, MFT has also been used to explore the link between multiple aspects of society and morality. For example, Graham, Haidt, and Rimm-Kaufman (2008) found that two schools of thinking with regards to moral education differed with regards to what they prioritized, showing a split similar to the liberal/conservative one.

Winegard and Deaner (2010) dove into how sport fandom related to moral foundations. They discovered that sport fandom was significantly correlated with two of the binding moral foundations (Loyalty/Betrayal and Authority/Subversion), but no other foundation. When they looked only at males there was significant correlation between all the binding foundations and sport fandom, but for females only Loyalty/Betrayal revealed a significant correlation with sport fandom.

There was no correlation between a measure of family loyalty² and sport fandom. Furthermore, men scored significantly higher on sport fandom than women and also significantly higher on loyalty, where women scored significantly higher on all other foundations with the exception of Authority/Subversion, for which there was no significant sex difference.

The authors questioned whether the difference in sport fandom scores among either sex was mediated by loyalty but found that sex had a significant effect on loyalty and sport fandom, and that loyalty partially mediated the sex difference in sport fandom, meaning that sex still plays a role in explaining this difference. These results did not translate to other genres of TV, namely the correlation between Loyalty/Betrayal and watching any TV genre.

With regards to personality, Hirsh, DeYoung, Xu, and Peterson (2010) studied how moral foundations interacted with personality traits. Firstly, they noticed how moral values that are usually linked to order and traditionalism, that is, the binding foundations, were related to higher levels of Conscientiousness³ and lower levels of Openness-Intellect⁴, which could be explained by the Orderliness dimension that is part of Conscientiousness, but not Industriousness.

²Different from the moral foundation of Loyalty/Betrayal

³Can be interpreted as a dimension that holds impulsive behavior in check, or as a dimension that organizes and directs behavior (McCrae & John, 1992)

⁴Openness-Intellect is seen structurally in the depth, scope, and permeability of consciousness, and motivationally in the need for variety and experience (McCrae & John, 1992)

In the case of egalitarian values, translated by the individualizing foundations, Agreeableness⁵ was their only significant predictor, mostly the Compassion aspect and less the Politeness dimension. Indeed, Compassion is most strongly associated with Harm/Care and Fairness/Reciprocity, where Politeness has its strongest link to Authority/Subversion, making it so that Compassion better reflects egalitarianism and Politeness is more relate to order-traditionalism.

Hirsh et al. (2010) also considered individualizing and binding foundations as unique predictors of political ideology each and found that political preferences are predicted independently by these factors. However, when performing regressions using all moral foundations to predict political orientation, significant effects were only found for Fairness/Reciprocity and Authority/Subversion. Still, when employing zero-order correlations⁶, all moral foundations, with the exception of Harm/Care, significantly predict political orientation.

Tamborini (2011) proposed that non-mediated cultural experiences shape audience moral orientations, which, in turn, drive their evaluations and responses to media content.

When exploring how religion and moral foundation interact, Graham and Haidt (2010) tried to address three mysteries:

- the first mystery was related to why religious people were happier than non-religious people. The authors predicted that in denominations that show a higher emphasis on the binding moral foundations there would be a higher correlation between participation and happiness than in congregations that are more focused on the individualizing foundations, as the binding foundations demote the needs of the self for the needs of the community and the community aspect of religion can provide meaning and well-being;
- secondly, why do religious people give more to charity? From the authors' perspective, this phenomenon is due to the fact that religious communities are often based on ideals of interdependence rather than autonomy, which lead to a willingness to part with one's own time and money;
- the final question tries to understand why most people are religious. Here, Graham and Haidt (2010) propose that early communities needed to stifle selfishness and make social life possible in order to survive, which led to the creation of a set of values which prioritized community. From them, religious practices and rituals evolved hand in hand with religious inclined minds, which now fit each other quite well.

⁵Agreeableness is a dimension that appears to involve the more humane aspects of humanity - characteristics such as altruism, nurturance, caring, and emotional support at the one end of the dimension, and hostility, indifference to others, self-centeredness, spitefulness, and jealousy at the other (McCrae & John, 1992)

⁶A correlation between two variables, without controlling for the possible influence of other variables

This work raised the question on how charities and MFT relate with each other. The work of Winterich, Zhang, and Mittal (2012) tried to find how a charity's positioning and political identity interacted to impact intentions and behavior. Before diving deeper into the issue, the authors acknowledged how, across the political spectrum, people tend to believe that liberals are more supportive of government programs and conservatives are more likely to endorse privately run programs, but how is this related to MFT?

A first study found that, indeed, liberals with high moral identity internalization would donate higher sums to government run programs, and the opposite happened for conservatives with high moral identity. In the case of individuals with low moral identity internalization, donation intentions did not differ regardless of political alignment.

The second study that Winterich et al. (2012) did took a look at how focusing on different moral foundations brought donations from people from different political orientations. Here, the participants were presented with one of two descriptions of the same charity. One of the descriptions emphasized the individualizing foundations, where the other accentuated the Sanctity/Degradation and Loyalty/Betrayal. The results were similar to the ones in the first study, with both liberals and conservatives with high moral identity showing distinctive donation patterns (liberals contributed more money to the charity more focused on Harm/Care and Fairness/Reciprocity, and vice-versa), and those with low moral identity internalization having indistinguishable charity patterns, despite being from different political fields.

Finally, a third study was conducted. This one was quite similar to the second one, but now one of the descriptions stressed the foundations of Authority/Subversion and Loyalty/Betrayal, rather than Sanctity/Degradation, and the results were not different than the ones from the previous surveys.

From this, the authors concluded that those at either end of the political spectrum were more likely to donate, as long as the charity aligned with their moral foundations.

Van Leeuwen, Park, Koenig, and Graham (2012)'s work tried to find the link between the morality of various countries, their pathogen prevalence (both present and historical), and gross domestic product (GDP) per capita. At the country-level, both historical and contemporary pathogen prevalence correlated significantly with average scores for the binding foundations, but not with Harm/Care or Fairness/Reciprocity. The binding foundations also had a moderate, but significant, correlation with GDP per capita. However, when controlling for GDP per capita, the correlation pattern remains mostly unchanged when studying the correlations between moral foundations and historical pathogen prevalence, but contemporary pathogen prevalence was not significantly correlated with any moral foundation.

Taking it further with a multilevel analysis, Van Leeuwen et al. (2012) found that historical pathogen prevalence significantly predicted endorsement of the binding

foundations, even when controlling for individual-level variation in political orientation, gender, education, and age. When looking at contemporary pathogen prevalence, the results were pretty similar, but there was also a significant effect for endorsement of Fairness/Reciprocity.

When comparing these results with each of the binding moral foundations, it made sense how endorsing ideals of Authority/Subversion and Loyalty/Betrayal would create measures that could reduce pathogen transmission, as those would promote adherence to existing traditions and norms. Furthermore, the Sanctity/Degradation foundation evolve specifically as a pathogen-defense system.

Since the introduction of the MFD by Graham et al. (2009), there has been a more machine learning oriented approach to the study of MFT. The creation of the Moral Foundations Twitter Corpus (MFTC) (Hoover et al., 2020) allowed the development of increasingly more complex and accurate algorithms whose objective is to detect morality in text, such as Araque et al. (2020)'s *MoralStrength*. Other notable works in this area include Garten et al. (2018)'s Distributed Dictionary Representation (DDR) of the MFD, or both Dehghani et al. (2016)'s or Kaur and Sasahara (2016)'s look into Twitter data. All of these works have already been explored in more depth in Section 1.1. In the same Section we also pointed out Matsuo et al. (2019)'s and Carvalho et al. (2020)'s translations of the MFD, that would allow them to kick start MFT related investigation in their own countries.

2.3 Methods

2.3.1 One-way analysis of variance (ANOVA)

ANOVA is a measure commonly used in situations involving the repeated measure of the same group of individuals. The null hypothesis for a one-way ANOVA test is that the mean for each sample will be the same, that is, for population means μ_i and sample size n (Heiberger & Neuwirth, 2009):

$$H_0 : \mu_1 = \mu_2 = \dots = \mu_i = \dots = \mu_n \quad (2.1)$$

$$H_1 : \text{Not all } \mu_i \text{ are equal } (i = 1, \dots, n) \quad (2.2)$$

In order to test this, the F-statistic is calculated:

$$F = \frac{\text{explained variance}}{\text{unexplained variance}} = \frac{\text{between-group variability}}{\text{within-group variability}}. \quad (2.3)$$

The “explained variance” is defined by:

$$\sum_{i=1}^K \frac{\bar{Y}_i - \bar{Y}}{K - 1}, \quad (2.4)$$

and the “unexplained variance” by:

$$\sum_{i=1}^K \sum_{j=1}^{n_i} \frac{(Y_{ij} - \bar{Y}_i)^2}{N - K}, \quad (2.5)$$

where \bar{Y}_i is the sample mean of the i^{th} group, \bar{Y} is the overall mean of the data, K is the number of groups, Y_{ij} is the j^{th} observation in the i^{th} group and N is the overall sample size.

The null hypothesis is rejected if the F-statistic is greater than the critical value of the F-distribution, commonly 0.05.

2.3.2 Linguistic Inquiry and Word Count (LIWC)

The LIWC algorithm was created to study verbal and written speech samples and evaluate its emotional, cognitive, and structural components. The idea behind LIWC was that identifying and classifying the words used in someone’s speech would provide us with “rich information about their beliefs, fears, thinking patterns, social relationships, and personalities” (Pennebaker et al., 2015).

When reading a text file or machine-readable equivalent, LIWC reads a word at a time and processes it, by searching for a match on the dictionary file. If a match is found, the corresponding category count is incremented. The LIWC2015 default dictionary is comprised of around 6400 words, word stems, and select emoticons, that define emotional categories making this a tool for sentiment analysis. However, LIWC can also be used in pair with other dictionaries, like Graham et al. (2009) did when they used the MFD to find words related to each moral foundation.

Of course, word count models do not account for context or word order. Such a model would look at the sentence “I am not happy”, identify the word “happy”, and classify the sentence as conveying a positive emotion, despite the negative adverb. In the case of LIWC, a good dictionary could overcome this limitation to some extent, and that is the case for the default LIWC2015 dictionary, whose validity has been thoroughly verified.

2.3.3 Weighted log-odds

Monroe, Colaresi, and Quinn (2008) presented a way to use weighted log-odds to study the differences between speeches by Republican and Democratic U.S. senators. Here, the goal was to model the choice of a word as a function of party i , $P(w|i)$, but this could also be thought of as modeling the choice of word as a function of group i .

The authors started by modelling word usage in the full collection of documents:

$$y \sim \text{Multinomial}(n, \pi) \quad n = \sum_{w=1}^W y_w \quad (2.6)$$

where y_w represents the counts of word w . Moreover, π is a W -vector of multinomial probabilities, constrained to be in the $(W-1)$ -dimensional simplex.

By considering the following log-odds transformation and its inverse:

$$\beta_w = \log(\pi_w) - \log(\pi_1) \quad w = 1, \dots, W, \quad (2.7)$$

$$\pi_w = \frac{\exp(\beta_w)}{\sum_{j=1}^W \exp(\beta_j)}, \quad (2.8)$$

as well as the likelihood function for a multinomial distribution:

$$L(\pi|y) = \prod_{w=1}^W \pi_w^{y_w}, \quad (2.9)$$

since Monroe et al. (2008) defined π_w as a function of β_w , they also got:

$$L(\beta|y) = \prod_{w=1}^W \left(\frac{\exp(\beta_w)}{\sum_{j=1}^W \exp(\beta_j)} \right)^{y_w} \quad (2.10)$$

and the corresponding log-likelihood:

$$\ell(\beta|y) = \sum_{w=1}^W y_w \log \left(\frac{\exp(\beta_w)}{\sum_{j=1}^W \exp(\beta_j)} \right). \quad (2.11)$$

Within group partitions, indexed by i , the model goes through with the addition of superscripts:

$$y^{(i)} \sim \text{Multinomial}(n^{(i)}, \pi^{(i)}), \quad (2.12)$$

and parameters such as $\beta_w^{(i)}$ and the log-likelihood $\ell(\beta^{(i)}|y^{(i)})$ are defined analogously.

The lack of covariates resulted in an immediately available analytical solution for the maximum likelihood estimate (MLE) of $\beta_w^{(i)}$, since:

$$\hat{\tau}^{MLE} = y \cdot \frac{1}{n} = \left(\frac{y_1}{n}, \frac{y_2}{n}, \dots, \frac{y_W}{n} \right), \quad (2.13)$$

they got $\hat{\beta}^{MLE}$ through the transformation defined by (2.7).

The following step in the Bayesian model was to specify the prior, using the conjugate distribution of the multinomial, the Dirichlet:

$$\pi \sim \text{Dirichlet}(\alpha) \quad (2.14)$$

where α was a W -vector, $\alpha_w > 0$. Here, the interpretation of α was that any Dirichlet prior defined by α affects the posterior exactly as if $\alpha_w - 1$ instances of the word w had been observed in the data. α can be defined in a way to be arbitrarily uninformative,

for example, $\alpha_w = 0.01$ for all w . This could be carried through to group partitions by use of superscripts.

Since the Dirichlet is the conjugate of the multinomial, Monroe et al. (2008) could also determine the full Bayesian estimate using the Dirichlet prior, as it is analogous to what was defined in (2.13):

$$\hat{\pi} = (y + \alpha) \cdot \frac{1}{n + \alpha_0} \quad \alpha_0 = \sum_{w=1}^W \alpha_w \quad (2.15)$$

These results went through to partitions through the superscripts.

Taking the odds of word w , relative to all others, as

$$\Omega_w = \frac{\pi_w}{1 - \pi_w}$$

and the log-odds-ratio as

$$\delta_w^{(i)} = \log \left(\frac{\Omega_w^{(i)}}{\Omega_w} \right)$$

with additional superscripts for specific groups, the authors deduced the following:

$$\delta_w^{(i)} = \log \left(\frac{\pi_w^{(i)}}{1 - \pi_w^{(i)}} \right) - \log \left(\frac{\pi_w}{1 - \pi_w} \right). \quad (2.16)$$

Note how the Ω_w are functions of the π_w , so estimates of the Ω_w follow directly from the $\hat{\pi}_w$. As such, from the estimate of $\hat{\pi}_w$ defined in (2.15), they got:

$$\hat{\delta}_w^{(i)} = \log \left(\frac{\frac{y_w^{(i)} + \alpha_w^{(i)}}{n + \alpha_0}}{1 - \frac{y_w^{(i)} + \alpha_w^{(i)}}{n + \alpha_0}} \right) - \log \left(\frac{\frac{y_w + \alpha_w}{n + \alpha_0}}{1 - \frac{y_w + \alpha_w}{n + \alpha_0}} \right), \quad (2.17)$$

$$\hat{\delta}_w^{(i)} = \log \left(\frac{y_w^{(i)} + \alpha_w^{(i)}}{n + \alpha_0 - y_w^{(i)} - \alpha_w^{(i)}} \right) - \log \left(\frac{y_w + \alpha_w}{n + \alpha_0 - y_w - \alpha_w} \right). \quad (2.18)$$

By having a specified model, it was now possible to get an approximation of the variance of these estimates:

$$\sigma^2(\hat{\delta}_w^{(i)}) \approx \frac{1}{y_w^{(i)} + \alpha_w^{(i)}} + \frac{1}{n^{(i)} + \alpha_0^{(i)} - y_w^{(i)} - \alpha_w^{(i)}} + \frac{1}{y_w + \alpha_w} + \frac{1}{n + \alpha_0 - y_w - \alpha_w}, \quad (2.19)$$

$$\sigma^2(\hat{\delta}_w^{(i)}) \approx \frac{1}{y_w^{(i)} + \alpha_w^{(i)}} + \frac{1}{y_w + \alpha_w}, \quad (2.20)$$

where the approximation in Equation (2.19) presupposed that $y_w^{(i)} \gg \alpha_w^{(i)}$ and ignored covariance terms that will typically be close to zero, and Equation (2.20) assumed $n^{(i)} \gg y_w^{(i)}$, $n \gg y_w$. Monroe et al. (2008) viewed these approximations as unnecessary but reasonable for documents of moderate size, as at 1000 words only the fourth decimal point is affect and these help make these equations clearer.

The final step was to get the weighted log-odds, ζ , as this measure is a function of the variables that were defined thus far:

$$\zeta_w^{(i)} = \frac{\hat{\delta}_w^{(i)}}{\sqrt{\sigma^2 \left(\hat{\delta}_w^{(i)} \right)}} \quad (2.21)$$

2.3.4 Linear Regression

Following the explanation provided by Groß (2012), linear models allow the formulation a linear relationship between a variable y and variables x_1, \dots, x_p , and thus making it possible to explain y through x_1, \dots, x_p :

$$y = \beta_0 + \beta_1 x_1 + \dots + \beta_p x_p. \quad (2.22)$$

Of course, when working with experimental data rather than a theoretical model, linear regressions will not model the relationship between y and x_1, \dots, x_p perfectly. Therefore, the equation must be updated:

$$y = \beta_0 + \beta_1 x_1 + \dots + \beta_p x_p + \epsilon, \quad (2.23)$$

where ϵ is the error variable, which is random but non-observable.

To define the interaction between y and x_1, \dots, x_p it is necessary to determine the $\beta_0, \beta_1, \dots, \beta_p$ parameters. When there are sample values of y_1, \dots, y_n given fixed values of $(x_{1,1}, \dots, x_{1,p}), \dots, (x_{n,1}, \dots, x_{n,p})$ it is possible to deduce the values of $\beta_0, \beta_1, \dots, \beta_p$, such that $\sum_{i=1}^n \epsilon_i^2$ is minimized, given that:

$$y_i = \beta_0 + \beta_1 x_{i,1} + \dots + \beta_p x_{i,p} + \epsilon_i. \quad (2.24)$$

Furthermore, there is the assumption that all ϵ_i have the same variance, σ^2 , and that two ϵ_i and ϵ_j are uncorrelated for $i \neq j$. With this, the n equations and the assumptions about ϵ_i can be written as:

$$y = X\beta + \epsilon \quad \epsilon \sim (0, \sigma^2 I_n) \quad (2.25)$$

where

$$y = \begin{pmatrix} y_1 \\ \vdots \\ y_n \end{pmatrix} \quad (2.26)$$

$$X = \begin{pmatrix} 1 & x_{1,1} & \dots & x_{1,p} \\ \vdots & \vdots & \ddots & \vdots \\ 1 & x_{n,1} & \dots & x_{n,p} \end{pmatrix} \quad (2.27)$$

$$\beta = \begin{pmatrix} \beta_0 \\ \beta_1 \\ \vdots \\ \beta_p \end{pmatrix} \quad (2.28)$$

$$\epsilon = \begin{pmatrix} \epsilon_1 \\ \vdots \\ \epsilon_n \end{pmatrix} \quad (2.29)$$

This means that the least squares estimator for β is given by:

$$\hat{\beta} = (X'X)^{-1}X'y, \quad (2.30)$$

which defines the linear model. When all variables x_1, \dots, x_p are quantitative, this model will be called a linear regression and, if $\beta_0 \neq 0$, a regression with intercept.

2.3.5 Multi-dimensional scaling (MDS)

According to Cox and Cox (2008), when trying to study the proximity between objects, this nearness might not always be as straightforward as the Euclidean distance. Indeed, given how many measures of proximity there are, for both quantitative and categorical data, it is possible that the right measure for our study is hard to visualize and interpret.

Proximity can be measured either by similarity or dissimilarity, which give information on how similar or dissimilar objects are. These measures are usually non-negative, and the dissimilarity of an object with itself is zero, while the similarity of an object with itself is the maximum similarity possible. Note that similarity measures are often scaled so that the maximum similarity is one.

Given n objects with a set of dissimilarities, MDS tries to project these objects onto a set of points in some space, where the distances between points represent the dissimilarities between the objects. That is, for $X = [x_{ri}]$, where X is the data matrix for n objects on p variables ($r = 1, \dots, n; i = 1, \dots, p$), if we define the dissimilarity between objects r and s as δ_{rs} , then the distance between the projections of r and s will be determined as:

$$d_{rs} = f(\delta_{rs}), \quad (2.31)$$

where f is a continuously monotonous function that attempts to transform the dissimilarities into distances.

2.3.6 Unsupervised learning

Unsupervised learning is a way to classify unlabeled data. There are countless algorithms that perform this task, some of which can be visualized in Figure 2.3, but in this work we only focused on three of them.

2.3.6.1 Hierarchical clustering (Ward's method)

Hierarchical clustering stems from the idea that points that are close to one another must be clustered.

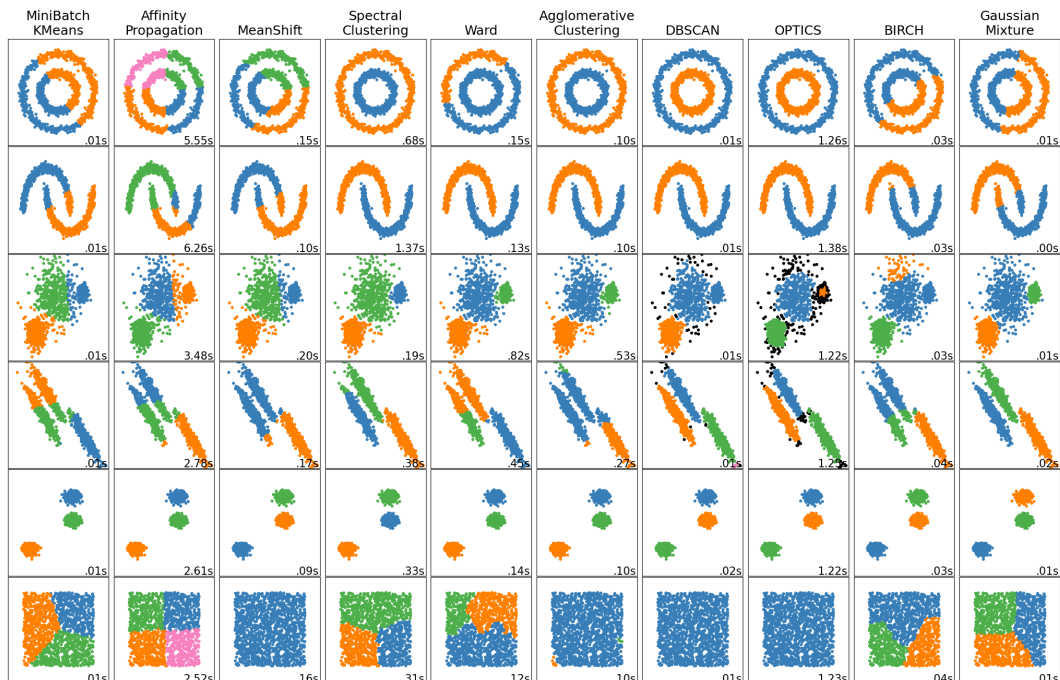


Figure 2.3: Comparing different clustering algorithms on toy datasets (taken from Buitinck et al. (2013))

Take C_0 to be the initial clustering stage, at which all clusters are singletons⁷, and consider $\alpha_0 = 0$, as α_i is the within-cluster variance at stage i , and at stage 0 the within-cluster variance is none.

If we are given the clustering at stage C_{i-1} , and D_{i-1} is the distance matrix between the clusters at this stage, then we find α_i to be the smallest non-zero element of D_{i-1} , merge the corresponding points, and get C_i . These steps are repeated until there is a single cluster and we can then evaluate at which stage C_i we got the best clustering. (Johnson, 1967)

2.3.6.2 Density-Based Spatial Clustering of Applications with Noise (DBSCAN)

According to Schubert, Sander, Ester, Kriegel, and Xu (2017), DBSCAN is a model that takes a database, a radius ϵ , a density threshold, that is, the minimum required number of points within radius ϵ so that the center is not considered noise, and a distance function; and proceeds to label the points in the database with cluster labels according to the density of the dataset.

All points in the database start unlabeled. For each point p in the database, if it is unlabeled, we define how many neighbors it has based on radius ϵ and the distance function we provided. If the number of neighbors of p is less than the density threshold, then it is considered noise, otherwise, we label p with a cluster label c . Each neighbor q of p is also labelled c , even if it had previously been considered noise. This iterative

⁷A singleton is a cluster with only one element

process continues until all points have either been labelled as part of a cluster or as noise.

2.3.6.3 Spectral Clustering

Spectral clustering is an algorithm that clusters points based on eigenvectors of matrices derived from the data (Ng, Jordan, & Weiss, 2002).

From a set of points $S = s_1, \dots, s_n$ in \mathbb{R}^l , let $A \in \mathbb{R}^{n \times n}$ be an affinity matrix such that

$$A_{ij} = \exp(-\|s_i - s_j\|/2\sigma^2) \text{ for } i \neq j \text{ and } A_{ii} = 0.$$

Then, define D as the diagonal matrix where D_{ii} is the sum of all elements in the i^{th} row of A , and construct the matrix

$$L = D^{-1/2}AD^{-1/2}.$$

With x_1, x_2, \dots, x_k as the k -largest eigenvectors of L (which are orthogonal to each other, in the case that there are repeated eigenvalues), we get the matrix

$$X = [x_1 x_2 \dots x_k] \in \mathbb{R}^{n \times k}.$$

Consider then Y such that

$$Y_{ij} = X_{ij} / \left(\sum_j X_{ij}^2 \right)^{1/2},$$

that is, Y is X after normalizing the rows so that they have unit length. We cluster each row of Y as if it were a point in \mathbb{R}^k into k clusters, using k-means.

Finally, we assign each point s_i to cluster j if and only if row i of matrix Y was assigned to cluster j .

Notice that the scaling parameter σ^2 controls how rapidly the affinity A_{ij} falls off with the distance between s_i and s_j .

But why would we perform all these transformations instead of using k-means directly? This algorithm allows a minimization of distortion, as once it maps the points to \mathbb{R}^k they form tight clusters.

2.4 Metrics

2.4.1 Jaccard score

The Jaccard score computes the average of Jaccard similarity coefficients between pairs of label sets.

The Jaccard similarity coefficient of the i^{th} samples, where the ground truth label set is y_i and predicted label set is \hat{y}_i , is defined as:

$$J(y_i, \hat{y}_i) = \frac{|y_i \cap \hat{y}_i|}{|y_i \cup \hat{y}_i|} \quad (2.32)$$

2.4.2 Precision

The precision is the ratio:

$$\frac{TP}{TP + FP} \quad (2.33)$$

where TP is the number of true positives and FP is the number of false positives. In other words, precision measures how well a classifier does not label a negative sample as positive.

2.4.3 Recall

The recall is the ratio:

$$\frac{TP}{TP + FN} \quad (2.34)$$

where TP is the number of true positives and FN is the number of false negatives. Alternatively, you could say that recall measures how well a classifier finds all positive samples.

2.4.4 f1-score

The f1-score could be seen as a harmonic mean of the precision and recall, where its best value is 1 and the worst is 0. The formula for the f1-score is:

$$f1 = \frac{2 \times (\textit{precision} \times \textit{recall})}{\textit{precision} + \textit{recall}} \quad (2.35)$$

2.4.5 Hamming loss

The Hamming loss is a metric that corresponds to the average Hamming loss or Hamming distance between two sets of samples.

Take \hat{y}_j as the predicted value for the j^{th} label of a given sample, where y_j is its true value and n is the number of labels or classes, then the Hamming loss is defined as:

$$L_{\textit{Hamming}}(y, \hat{y}) = \frac{1}{n} \sum_{j=0}^{n-1} 1(\hat{y}_j \neq y_j) \quad (2.36)$$

where $1(x)$ is the characteristic function, that is, $1(x) = 1$ if x is true and $1(x) = 0$ if x is false.

MORAL FOUNDATIONS DICTIONARY IN EUROPEAN PORTUGUESE

Since the Portuguese cultural context has not yet been looked at through the lens of Moral Foundations Theory (MFT), resources such as annotated text are lacking. In order to create a European Portuguese Moral Foundations Dictionary (MFD), we adapted the process developed by Matsuo et al. (2019), adding a few extra validations and using different tools. This dictionary is what will allow us to study how moral foundations and political parties relate.

Also, from this chapter on we shall refer to the five moral foundations as Harm (Harm/Care), Fairness (Fairness/Reciprocity), Ingroup (Loyalty/Betrayal), Authority (Authority/Subversion), and Purity (Sanctity/Degradation).

3.1 Development of the MFD

The original MFD, developed by Graham et al. (2009) for the American context, took a list of words and word stems¹ and classified each of them as being related to one or more moral foundations. Additionally, these words were categorized as either virtues or vices, if they followed or violated the respective moral foundation. Finally, another class was also included, *Morality General*, which considered words that were related to morality but not specific foundations, such as *good* or *bad*. These classes were codified in numbers as described in Table 3.1.

The translation stage consisted of six steps:

1. Unfold word stems;
2. Eliminate non-moral and obsolete words;
3. Translation;
4. Filter by commonness;

¹Word stems are parts of words. In this case, word stems are parts of words to which suffixes can be attached and are identified by a “*” at the end of the word

	Virtue	Vice
Harm	1	2
Fairness	3	4
Ingroup	5	6
Authority	7	8
Purity	9	10
Morality General	11	

Table 3.1: How the MFD classes were encoded

5. Back-translation check;
6. Eliminate non-moral words and adjust moral categories.

All processes are automatic with the exception of steps 2 and 6.

Starting from the American MFD, all the words stems were unfolded by scraping *OneLook* (Datamuse, 1996) to find all words starting with those stems, using the *Common Words* filter. Taking the stem “safe*” as an example, it expanded to “safety”, “safeties”, “safest”, and “safes”.

Then, the *Merriam-Webster* online dictionary (Merriam-Webster, n.d.) was also scraped to find which words had meanings flagged as *obsolete* or *archaic*. For example, the word “sympathetical” showed up in our list of words despite being an archaic version of “sympathetic”, and words such as “peace” were flagged in this step as well because they had some meanings that we do not consider anymore.

Not all words were found on *Merriam-Webster*, such as “protectingly”. In these cases, *Wiktionary* (Wikimedia Foundation, n.d.) was utilized to search for the same information, again using web scraping tools. Looking at “protectingly” again we saw that it did not have any archaic meanings.

Manually, all the words in the dictionary obtained after checking *OneLook* were reviewed with the goal of eliminating any that were non-moral or obsolete, giving special attention to those flagged as archaic by either dictionary. Finding which words have outdated definitions was a step that was not present in the original Matsuo et al. (2019) methodology, but it was found that it helped to identify words that are not in common use anymore, rather than relying only on the manual process.

In order to translate the resulting list of words to Portuguese, *Cambridge University’s English (US) - Portuguese* dictionary (Cambridge University Press, n.d.-a) was used. Translations that were expressions rather than words were dismissed, like in the case of “care”, which included “gostar de” as one of the translations, which was excluded, and, for words that translated to reflexive verbs, the verb in the infinitive was manually added to the list of translations. Again, in the instance of “care”, this word also translated to “preocupar-se”, so the verb “preocupar” was added to our list of words.

The MFD is meant to represent current Portuguese speech, so uncommon words were filtered using the resources in the Corpus de Referência do Português Contemporâneo (Reference Corpus for Contemporary Portuguese) (CRPC) (Mendes & Bacelar do Nascimento, 2014). By using web scraping tools on the *Word Look* query, it was possible to find the frequency of the MFD words. The word “valorizar” shows up 3839 times in the considered corpora. However, because of the Portuguese Language Orthographic Agreement of 1990 some words on the dictionary show up in the CRPC with a different orthography. This is the case for the word “infrator”, for example, which shows up in the CRPC as “infractor”. This was not the case for many words, so they were searched manually with the old orthography, as the interest was more on how common the word is in the Portuguese language, and not if the orthography is common. For words that were radicals on the original dictionary, the 10 most common translations were kept, and, in the case of plain words, the 5 most common translations were kept, like with the word “rights”, for which there were 10 different translations, words such as “exato” or “correto” were removed because they were not as common as “bem” or “certo”.

To guarantee that the translated words kept the moral charge of the original words, a back translation check was performed by scraping *Cambridge University’s English (US) - Portuguese* dictionary (Cambridge University Press, n.d.-b). All the words for which the backtranslation differed from the original were eliminated. For example, the word “care” translated to “preocupar”, which backtranslated to “to worry” or “to concern”, but never to “care”. Thus, “preocupar” was removed.

Finally, all the resulting Portuguese words were checked to guarantee that they were all moral and the moral categories were adjusted such that they would better reflect the Portuguese reality. Some words had the same moral foundation as the original dictionary word, such as “care” and “cuidado”, while other did not, such as “harmony”, from “harm*”, which was originally classified as a Harm Vice words, and was then considered a Morality General word. Derived of this process, the outcome was a list of words, unlike the original MFD which was a list of words and word stems. Manually, words that started the same way and had the same moral foundations were gathered into lemmas, checking the CRPC to make sure that using the lemma on a word search program would not yield unwanted results. Also, because of the Portuguese Language Orthographic Agreement of 1990 (Instituto de Linguística Teórica e Computacional, 1990) double orthography was considered for some words and word stems, like with “protec*” (protector) and “protet*” (protetor).

Figure 3.1 illustrates each step of the process using the stem “safe*” as an example.

3.2 Validation of the MFD

In order to test the validity of the resulting dictionary, a survey was created, inspired, again, by the work in Matsuo et al. (2019).

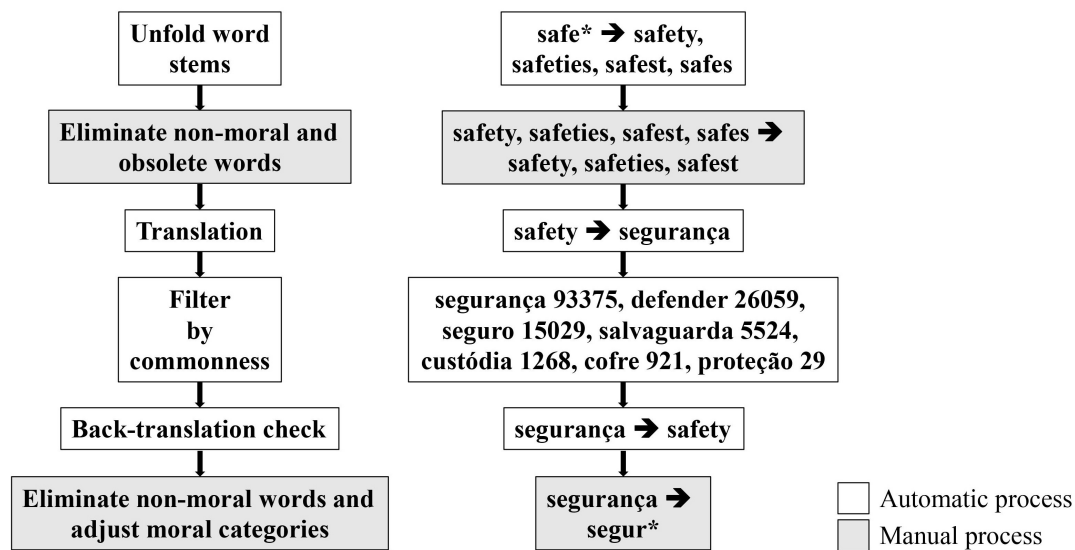


Figure 3.1: Illustrative workflow of the translations process (left) using the stem “safe*” as an example (right)

In this survey, the participants read brief explanations on each moral foundation and described all possible situations where the foundations were validated or violated. Then they were asked to fill the Moral Foundations Questionnaire (MFQ) in European Portuguese to examine the relation between the reported moral situations and the MFQ score. Our dictionary would be considered as valid if a one-way analysis of variance (ANOVA) showed a main effect of moral foundations, that is, if there was a significantly higher frequency of words from the moral foundation in question than the words from the remaining moral foundations.

We also decided to test the hypothesis that Matsuo et al. posed with their work, that people with a high score on a certain foundation would have more organized and articulated thoughts when describing situation related to that foundation.

This hypothesis was tested for each of the five moral foundations by measuring:

1. How many words were used to describe the situations (both violations and validations of the foundation);
2. How many foundation-related words were used when describing the situations.

Two surveys had to be done, as it was found that the first one was not clear enough and misled the respondents.

3.2.1 First Survey

The survey presented by Matsuo et al. (2019) was in Japanese and, as such, had to be translated to European Portuguese. Since they included an English version of the survey in their writing, the translation used was based on those texts. When it came to

the MFQ, the Moral Foundations website² provided a version in European Portuguese which was used (Frias, 2011).

Participants were recruited by making the survey publicly available and trying to reach the maximum number of people possible, using social media and university platforms.

This survey had a total of 307 recorded responses, however only 101 of the participants finished the survey and only those answers were considered for analysis. Around 70% of the repliers were female (F) and 27% were male (M), with the remaining 3% either preferring to not answer (rather not respond (NR)) or identifying as other (O) (Figure 3.2a).

All responders lived in Portugal at the time of their participation in the survey but only 93% of them were originally from Portugal (PRT). The other participants were from Brazil (BRA), Mozambique (MOZ), S. Tomé and Príncipe (STP), Colombia, and Canada (O) (Figure 3.2b). Similarly, 93% of the repliers spoke Portuguese as their first language, with the other participants speaking English and Spanish as their first language.

Age wise, the participants were between the ages of 18 and 74, with the majority of them being 18 (18%) when they filled out the survey. The age bracket between 20 and 29 had the most answerers (48%), and participants over 40 corresponded to less than 10% of responders (Figure 3.2c).

The overwhelming majority of participants had a level of education between high school (HS) and a master's degree (Md), with only 1% being qualified with a doctorate's degree (PhD) and 1% having a level of education lower than high school (basic education (Be)) (Figure 3.2d).

Finally, most responders were full-time students (STU) (48%) and 32% of answerers were employed (E). Only a few (10%) were unemployed (U) or retired (R) and 1% of participants were self-employed (SE) (Figure 3.2e).

However, looking at the responses to the survey (Figure 3.3), the results indicated that there was a gap between what was expected for each moral foundation and the answers given. Though it was possible that the participants had a different understanding of the moral foundations than the creators of the survey, it was concluded that the issue lied with how the survey was written.

3.2.2 Second survey

In order to fix the issues found in the first survey, another base text was chosen for the definitions of the Moral Foundations. Now, Haidt (2012) was the source of the definitions provided to the participants.

²moralfoundations.org

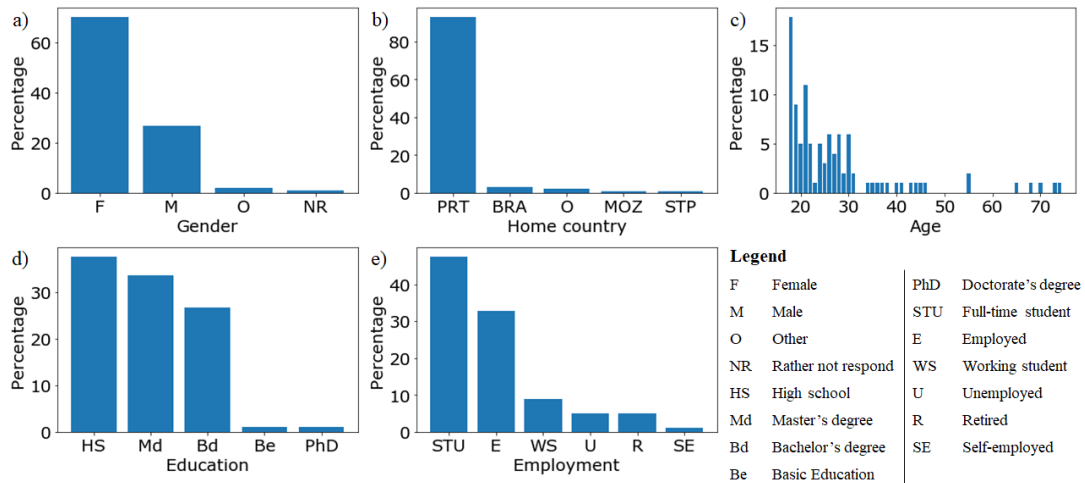


Figure 3.2: Distribution of demographic metrics across survey participants (first survey)

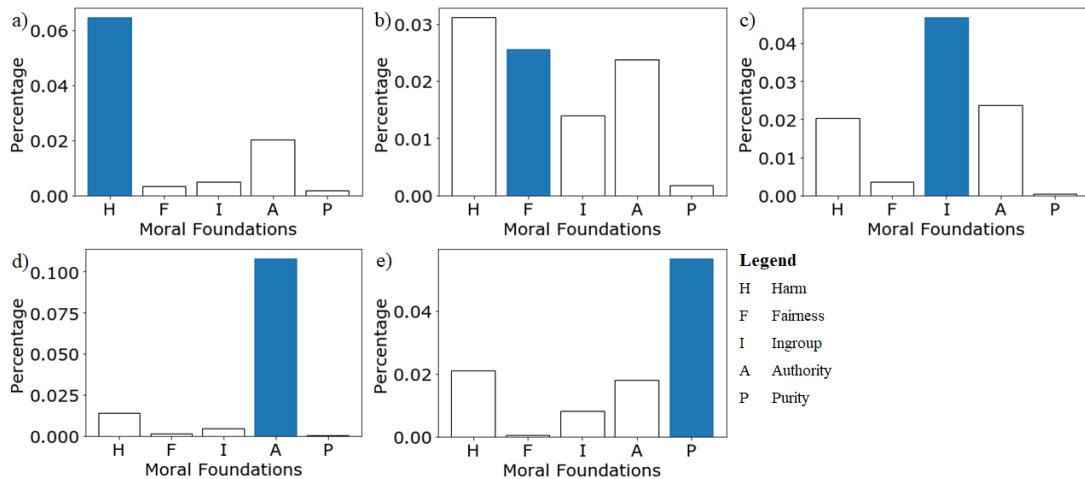


Figure 3.3: Mean percentage of dictionary words in examples for each Moral Foundation (first survey)

To guarantee that this version did not create as much confusion in the responders as the original one did, a question asking if the participant had understood the definition of the moral foundation present in the survey was added.

Another way the second survey differed from the first one was that now participants were not only found by sharing the survey on social media and university platforms, but also using Prolific. Since the Prolific participants were being paid, unlike the others, there was a need to add attention checks to the survey to authenticate the validity of the responses.

From this survey we got 426 valid responses. Unlike the first questionnaire, here approximately 61% of the respondents were male (M) and 39% were female (F) (Figure 3.4a).

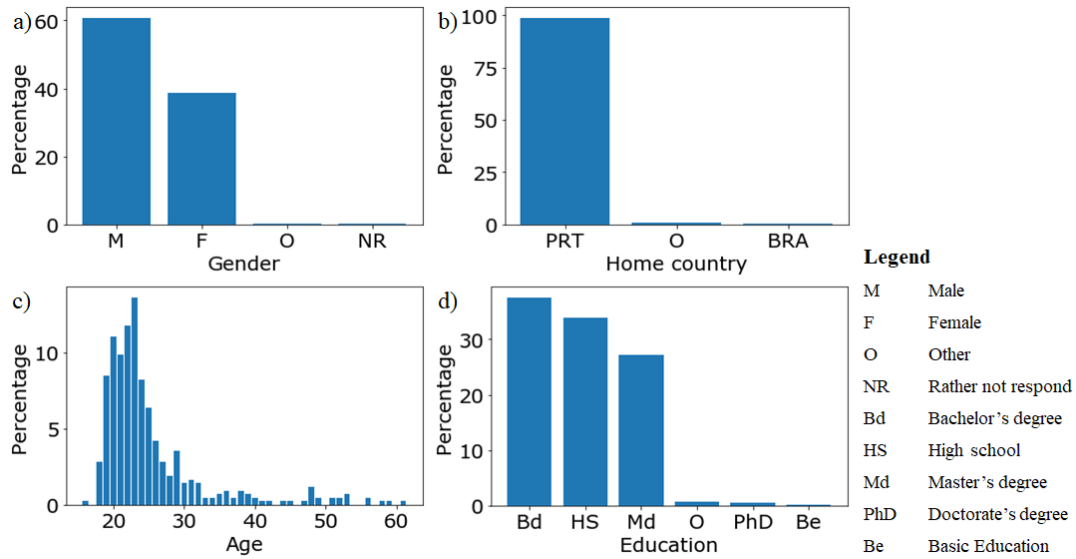


Figure 3.4: Distribution of demographic metrics across survey participants (second survey)

The overwhelming majority of participants were Portuguese (PRT) (98%), with only one participant being from Brazil (BRA), one from France, and one from Ukraine (other (O)) (Figure 3.4b). 98% is also the number of participants who speak Portuguese as their first language, with the remaining 2% speaking French, English, and Russian instead.

With regards to age, the participants were aged between 16 and 61, where most participants (14%) were 23 at the time of participation. Just like in the first survey, the age bracket between 20 and 29 had the most answers (73%), and less than 10% of all participants were over 40 (Figure 3.4c).

Similarly to what happened with the first survey, most participants had a level of education between high school (HS) and a master's degree (Md), where all other qualifications had less than 1% of participants each. The answers who selected the "Other" (O) category had technical degrees whose qualifications are between a bachelor's degree (Bd) and a high school diploma (Figure 3.4d).

In the end, we decided to remove the question related with employment from our second survey as we felt it was unnecessary to characterize our sample.

3.2.3 Validating the results

Once all the responses to the surveys were collected, the first step was to reject those with failed attention checks. Then, as we used multiple collection avenues for our data, each data set was slightly different and needed some work. The survey which was shared through social connections and university platforms had no attention checks included, as well the small sample questionnaire that was posted on Prolific before

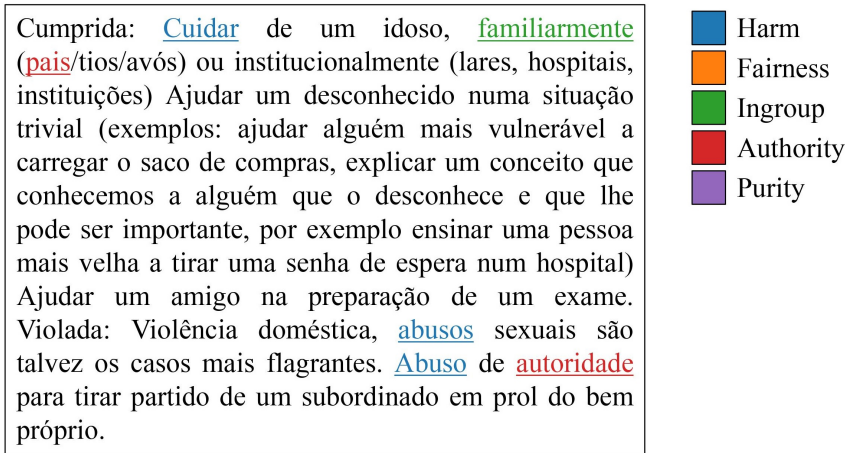


Figure 3.5: Detecting MFD words in a Harm/Care answer

launching the survey more broadly. Both these data sets did not have the attention checks included, and both of the data sets from Prolific (the test one and the final one) had the questions in a different order than the publicly available survey in order to better comply with Prolific policy. As such, we had a total of 426 valid responses: 102 from the publicly available survey, 5 from the Prolific test sample, and 319 from the final Prolific sample.

After gathering all valid responses onto a single dataset, we looked at the set of responses for each moral foundation and calculated the ratios of words related to each moral foundation within a specific moral foundation set. Taking the Harm/Care foundation as an example, we wanted to check if words related to Harm/Care were indeed more common than the words for other moral foundations. This process was repeated for the answers relative to all moral foundations. Figure 3.5 illustrates how MFD words were detected in a Harm/Care related answer, and the following formulas show how some of the ratios were defined.

$$\text{Harm Ratio in Harm Set} = \frac{\#\text{Harm Words in Harm Set}}{\#\text{All Words in Harm Set}} \quad (3.1)$$

$$\text{Fairness Ratio in Harm Set} = \frac{\#\text{Fairness Words in Harm Set}}{\#\text{All Words in Harm Set}} \quad (3.2)$$

These ratios were then plotted for each moral foundation (Figure 3.6).

From Figure 3.6 we could see that, for most moral foundations, the most commonly identified MFD words were the ones related to the foundation we were looking at, with the exception of the Ingroup foundation.

Was this phenomenon caused by people misunderstanding the concept of the Ingroup foundation or was there something wrong with our MFD? Our survey had a question to check whether the respondents understood the concepts they were being asked to expand on. Since some people claimed they did not understand the moral foundations definitions that were provided, we decided to exclude all answers

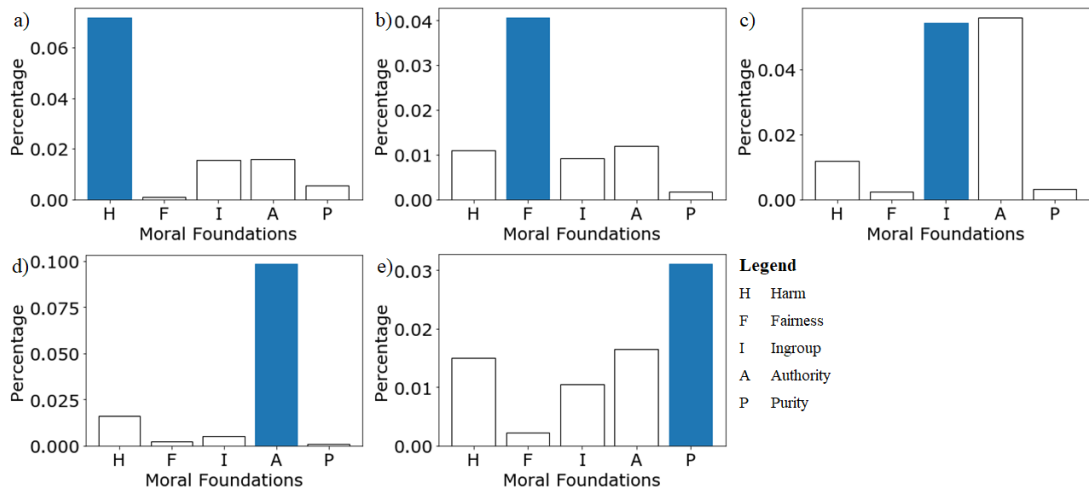


Figure 3.6: Mean percentage of dictionary words in examples for each Moral Foundation (second survey)

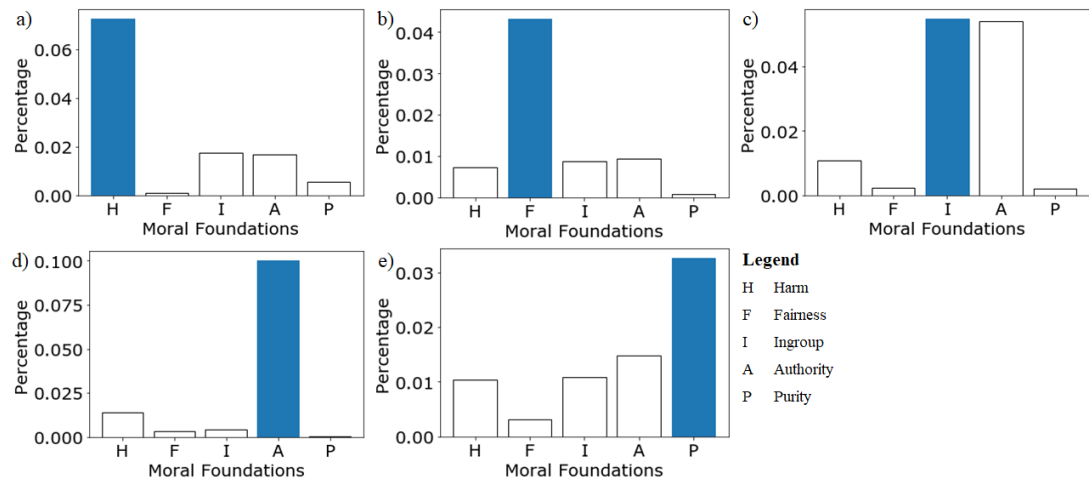


Figure 3.7: Mean percentage of dictionary words in examples for each Moral Foundation where only the participants who understand the definitions are considered

in which people had felt they did not understand at least one moral foundation. This meant we now had 147 answers, rather than the original 426, but this higher level of understanding did not translate to better results, as can be seen in the graphics in Figure 3.7.

We were led to the conclusion that we needed to change our MFD to better represent the Portuguese understanding of the Ingroup moral foundation. Still, throughout this process, there was special attention given to the fact that the MFD should not overfit to the survey responses, as the sample was not representative of the Portuguese population and language is dynamic and very personal.

Using all survey answers, for all words that were flagged as any foundation other than Ingroup (with the exception of Morality General), we calculated the ratio of each

	MFD Category	Ratio		MFD Category	Ratio
família*	Ingroup	0.0052	cumpr*	Authority	0.0038
cumpr*	Authority	0.0047	viol*	Harm	0.0030
doen*	Purity	0.0039	empati*	Harm	0.0025
abandon*	Ingroup	0.0035	grup*	Ingroup	0.0021
pais	Authority	0.0035	indivídu*	Ingroup	0.0018
(a) Harm			(b) Fairness		

	MFD Category	Ratio		MFD Category	Ratio
traí*	Authority	0.0214	viol*	Harm	0.0056
lea*	Authority	0.0185	abus*	Harm	0.0038
cumpr*	Authority	0.0066	segur*	Harm	0.0018
respeit*	Authority	0.0036	just*	Fairness	0.0010
viol*	Harm	0.0035	insult*	Harm	0.0009
(c) Ingroup			(d) Authority		

	MFD Category	Ratio
viol*	Harm	0.0065
respeit*	Authority	0.0061
cumpr*	Authority	0.0045
naciona*	Ingroup	0.0020
associ*	Ingroup	0.0018
(e) Purity		

Table 3.2: Top 5 misclassified words for each Moral Foundation

of those words in the Ingroup set. This metric allowed us to find which words show up in the “wrong” moral foundation more often, so that corrections could be made.

$$\text{“Word” Ratio in Ingroup Set} = \frac{\#\text{“Word” in Ingroup Set}}{\#\text{All Words in Ingroup Set}} \quad (3.3)$$

We got the results in Table 3.2.

With “traí*” and “lea*” showing up in the Ingroup answers more than twice as often as the next most common non-Ingroup word, we decided to change the MFD so that these words would only be Ingroup, rather than being both Authority and Ingroup as previously defined. We also changed the category of “deslea*” in the same way, as this word is the direct antonym of “lea*” and it would not make sense to have them be classified differently. Furthermore, we noticed how “cumpr*” and “viol*” were consistently misclassified across all Moral Foundations, and realized that these words were being used in the survey questions when participants were asked to describe situations that followed (cumpr*) or violated (viol*) the Moral Foundations. As such, we decided to exclude those words from the MFD altogether.

After these corrections, we plotted the same ratios as we had done previously and, at a glance, this measure appeared to correct our issues, as seen in Figure 3.8.

Furthermore, we decided to run an ANOVA test to check whether using our MFD

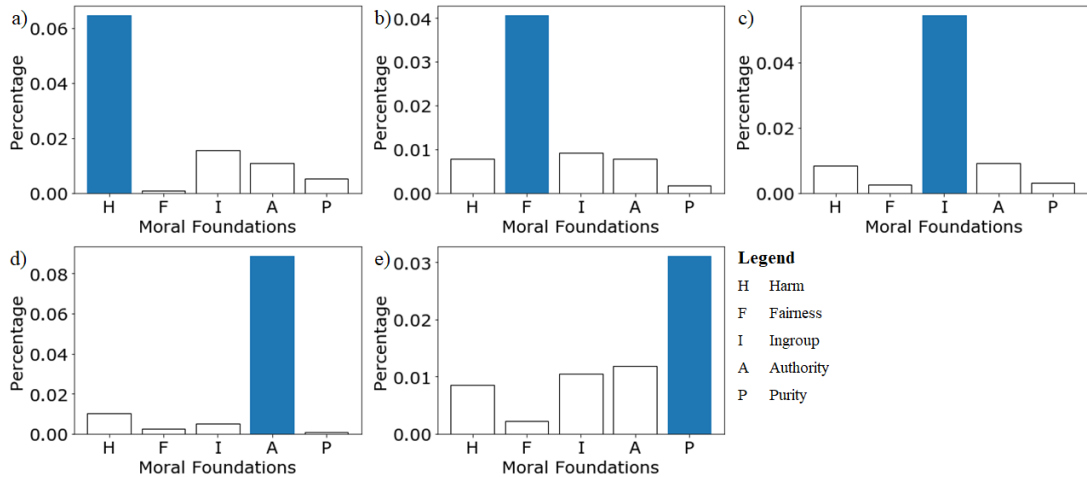


Figure 3.8: Mean percentage of dictionary words in examples for each Moral Foundation after corrections to the MFD

Moral Foundation	F	p-value
Harm	265.68	2.64×10^{-185}
Fairness	88.78	7.59×10^{-70}
Ingroup	161.71	5.94×10^{-121}
Authority	386.56	2.29×10^{-250}
Purity	58.16	1.21×10^{-46}

Table 3.3: Results of the one-way ANOVA test

in tandem with the Linguistic Inquiry and Word Count (LIWC) algorithm as a way to classify the moral foundation of different survey answers would be statistically relevant, and the results in Table 3.3 indicate that that is the fact.

When it came to testing the hypothesis investigated by Matsuo et al., the correlation results are shown in Tables 3.4 and 3.5.

Both correlations are significant for Harm and Fairness, and the second one is also significant for Authority. These results bear some similarity to those from Matsuo et al., for whom Harm and Fairness also had significant correlations with the number of words and moral words used. The authors theorized that this phenomenon was observable because Harm and Fairness were more universal foundations where the other three were more culture-dependent and, since our MFD is a work of translation from an American tool, it may miss some aspects of Portuguese culture.

By looking at the original classification of each word present in the MFD and the moral foundations of the answers where they show up, it was also possible to calculate four metrics: Jaccard, precision, recall, f1-measure, and Hamming Loss. We got these measures by considering the MFD categories for each word and the categories of the survey answers where that word showed up. We then calculated the average of these measures for each moral foundation, shown in Figure 3.9. This information allowed for conclusions about which words were more ambiguous and showed up across many

Moral Foundation	r	p-value
Harm	.1451	.0027
Fairness	.0992	.0407
Ingroup	-.0246	.6119
Authority	-.0894	.0653
Purity	-.0388	.4246

Table 3.4: Correlation between number of words used and MFQ score

Moral Foundation	r	p-value
Harm	.1192	0.0138
Fairness	.0952	0.0496
Ingroup	-.0026	0.9568
Authority	-.1029	0.0337
Purity	-.06327	0.1963

Table 3.5: Correlation between number of MFD words used and MFQ score

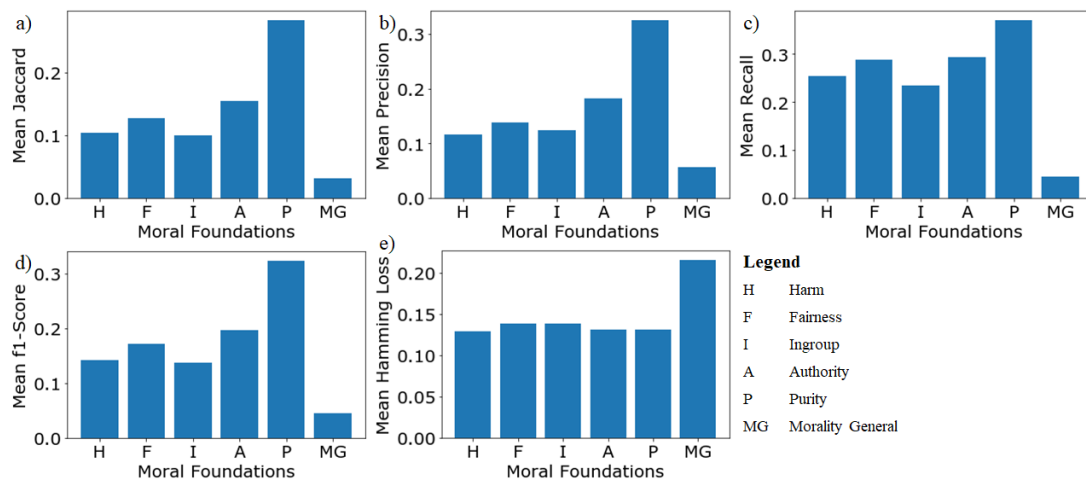


Figure 3.9: Average measures for each moral foundation

moral foundations, even if not often, and which ones were unequivocally related to very few moral foundations.

For all measures except Hamming Loss, Purity showed a significantly higher score, suggesting that Purity-related words are rarely used in other contexts, however, the ratio plots from earlier reveal that non-Purity words are often used to talk about Purity. It can also be seen that the moral foundation that consistently performs worse is Morality General, which makes sense, since this is the category for words that refer to broad aspects of morality but not any specific foundation.

APPLYING THE MORAL FOUNDATIONS DICTIONARY TO DIARY OF THE ASSEMBLY OF THE REPUBLIC TRANSCRIPTS

After having our Moral Foundations Dictionary (MFD) we decided to apply it to transcripts of the *Diário da Assembleia da República* (Diary of the Assembly of the Republic) (DAR) with two questions:

- How do the parties currently in parliament relate to each other with regards to morality?
- How have these relationships evolved over time?

4.1 Pre-processing the transcripts

In order to explore the Portuguese political spectrum through this lens, it was necessary to find text that was related to each of the political parties. For that reason, we chose to use the transcripts of the *Diário da Assembleia da República* (Diary of the Assembly of the Republic) (DAR) that can be found publicly¹. We specifically chose to only use the transcripts from *Série I* as those are the transcripts of parliamentary debates. The other *Séries* have information on proposals and votes and, as such, were not considered as relevant to our research.

These transcripts were obtained through web scraping and were processed in the steps shown in Figure 4.1.

Using Python, the first step in readying the transcripts for analysis was eliminating blank lines, ensuring that each line in the text file corresponded to someone's intervention, and replacing all em-dashes with hyphens to guarantee homogeneity in characters used. This was followed by eliminating the page headers containing the page and diary numbers and the publishing date, as this was not relevant information and meant that lines of speech were interrupted by meta information.

¹<https://debates.parlamento.pt/>

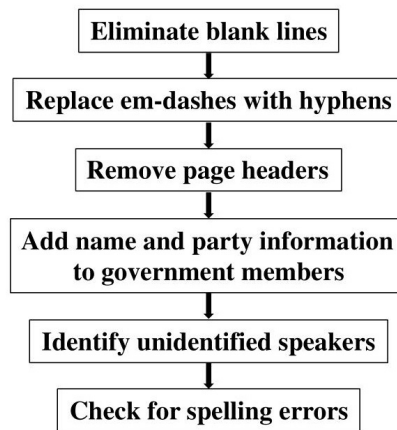


Figure 4.1: Processing steps for the DAR transcript files

Members of the government were often only identified by their function. Given that the same position can be occupied by many people over time, and vice-versa, name and party information were added in those cases.

If a line did not have an identified speaker, it was determined it was the same speaker as in the previous line, unless the line was referring to: applause, protests, laugh, pauses, votes, or changes in presidency of the assembly. This way, lines that are not interventions by members of parliament were not wrongly attributed to a speaker.

After this automatic process, all transcripts used were manually checked for orthographic errors with the help of *Microsoft Word's* spell check, as the text files contained some spelling mistakes that did not feature in the original *pdf* files, available online.

The edited transcripts were then processed line by line. Each line was classified as one of 6 categories if it did not have a specified speaker:

- **Summary:** the debate's summary;
- **Note:** notes at the end of the transcripts;
- **Proposals:** the transcripts featured legislature proposals that could be attributed to political parties;
- **Vote declaration:** members of parliament could submit a justification to their vote, and these were included after the debate;
- **Ratification:** if a specific party wanted to correct a mistake that showed in a previous diary;
- **Voices:** interventions during the debate that were not attributed to a single Member of Parliament (MP). Usually, interruptions and interjections.

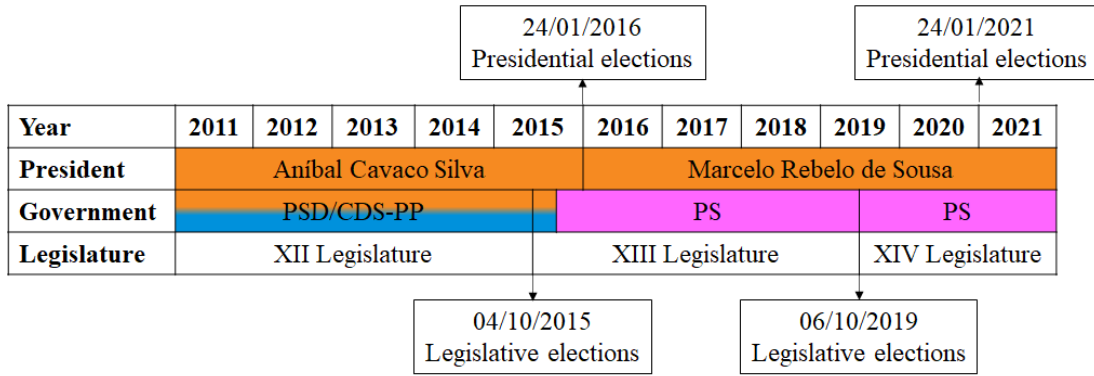


Figure 4.2: A brief timeline of the parties in power in Portuguese politics

The corresponding text was saved under that classification. If the line had a specified speaker, we saved their name and function (MP or their role within the government), as well as their intervention.

The resulting dataset includes all parliamentary sessions from 20/06/2011 to 22/07/2021, spanning three different legislatures², four different governments³, and ten years' worth of political interventions on the parliament floor. Each legislature is divided into sessions, each corresponding to a year-long period. Legislative sessions do not necessarily line up with civil years, and, in the case of our dataset, legislative sessions often go from October to October. For that reason, we will be referring to these time periods as the i^{th} session of the j^{th} legislature and not by civil year, with the sessions going from 1 to 4, each corresponding to each of the years of the legislature.

This time period covers the harsh austerity mandated by *Troika*, the economic growth that followed, the first *superavit* in 40 years, the slow but steady growth and normalization of the far right, and the COVID-19 pandemic. Figure 4.2 illustrates which parties have been in power during the time period under study. This includes both presidential and governmental power.

Though our analysis will focus on the interventions by MPs and members of government, the 371,360 rows of our sample also encompass summary debates, notes, proposals, vote declarations, ratification, and unnamed interventions that will be dismissed in the context of this work.

²A legislature corresponds to the period between legislative election, which elect the MPs in the Assembleia da República (Assembly of the Republic) (AR).

³A government is decided based on the number of MPs each party elected to the AR, however, governments do not necessarily line up with legislatures. For example, after the 2015 election there was a PSD/CDS-PP coalition government for a brief period, before a new PS government was created without new elections.

4.2 Analyzing the transcripts using the MFD

There were two main insights that could be extracted from the data and determined the focus of our research: an analysis of the speech of political parties over time and a cluster analysis of the current parliament constitution. But, just as important as the type of analysis, was the way the data was encoded. As such we decided to look at our data through three different encodings: the one proposed by Graham et al. (2009), the one created by Parker et al. (2019), and a brand-new encoding of our own design.

Graham et al. (2009) compared the political speech of liberals and conservatives by looking at how often words related to each moral foundation showed in sermons of liberal and conservative churches. However, Parker et al. (2019) found that individual differences mattered more when determining the “moral profile” of a person than if they identified as conservative or liberal if, instead of ratios, one looked at the weighted log-odds of each moral foundation.

At last, an original encoding was developed. It was noticed that the number of moral words said by an MP appeared to be directly proportional to the total number of words they said. Knowing that, the number of moral words for each MP was summed and then a log-log linear regression was computed to find the relationship between these dimensions. After obtaining these regressions, the residuals for each MP were calculated, resulting in our encoding.

We used these three encodings to study the questions we outlined. The first one was how the moralities of parties currently in government related to each other and then we looked at the evolution of moral speech over time for each party. Here, the data was grouped by party and by legislative session and then the values for each moral foundation were plotted over time for each party.

Then, for the cluster analysis, we compared the results from three different algorithms, as each provided distinct insights: hierarchical clustering, density-based spatial clustering of applications with noise (DBSCAN), and spectral clustering. In this case, only the data from the most recent legislative session was considered and then grouped by party.

Furthermore, to figure whether the dynamic of the MPs differed much from the patterns exhibited by their parties, we also plotted the “morality profile” of each MP on a reduced dimension projection⁴ to see how it would compare to the behavior of the parties as a whole.

Note that, while we are comparing parties and MPs, the sample sizes for each “entity” are quite varied. Indeed, some MPs have small interventions while others, such as parliamentary leaders, speak more often and for longer periods of time. This means that not all samples may be representative of the moral reality of the party or MP they represent.

⁴The dimensions were reduced using multi-dimensional scaling (MDS)

4.2.1 Graham et al. (2009)

4.2.1.1 Current panorama (2020/21)

The first thing we did was compare how the different parties currently in parliament compared with each other and the government. From Figure 4.3a it was noticeable that there did not appear a stark difference between most of the political forces under scrutiny, implying that, though saying and believing in different principles, all current political actors appear to appeal to the same underlying moral foundations. Furthermore, no political force adheres to the liberal or conservative profiles defined by Graham et al. (2009), or to any of the identities that Haidt et al. (2009) or Weber and Federico (2013) described. Instead the parties defined a sort of parliamentary profile, which had consistently higher values of Harm, Ingroup, and Authority, and lower levels of Fairness and Purity, with the first three foundations showing larger amplitudes in values. The exception to this was the MP Joacine Katar Moreira (JKM), originally elected as a member of the Livre (Free) (L) party but who later became an independent MP. However, when we projected the morality profiles onto a two dimensional space using multi-dimensional scaling (MDS) (see Section 2.3.5) (Figure 4.3b), we could already see that some parties showed up closer to one another and some dynamics could be gleaned, likely from the variations in Harm, Ingroup, and Authority we saw in Figure 4.3a.

Before going any further, we decided to explore the variations in Harm, Fairness, and Authority by plotting these three dimensions (Figure 4.4). Since the 3D plot was not the clearest and quite hard to read (Figure 4.4a), we also plotted each pair of dimensions. Here we could gather that all of these measures exhibited some degree of correlation, with Authority and Ingroup (Figure 4.4d) appearing to be the most correlated, and Harm and Authority (Figure 4.4c) the least.

Nonetheless, higher values of these moral foundations seem to correspond to the left wing, and lower values to the right-wing.

Our next step was to find out which parties are closer to each other, even forming clusters. By looking at the distance matrix in Figure 4.5a we could already perceive that independent MP Joacine Katar Moreira appears to be the farthest away from all other political parties or MPs. This result was consistent with what was shown in Figure 4.3 as well. Considering Joacine Katar Moreira's turbulent and controversial path in Parliament, including losing the political trust of her own party and becoming an independent MP, it was not that surprising how this dynamic played out. By applying a hierarchical algorithm to this distance matrix we got the results on Figures 4.5c, which did not provide us with any new insights due to Joacine Katar Moreira's position as a clear outlier.

By removing Joacine Katar Moreira and rerunning these algorithms we were able to better discern some groups through hierarchical clustering. Now the parties appeared divided in two cohorts: Partido Socialista (Socialist Party) (PS), Partido Comunista

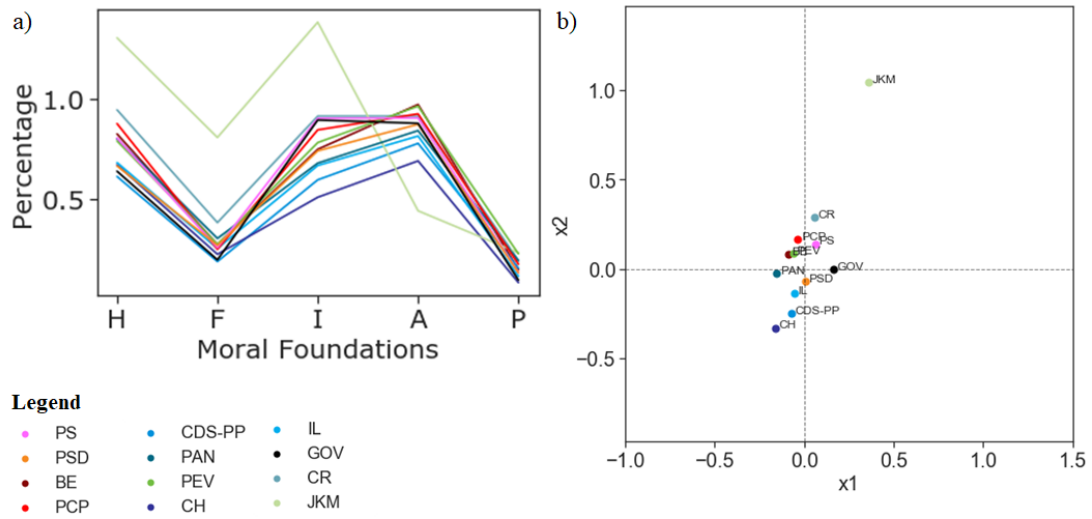


Figure 4.3: Morality profile of every party currently in government (a), and its 2D projection (b) (Graham, Haidt, and Nosek (2009))

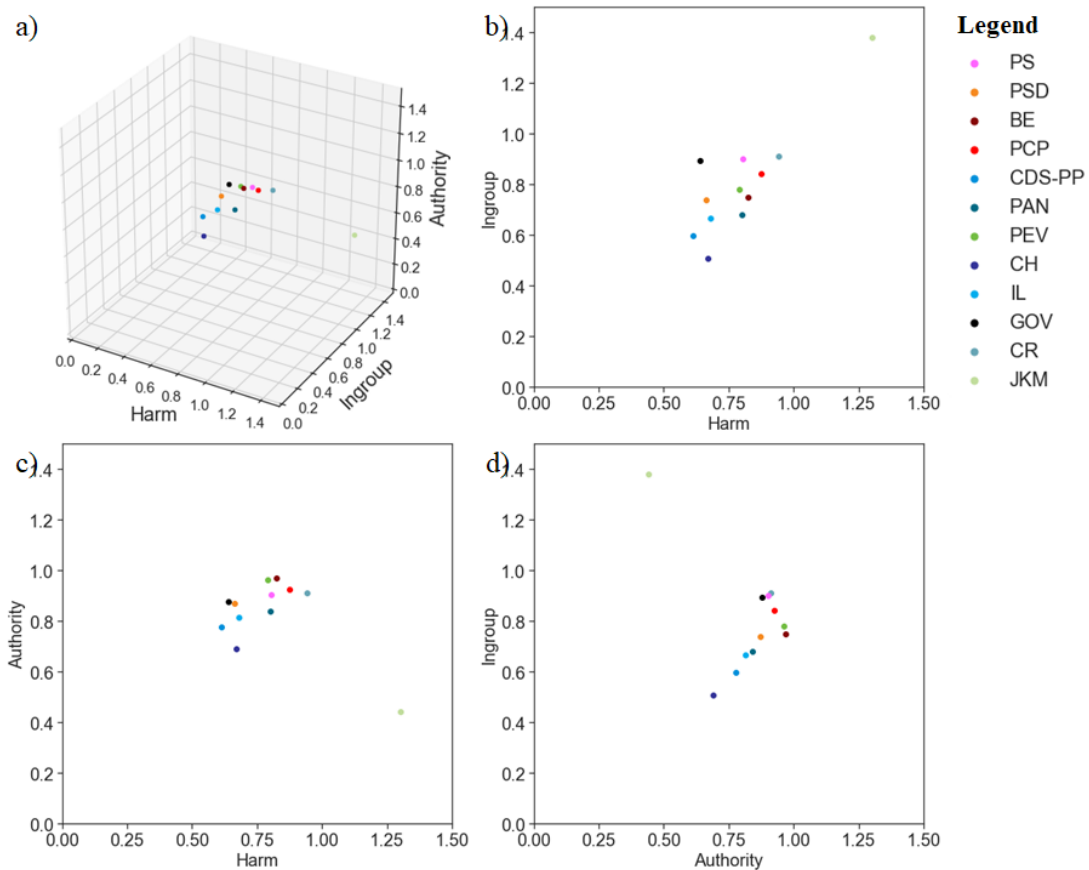


Figure 4.4: Projections of the moral foundations of Harm, Ingroup, and Authority (Graham, Haidt, and Nosek (2009))

Português (Portuguese Communist Party) (PCP), Bloco de Esquerda (Left Block) (BE), Partido Ecologista "Os Verdes" (Ecologist Party "the Greens") (PEV), and independent MP Cristina Rodrigues (CR); and Partido Social Democrata (Social-Democratic Party) (PSD), Iniciativa Liberal (Liberal Initiative) (IL), Pessoas-Animais-Natureza (People-Animals-Nature) (PAN), CDS-Partido Popular (People's Party) (CDS-PP), CHEGA (Enough) (CH), and the government. At first glance, this division seemed to reproduce the right/left wing split that is commonly attributed to Portuguese politics, but there were some unexpected links, namely, how the government appeared to be closer to the right-wing cluster despite being a PS government. Still, when looking at the projection in Figure 4.5d, it was noticeable how the government appeared to be halfway between PS and PSD, suggesting a centrist nature to the government. Furthermore, the environmental party People-Animals-Nature (PAN) showed up closer to right-wing parties who do not tend to defend environmental policies with much fervor, rather than next to the other environmental party (Ecologist Party "The Greens" - PEV).

From these algorithms and analyses, we got a reflection of the traditional right-left-center divisions that are attributed to Portuguese politics. It is relevant to note how Joacine Katar Moreira showed up so far removed from all other political parties and independent MPs, and how PAN and the government were the two entities who appeared to be halfway between the right and the left, suggesting that the government is more centrist than its own party (PS) and reflecting the syncretic⁵ nature of PAN. Moreover, it was interesting to notice how PCP and PEV were not that close, as, since PEV's creation, the two parties have ran together as a coalition for all elections.

Do all MPs follow party dynamics, or are we simply looking at oversimplified averages? Indeed, from Figure 4.6 it was clear that most parties have outliers within them, so much so that Joacine Katar Moreira did not even show up as that much an outlier when we plotted the morality profile of every MP. Yet, there did not appear to be any party clusters or anything similar. Most MPs seem to have had similar enough morality profiles in their discourse, with only a few breaking out of the masses, and the party averages appear to be quite central. We also noticed that, the bigger a party is, the more likely it is to have diverging morality profiles.

4.2.1.2 Historical perspective (2011-2021)

How did party dynamics shift over time? Figure 4.7 illustrates the path each party took over time, and a yearly breakdown can be found in the Appendix (Figure D.7).

Recent parties such as IL and CH have not changed much over the two years they have been in parliament, whereas the two independent MPs have demonstrated major alterations in their speech, with Cristina Rodrigues moving closer to the mainstream and Joacine Katar Moreira moving further away. Notably, both CH and IL are both represented by a single MP in parliament, so the drastic changes in the speech of

⁵combines different elements across right and left wing, taking political positions of neutrality

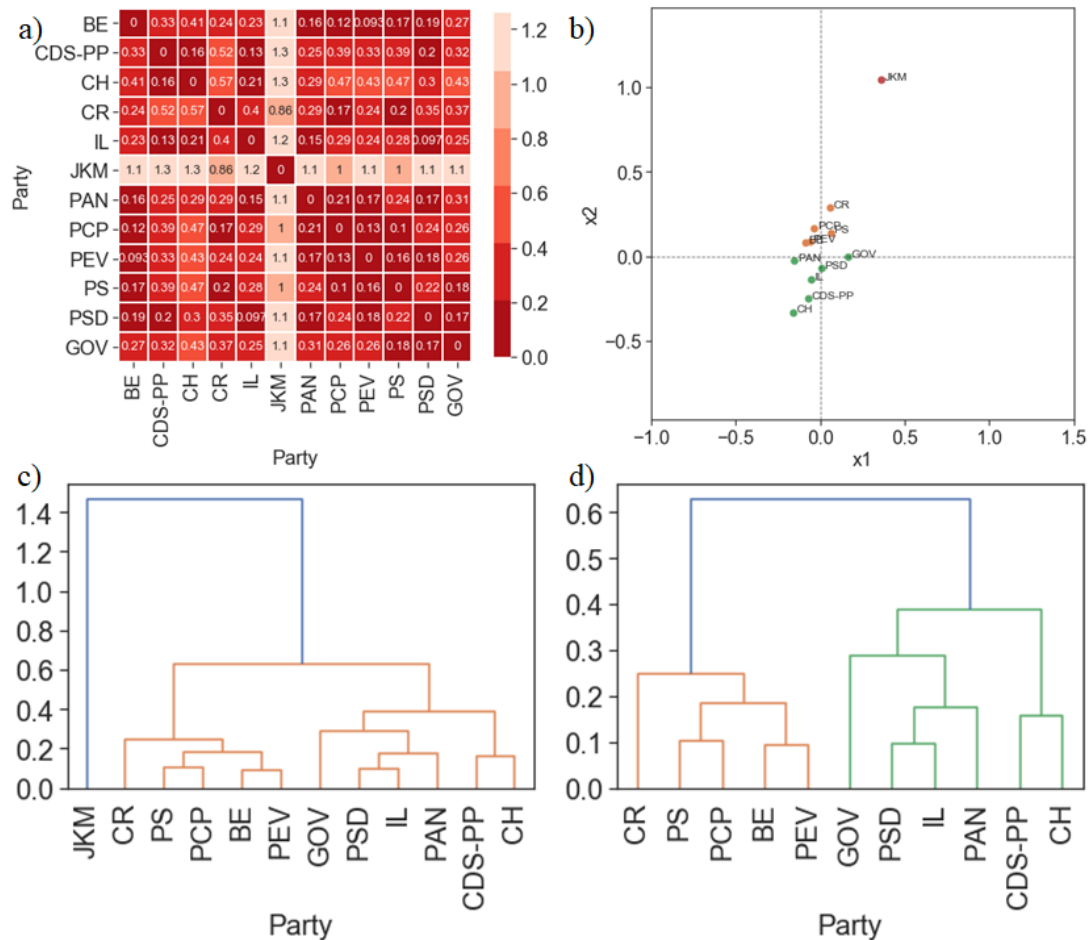


Figure 4.5: Hierarchical clustering of all the parties in parliament during the 2nd session of the 14th legislature (2020/21), before (c) and after removing Joacine Katar Moreira (d), as well as the corresponding distance matrix (a) and 2D projection (b) (Graham, Haidt, and Nosek (2009))

Cristina Rodrigues and Joacine Katar Moreira cannot be fully explained by the fact that single MPs would naturally have more volatile profiles than party averages. Another recent party, PAN, shows a path that resembles that of its former MP, starting far from all other parties and now establishing itself in the vicinity of the mainstream.

PEV and PCP, notable coalition partners, have been inching closer over the past 10 years, mostly due to PEV’s movement, as PCP has shown some variation but has stayed mostly in a small area. Also PS and BE have changed to be closer to PCP over time, and so has the government. Considering how PS, BE, and PCP were partners in the *Geringonça* from 2015 to 2019 and, after the 2019 elections, PS has governed with the support of BE and PCP, this shift reflects clearly the parliamentary dynamics that we have observed from a politics stand point.

Conversely, CDS-PP has moved away from PSD, PS, and the government following the fall of the right-wing coalition that formed government from 2011 to 2015, another

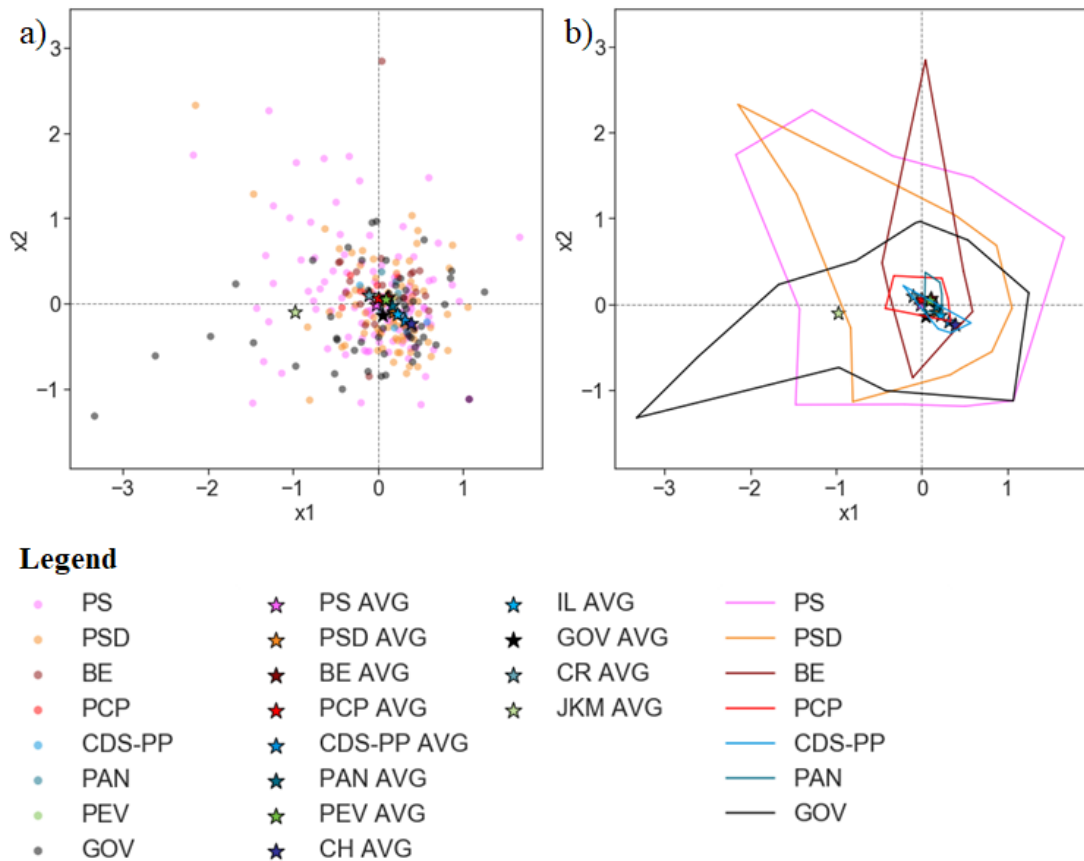


Figure 4.6: Morality profile of every MP currently in parliament (Graham, Haidt, and Nosek (2009))

shift that aligns well with political reality. At last, PSD has also not shown significant changes over the past 10, not even evidencing major changes when it stopped being one of the parties in government.

This plot also included former PS MP Paulo Trigo Pereira (PTP), who became an independent MP on December 2018 and was in parliament until the October 10th 2019 election. Due to only being an independent agent for a year, there was no evolution to analyze, but his closeness to PS was an interesting to note.

Could these changes be attributed to any major disturbances in the parties' speech patterns? Figure 4.8 suggested that that is not the case, as all parties have used more Authority, Harm, and Ingroup words in their interventions, rather than Fairness or Purity, over time, and, despite some small fluctuations, the morality profiles for all parties have remained stable. Even so, these results corroborate those from Figure 4.3, which suggested that Authority, Harm, and Ingroup showed the biggest variations among parties, it would appear that these are the foundations that have changed the most over time.

Overall, through this encoding we were able to gather that the current parliamentary dynamic reflects the common conception of a right/left wing dichotomy in the

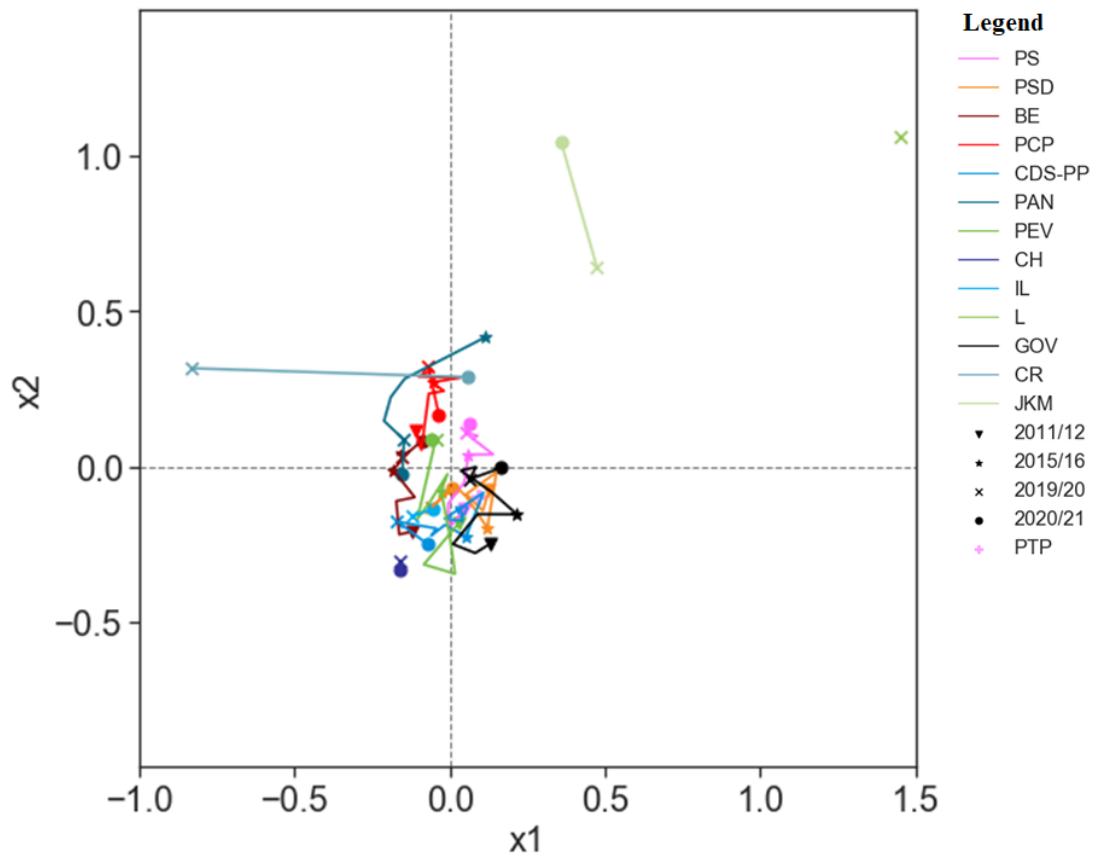


Figure 4.7: Evolution of the distance between parties and independent MPs when looking at moral speech (Graham, Haidt, and Nosek (2009))

Portuguese political system. However, though the morality profiles of the parties have not changed much over time, which parties show up closer to each other with regards to morality has varied, evidencing parliamentary alliances and oppositions, which play a major role in the texts that were being analyzed, as they were transcripts of parliamentary debates.

4.2.2 Parker et al. (2019)

4.2.2.1 Current panorama (2020/21)

Parker et al.'s methodology was based on comparing different presidents and political parties in Australia by comparing the weighted log-odds of moral words. Yet, when applying their methodology to the type of analysis we were looking to perform, it made more sense to consider the weighted log-odds of each foundation rather than those of the words.

With that, our first step was to calculate the weighted log-odds for every moral foundation for each party and plot them (Figure 4.9).

Figure 4.9a suggested that each party has their unique morality profile, unlike what

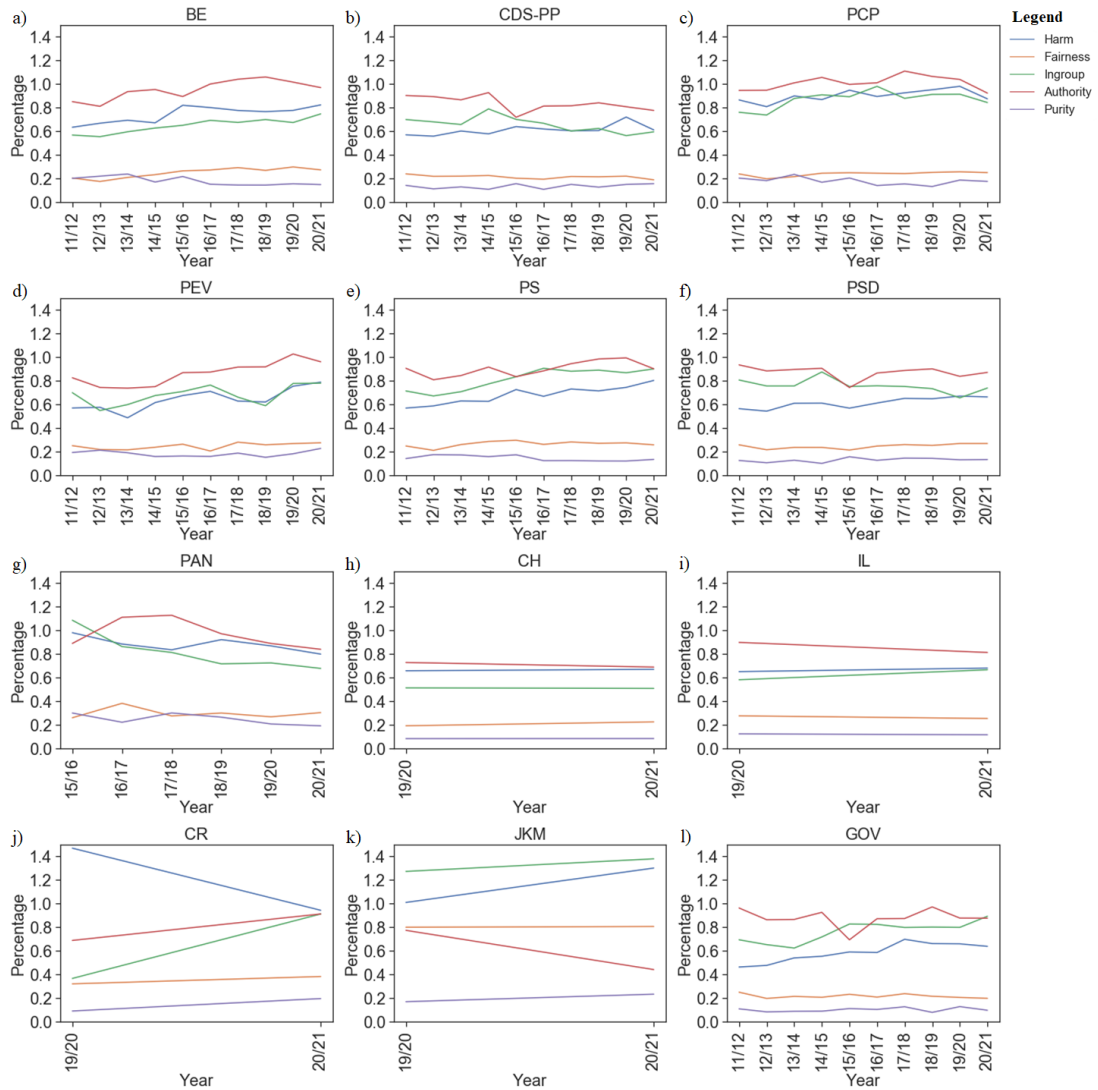


Figure 4.8: Evolution of how much each moral foundation is present in the speeches of different parties (Graham, Haidt, and Nosek (2009))

happened when we used Graham et al.’s methods, with the government appearing to have a more distinct approach to morality than the rest of parliament. This result is aligned with Parker et al.’s findings that individual differences were a better predictor of morality in speech than political affiliation, when using weighted log-odds. It is still worthy to note that, when excluding the government, the foundations that registered the lowest values were Authority and Harm, and the highest values were found in Ingroup and Purity, though these extremes were seldom encountered in the same party. In Figure 4.9b the separation between the government and the rest of parliament is highlighted.

We could already start to draw connections and proximity between political agents, but decided to supplement these intuitions by calculating the distance matrix between the parties (Figure 4.10a). Once again, the government showed up as an outsider to

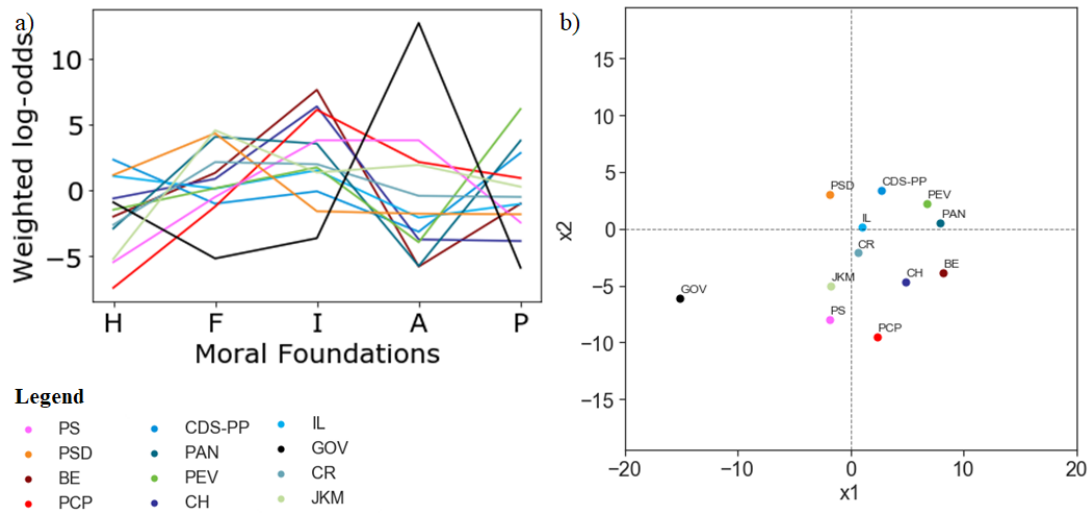


Figure 4.9: Morality profile of every party currently in government (a), and its 2D projection (b) (Parker, Sahdra, and Ondaatje (2019))

the rest of parliament and, when we applied a hierarchical clustering algorithm to our data, the presence of the government did not allow for a deeper analysis of the party dynamics within the parliament (Figure 4.10c). As such, we ran the clustering algorithm again, but now without considering the government, and got the results from Figures 4.10b and 4.10d. This yielded some unexpected results, as the clusters did not fit the right/left wing spectrum we found previously. On the contrary, parties such as BE and CH, which only see eye to eye on extremely rare occasions, were clustered together. This suggested that it is possible for parties to have similar speeches despite not sharing ideologies, which would also explain how ecologist parties (PAN and PEV) appear close to the right-wing, which does not tend to be as sensitive to the environmental cause as the left wing. These clusters do not have simple interpretations given the Portuguese parliamentary reality, and instead imply that the moral foundations that a certain party appeals to may be the same as another, but the proposals and ideas could have nothing in common.

We also calculated the weighted log odds for all MPs rather than political parties (Figure 4.11). Similar to what we could see in Figure 4.6, the MPs do not appear to aggregate according to party. Due to the nature of weighted log-odds, the previously calculated party values would not be comparable with the weighted log-odds of the MPs and, for that, we also plotted the party averages so we could find out how the parties would compare with the MPs. Interestingly, now the government would not be classified as an outlier, despite turning up at the edge of the parties, but CH, which used to be close to BE, now defined itself by how far away André Ventura's profile is from the profile of most MPs. Since weighted log-odds are calculated by comparing the distribution of features within a certain set versus other sets, this meant that CH's feature distribution was not that dissimilar from other parties when they were

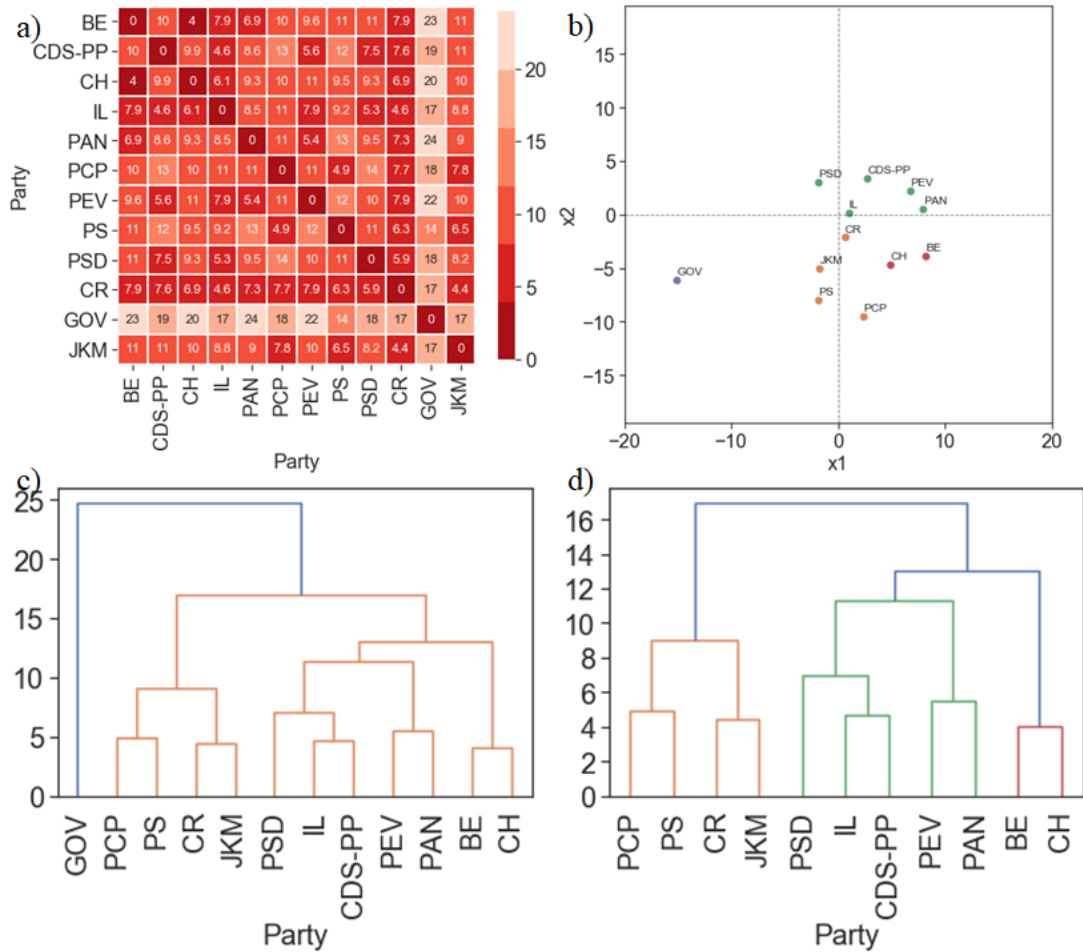


Figure 4.10: Hierarchical clustering of all the parties in parliament during the 2nd session of the 14th legislature (2020/21), before (c) and after removing the government (d), as well as the corresponding distance matrix (a) and 2D projection (b) (Parker, Sahdra, and Ondaatje (2019))

considered as a whole, but strongly differed from that of the other MPs. The same phenomenon happened with Joacine Katar Moreira, meeting expectations, as both these MPs are very controversial in their conducts.

4.2.2.2 Historical perspective (2011-2021)

When it came to the evolution of parliamentary dynamics over time, we could see from Figure 4.12 that PCP has stayed relatively isolated from all other parties over time where most other parties have shown dramatic changes over time. A clear dynamic was how the government, PSD, and CDS-PP were all relatively close when PSD and CDS-PP were the parties in government, but when the governing party changed to PS they moved far away from each other and PS shifted to be closer to the government, relocating away when there were new elections in 2019 (though PS was still the party in power). New parties such as IL and CH have not evidenced significant alterations in

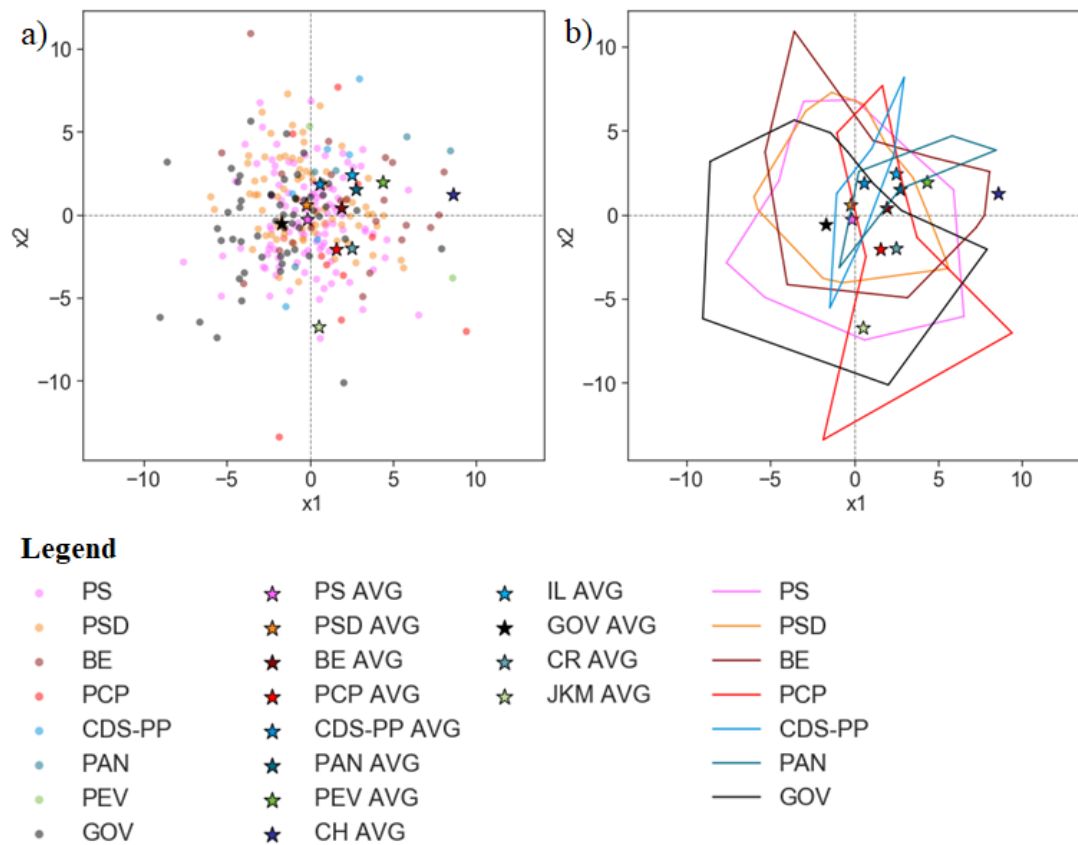


Figure 4.11: Morality profile of every MP currently in parliament (Parker, Sahdra, and Ondaatje, 2019)

the two years since they have elected MPs, and the same goes for the independent MPs Joacine Katar Moreira and Catarina Rodrigues. Finally, BE has been moving closer to PCP, reflecting the parliamentary agreement from 2015, and PAN and PEV have kept their proximity, as they are two environmental parties. For further detail, please refer to the yearly analysis in Figure D.8.

By plotting the weighted log-odds of each party over time (Figure 4.13) we gathered that most parties have exhibited changes over time. Here, the government showed the most extreme values, over time, demonstrating that the “outsider” position of the government we saw in Figure 4.9 was not exclusive to the latest year of parliamentary debates, but has been a reality over the past 10 years, but the foundations with the highest odds changed over time. Parties such as PSD and CDS-PP used to present more extreme values but have been getting closer to zero, and PS displayed a similar behavior but not in such a relevant way. The most recent parties (PAN, CH, and IL) all have shown values relatively close to zero, for now at least, but BE and PCP exhibited more extreme values overall, though not as extreme as those from the government.

In sum, Parker et al.’s approach did not evidence the right/left wing dynamic we saw reflected in Section 4.2.1, instead highlighting a government/parliament dynamic,

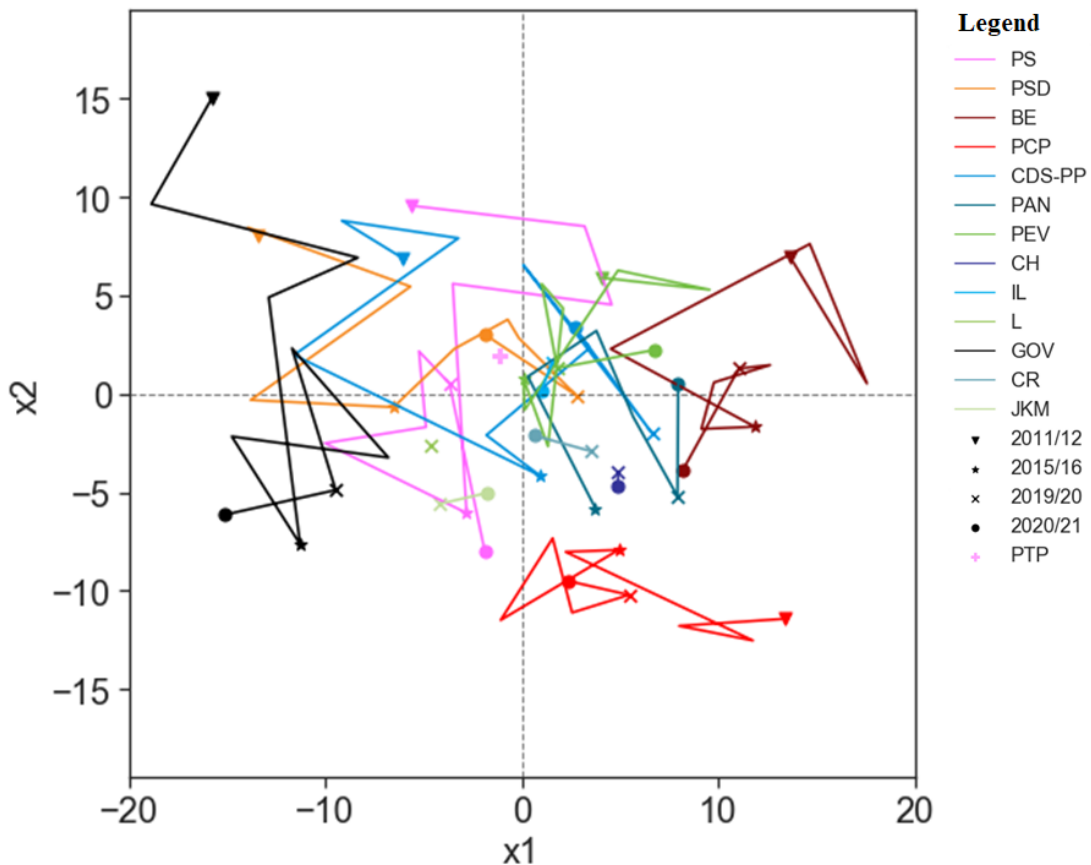


Figure 4.12: Evolution of the distance between parties and independent MPs when looking at moral speech (Parker, Sahdra, and Ondaatje (2019))

where we could see a bit of the right/left spectrum but there appeared to be an extra dimension to it that would push parties such as BE and CH together, which could maybe be explained by their relationship to the government, independently of left or right-wing. However, the analysis of how the parties have related to each other over time did mirror the dynamics we would expect, with parties in power moving closer to the government and vice versa, and parliamentary agreements also being evident, to some extent. Furthermore, when looking at how MPs related to each other rather than the parties themselves, we did not see major clusters for each party, but we did notice how MPs who are commonly regarded as polemic appeared closer to the edge, unlike the behavior we noticed when looking exclusively at the parties.

4.2.3 New encoding

Our final analysis was done using an encoding created by us by following these steps:

1. Group the speech of all MPs and sum the total number of words and the number of words in each moral foundation;

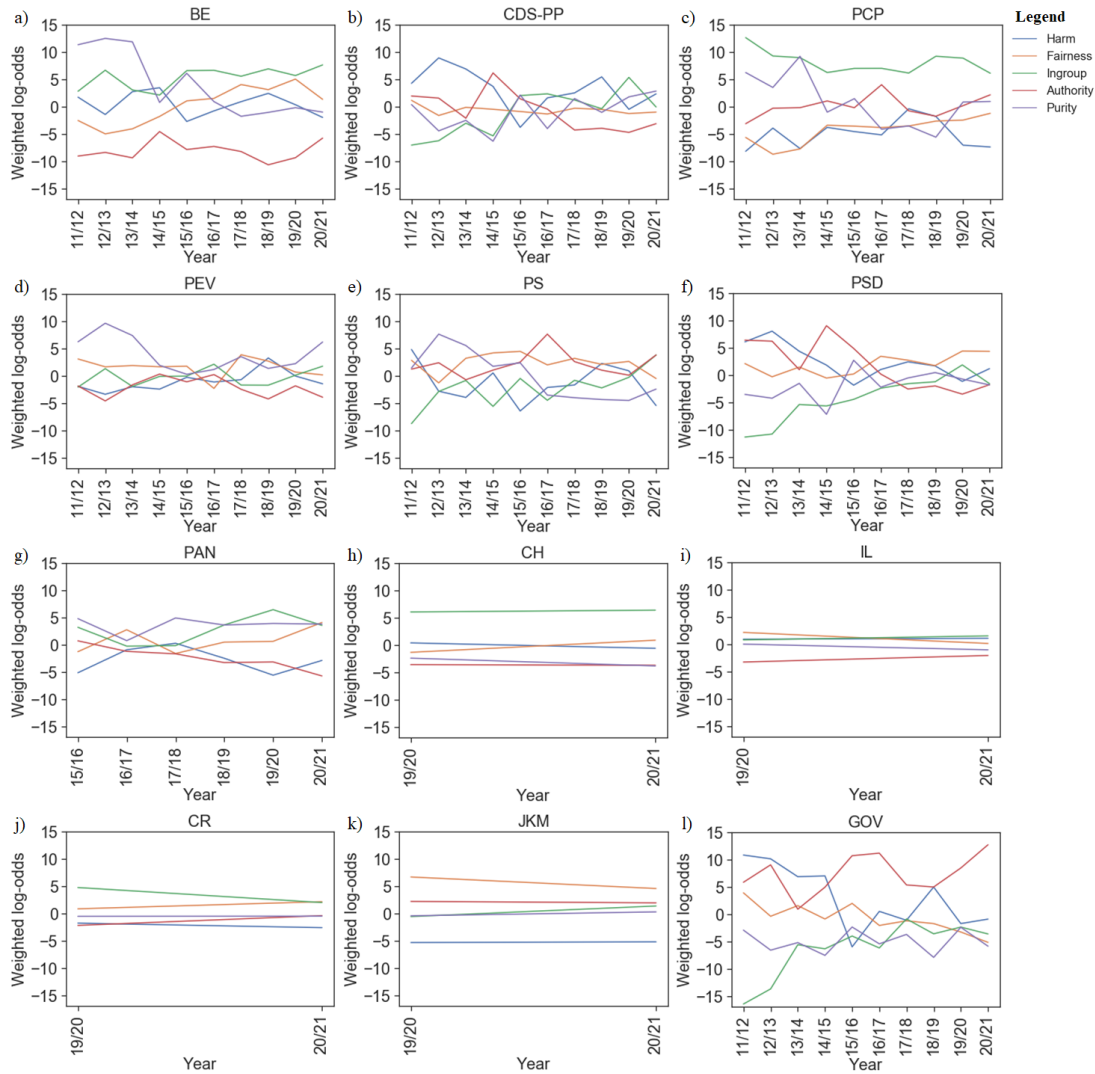


Figure 4.13: Evolution of how much each moral foundation is present in the speeches of different parties (Parker, Sahdra, and Ondaatje (2019))

2. Create log-log regressions for all moral foundations, where the x-axis was the number of words in a moral foundation and the y-axis was the total number of words used;
3. Group the speech by party, by year, and sum the total number of words and the number of words in each moral foundation;
4. Calculate the residuals for each moral foundation, for each party, using the previously defined regressions.

Why did we use a log-log linear regression and not a simple linear regression? Looking at how the total number of words is distributed versus the base 10 logarithm of the same number (Figure 4.14), we could see that by using the logarithm the distribution became closer to normal, rather than heavily concentrated around an extreme, which

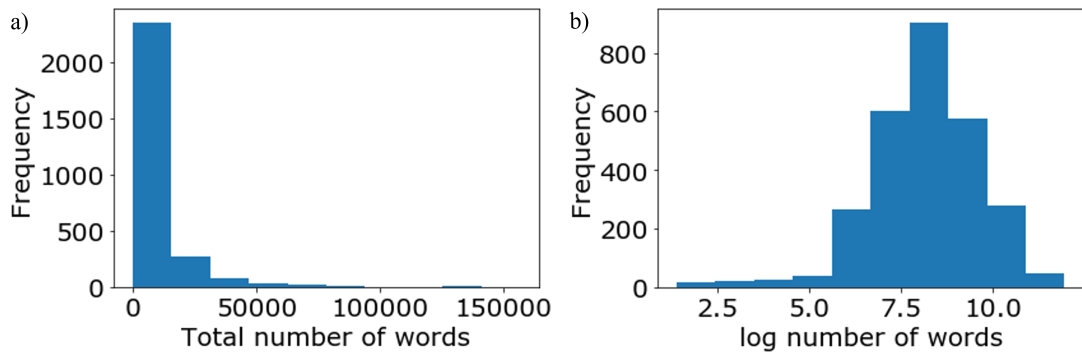


Figure 4.14: Comparison of the distribution of the total number of words used when the values are raw (a) versus after applying a base 10 logarithm (b)

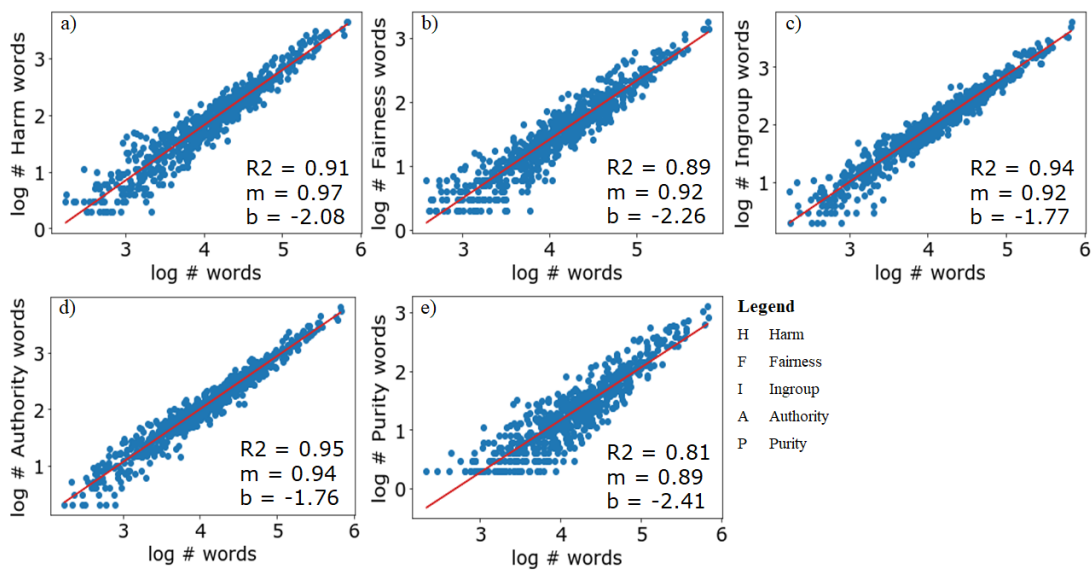


Figure 4.15: log-log regressions of the total number of words by the total number of foundation words

would provide us with a more robust regression. Also, a base 10 logarithm allows for easier interpretation of results rather than using base e .

Moreover, these regressions had R^2 scores that could be considered quite high, lending confidence to the results from these regressions (Figure 4.15)

4.2.3.1 Current panorama (2020/21)

Following the step of encoding our data, we plotted the values for each moral foundation for each party (Figure 4.16a) and projected our five moral foundations onto two dimensions using MDS (Figure 4.16b). Similar to what happened in when using the methodology by Graham et al. (2009), Joacine Katar Moreira stood out by exhibiting more extreme values than all other parties when it came to Harm, Fairness, and Authority. Regarding the rest of the political actors, most parties did not show much

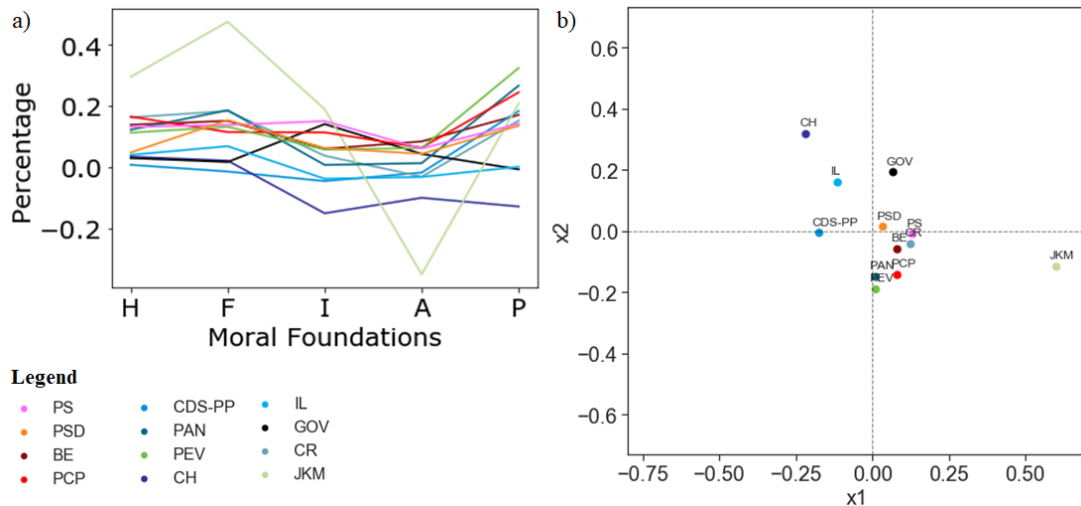


Figure 4.16: Morality profile of every party currently in government (a), and its 2D projection (b) (new encoding)

variation within the foundation, though purity did have a larger range of values than the rest. When analyzing the 2D projection there appeared to be a concentration of left wing parties, where the right-wing parties show a sparser distribution.

By analyzing the distance matrix (Figure 4.17a) of these parties and the dendrogram that originated from hierarchical clustering (Figure 4.17c), we noticed that Joacine Katar Moreira was detected as an outlier, and decided to verify if removing her from the dataset would change our results. Indeed, this alteration did not modify the cohorts we got (Figure 4.17d), where you could see a right/left-wing split. However, the government appeared in the right-wing cluster (the governing party, PS, is center-left), and PSD (center-right) is in the same cluster as all left-wing parties. Note also, how the environmental parties showed up close to each other, like they did in Section 4.2.1, and now PCP and PEV actually appeared to be next to one another, unlike what we have seen previously but accordingly to our usual understanding of parliamentary dynamics. By looking at the 2D projection of these clusters (Figure 4.17b) we could also understand how, though the government appeared in the “right-wing” cluster, it was still quite isolated from the parties in the same group. Indeed all right-wing parties, with the exception of PSD, seemed to be quite separated from each other, possibly reflecting the crisis of identity that the Portuguese right-wing is currently undergoing, in contrast with a united left-wing and a PSD that is shifting closer to the center.

When regarding how MPs are distributed rather than parties we got a similar conclusion to the one we were led to by the previous two encodings: there did not appear to be major party clusters, but also the bigger the party is, the bigger the likelihood that some of their members had a more extreme speech profile. Note, however, how Joacine Katar Moreira exhibited a behavior more alike that of individual MPs, by with

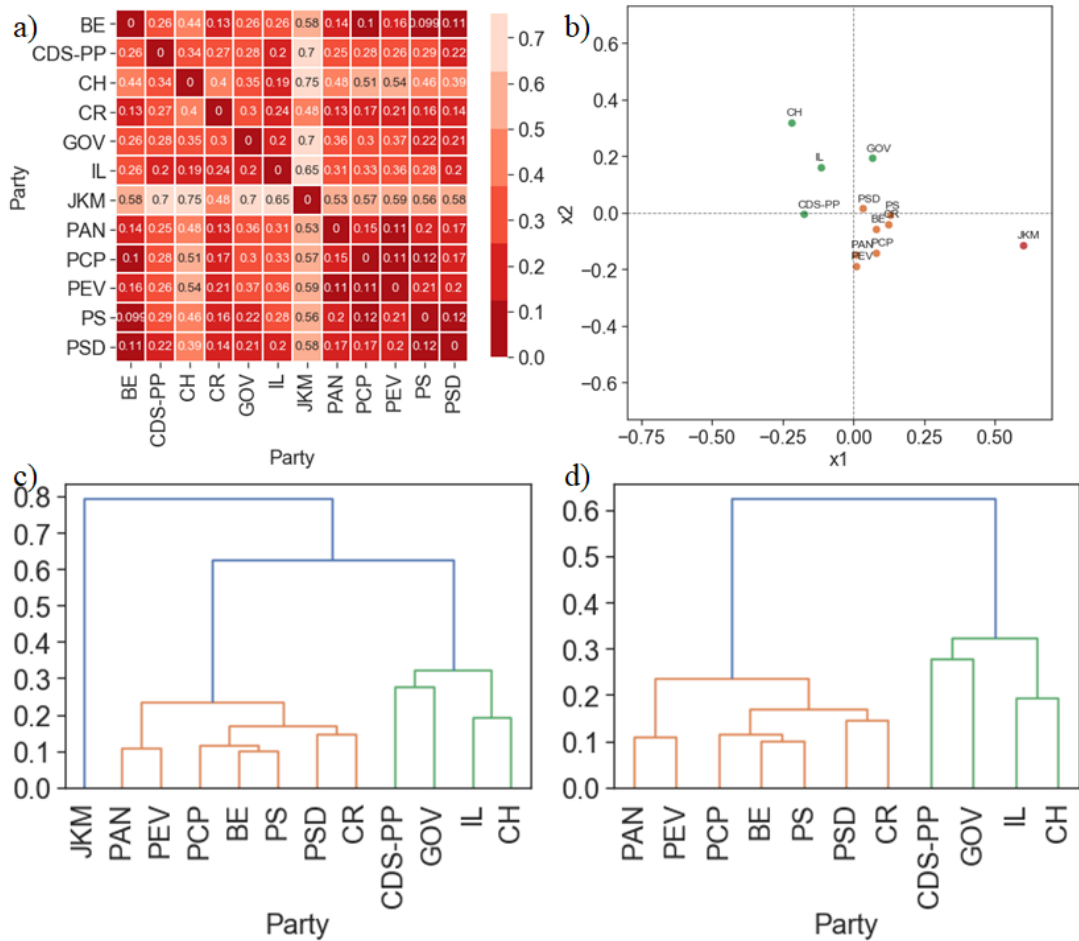


Figure 4.17: Hierarchical clustering of all the parties in parliament during the 2nd session of the 14th legislature (2020/21), before (c) and after removing Joacine Katar Moreira (d), as well as the corresponding distance matrix (a) and 2D projection (b) (new encoding)

a speech profile that deviated from the norm, but parties with only one member (IL and CH) had profiles that resembled that of a party average (Figure 4.18).

4.2.3.2 Historical perspective (2011-2021)

Time-wise, it was visible in Figure 4.19 how PSD and CDS-PP moved away from being close to the government when PS became the party in power, but then CDS-PP kept its distance while PSD and government have shifted closer over time. In contrast, the government has repositioned itself to be closer to PS by 2015, but has become more distant over time. It could also be seen how PS and BE have shifted closer to PCP, but PCP has stayed approximately on the same area over the past 10 years and, where new parties have been stable over the past 2 years, independent MPs have not. Like we saw previously as well, it was noticeable how PEV has changed to be closer to PAN, becoming closer to PCP in the process. A closer look at the yearly evolution of the

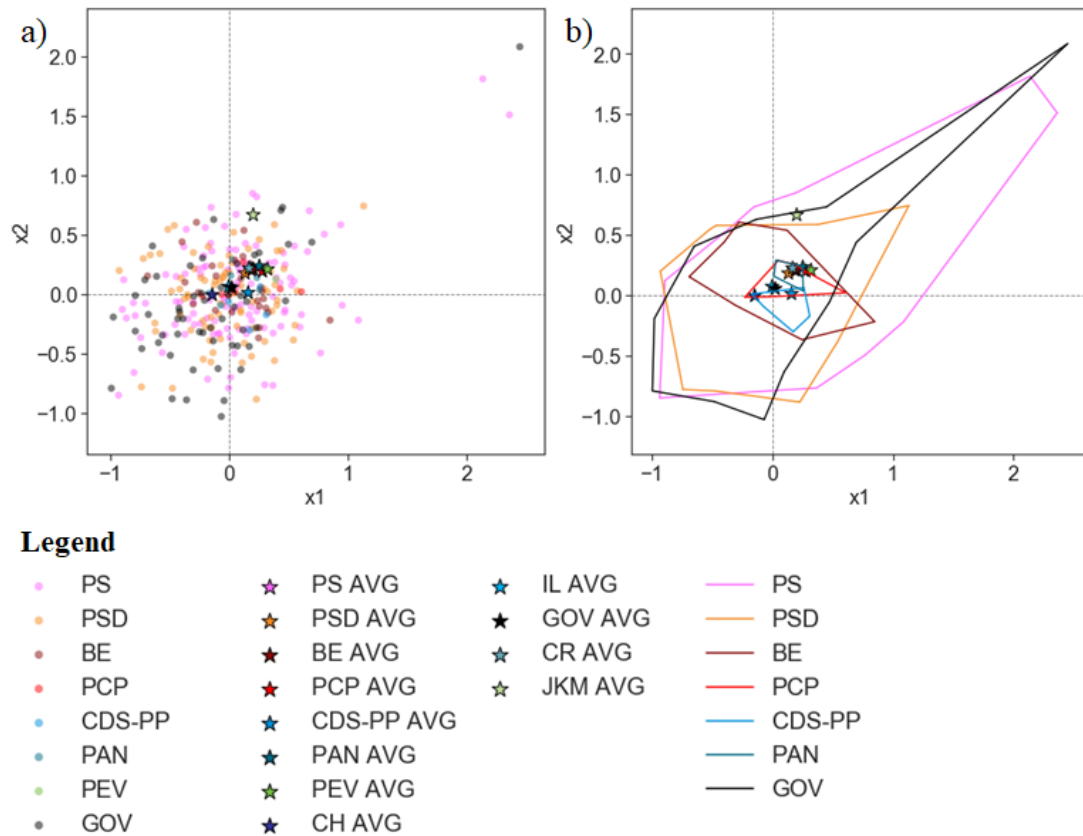


Figure 4.18: Morality profile of every MP currently in parliament (new encoding)

parties can be found in Figure D.9.

Also, when looking at Figure 4.20, we could see that though the values of the foundations have changed over the past decade, these were not as volatile as they were when using Parker et al.'s methodology. In fact, similarly to when we used the method from Graham et al., the order in which the foundations appear, from most used to least, appears to be consistent over time, with parties that have moved closer to the government showing values closer to zero, that is, more within predicted values, such as BE, PCP, and PS, and the opposite happened with CDS-PP as it lost government power. Both PSD and the government have shown stability in their values over the years, with PSD not exhibiting the same phenomenon as CDS-PP, even though both parties lost power after the 2015 elections, and the newest parties (PAN, IL, and CH) have not changed much either.

For all encodings, we performed similar analysis using DBSCAN and spectral scaling. However, the results from DBSCAN did not provide any insights, with the exception of reinforcing that the outliers we found through hierarchical clustering were truly outliers (Figures D.1, D.3, and D.5) and, though spectral scaling did in fact create clusters, these were not as easy to interpret as the ones from hierarchical clustering and did not reflect the dynamics we know to be true of Portuguese parliamentary politics

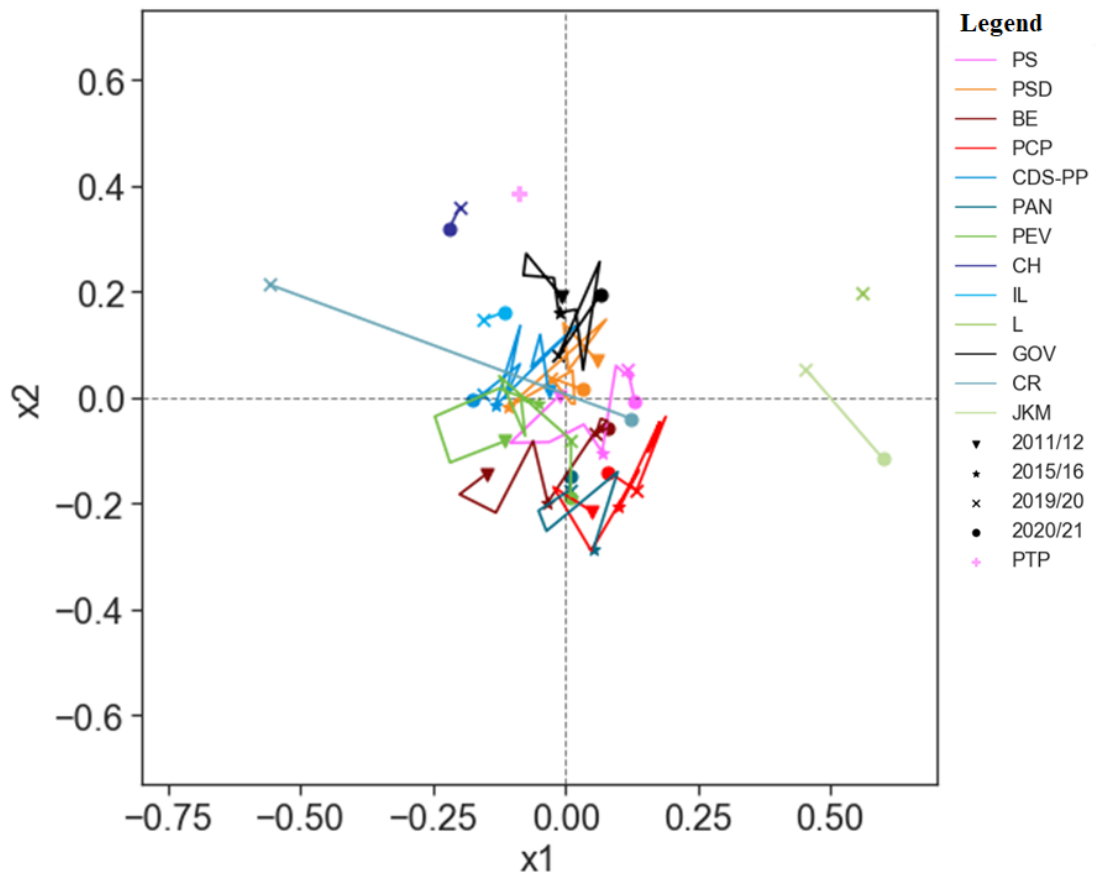


Figure 4.19: Evolution of the distance between parties and independent MPs when looking at moral speech (new encoding)

as well. Additionally, some of the relationships gleamed by running spectral scaling could also be found by analyzing the dendrograms (Figures D.2, D.4, and D.6).

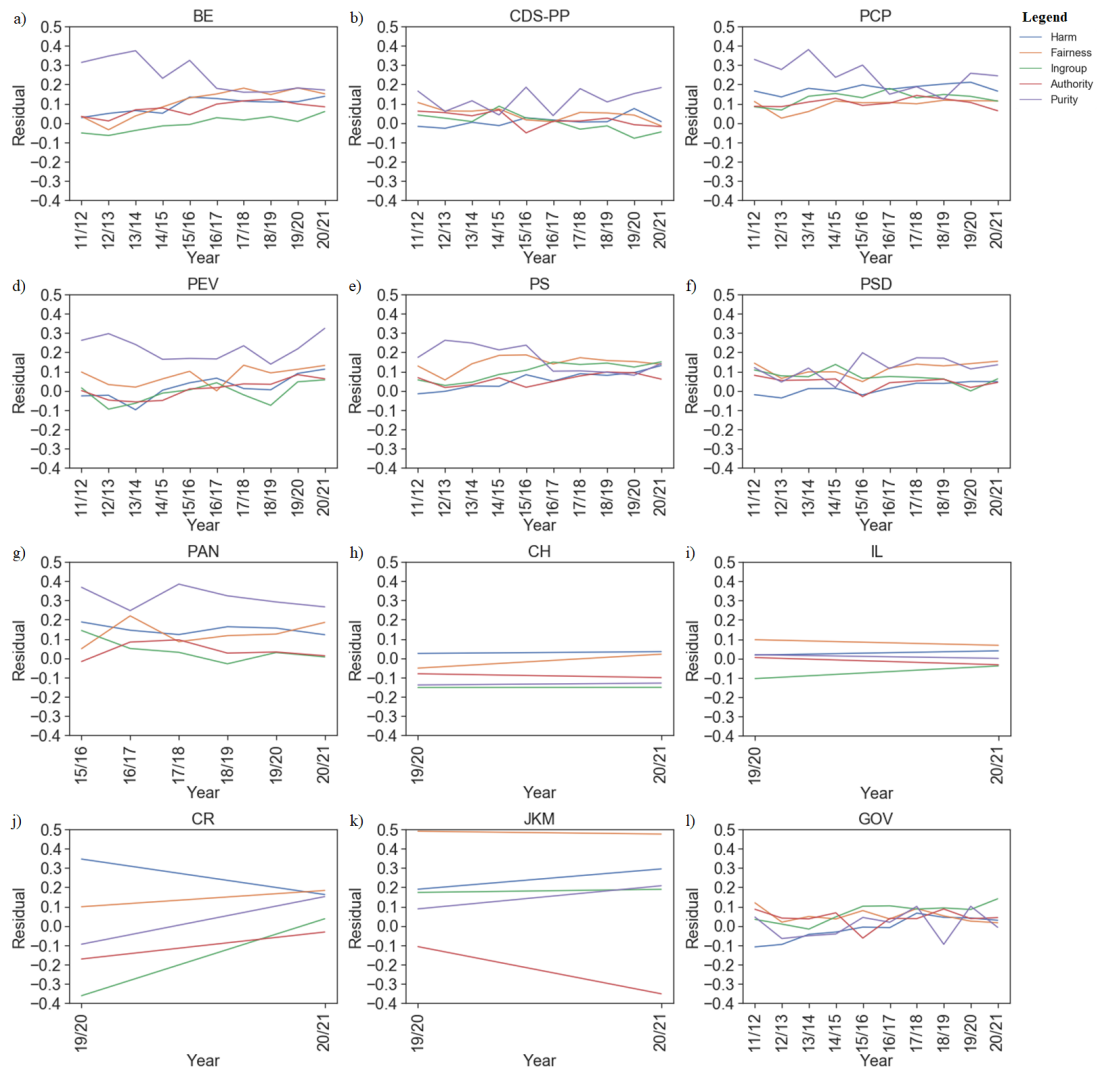


Figure 4.20: Evolution of how much each moral foundation is present in the speeches of different parties (new encoding)

CONCLUSIONS AND FUTURE WORK

Our work took the first steps when it came to the development and application of methodologies related to Moral Foundations Theory (MFT) in Portugal and Portuguese contexts. By creating a Moral Foundations Dictionary (MFD) for European Portuguese and using it in partnership with Linguistic Inquiry and Word Count (LIWC), there are a plethora of applications that can be developed to further the study of moral foundations in speech in the Portuguese context.

For this research project, we chose to focus on using transcripts from the *Diário da Assembleia da República* (Diary of the Assembly of the Republic) (DAR) to try to understand how moral foundations and the Portuguese context match. By projecting the parties to a two-dimensional plane (using multi-dimensional scaling (MDS)) we noticed that, for every encoding, there appeared to be a right/left wing dimension and a government/opposition dimension. Here we noticed how the government tended to be quite central with regards to the right/left wing spectrum, tending to be clustered with the right wing, but was always at the extreme of the government/opposition dynamic. Also, normally the two parties closer to the government were usually Partido Socialista (Socialist Party) (PS) and Partido Social Democrata (Social-Democratic Party) (PSD), which are both the parties that define the Portuguese political center, and are the two main parties who have shared power since 1976. Additionally, the clusters we got from hierarchical clustering usually defined right/left wing groups, rather than government/opposition cohorts, suggesting lower variability in the government/opposition dimension.

However, when checking how the parties related to each other over time, we could verify that that was not always the case and other years would need further and deeper analysis to better understand their dynamic. Still, the movement we regarded in Figures 4.7, 4.12, and 4.19 did add up with the political dynamics and shifts from the past 10 years, for the most part. Analyzing the changes in morality over time (Figures 4.8, 4.13, and 4.20) we saw that there were no great shifts as the years passed when using the encoding from Graham et al. (2009), and though using the encoding

from Parker et al. (2019) highlighted many variations over time, a consistent characteristic over time was whether the values were more extreme or closer to zero. At last, looking at how morality in the parties evolved over time using our encoding showed change over time, but the order in which they appeared did not suffer major reforms.

Yet, when we looked at the morality profiles of the Portuguese left and right wing, we could gather that these profiles do not resemble that of the American liberal/conservative divide but have a moral identity of their own. Additionally, there did not appear to be any signs of the polarization evident in the American context, as most parties appeared to be relatively close together, both presently and over time, with a few notable exceptions, such as independent Member of Parliament (MP) Joacine Katar Moreira.

Nonetheless, our analysis of the political dynamics did not consider the different sample sizes between parties and MPs. This created limitations with regards to the representativeness of some samples, as not all parties and MPs speak with the same frequency or for the same length of time.

The methodology used in the development of this work has the same limitations of all word count algorithms, which ignore context words and give the same weight to all words. Due to the lack of MFT related resources in European Portuguese, our proposed solutions did not feature the most advanced algorithms that MFT research has provided in English, as those were built up on top of previous existing work in English. This means that there is a major opportunity to create better and more accurate algorithms to detect moral foundations in text that could be created by expanding on the work we presented. Still, it is necessary to note that most of the mentioned algorithms were tested for accuracy on annotated corpora. That is not an asset that appears to exist in European Portuguese either and would need to be created in order to enable these future developments.

Furthermore, our MFD was a translation of an MFD created specifically for the American context. As such, it is likely that our MFD failed to capture some nuances and peculiarities of the Portuguese language and moral context, which could be better grasped by an MFD that created from scratch, by linguists or specialists in MFT. Nonetheless, our work provides a baseline upon which future work could be developed and improvements could be made.

While this project took a look at 10 years' worth of parliamentary data, our work could still be expanded by taking an even broader look to the Portuguese parliament, or even expanding the type of text we are taking into consideration. Close analysis of morality in speech during elections or referendums would undoubtedly create interesting insights, despite the fact that most of the candidates' addresses to their electorate are through speeches and not text, creating an impediment to the type of analysis we are proposing. Indeed, the lack of transcripts of political speeches outside of parliament proves to be an obstacle to increase the scope of these types of studies.

Another interesting avenue of research would be to consider texts extracted from

the Internet, namely tweets. Here, the use of a word count algorithm poses an obstacle once again, as Internet speech tends to be shortened for brevity and succinctness, and new terms keep being created organically within this context. This means that word count algorithms have a harder time detecting the words on their dictionaries, due to misspellings or abbreviations, as well as miss important words that were not considered when developing the dictionary. As we mentioned previously, studying this type of text would mean the expansion of the MFD via supervised learning, as well as a corpus of annotated tweets in Portuguese to study the accuracy of these methodologies.

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| A

FIRST SURVEY

Caro participante,
O meu nome é Mafalda Zúquete e sou estudante no Mestrado de Data Science and Advanced Analytics, com major em Data Science, pela NOVA Information Management School, Universidade Nova de Lisboa.
No contexto da realização da minha tese de mestrado procuro explorar o vocabulário utilizado pelos portugueses no debate de questões relacionadas com a moralidade. Por essa razão, agradeço a participação neste questionário para que consiga aprofundar a compreensão do vocabulário referente à moralidade em Portugal.
Este questionário tem um tempo médio de preenchimento de 10 minutos e pede-se o máximo de honestidade e rigor nas respostas, pois o sucesso do estudo está dependente de tal.
A sua participação é livre e voluntária, podendo desistir de responder ao inquérito a qualquer momento. Toda a informação recolhida será anónima e confidencial, sendo utilizada apenas para fins académicos.
Caso haja alguma dúvida ou questão, por favor não hesite em contactar-me através do e-mail: m20190257@novaims.unl.pt
Muito obrigada pela sua colaboração!
Mafalda Zúquete

A seguir vamos apresentar-lhe um conjunto de cinco dimensões relacionadas com moralidade.

Para cada, vamos pedir que descreva situações (eventos/ações) em que a dimensão moral em causa ou é cumprida ou é violada. Descreva situações que tenha testemunhado, experienciado, ou consiga imaginar. Escreva tantas situações quantas se conseguir lembrar.

Não causar dano/não fazer mal:

Moralidade de não fazer mal: esta moralidade está relacionada com a proteção dos mais fracos. Não se deve ofender os outros, física ou moralmente.

Descreva situações (eventos/ações) em que a dimensão moral de "não fazer mal" ou é cumprida ou é violada. Descreva situações que tenha testemunhado, experienciado, ou consiga imaginar. Escreva tantas situações quantas se conseguir lembrar.
Por favor escreva pelo menos uma situação.

Ser justo:

Moralidade de justiça: não se deve fazer algo injusto, enganar, ou mentir.

Descreva situações (eventos/ações) em que a dimensão moral de "ser justo" ou é cumprida ou é violada. Descreva situações que tenha testemunhado, experienciado, ou consiga imaginar. Escreva tantas situações quantas se conseguir lembrar.

Por favor escreva pelo menos uma situação.

Cuidar do nosso grupo:

Moralidade de camaradagem: deve-se cuidar dos membros do grupo. Para cumprir o nosso papel no grupo, não se deve trair os outros membros.

Descreva situações (eventos/ações) em que a dimensão moral de "cuidar do grupo" ou é cumprida ou é violada. Descreva situações que tenha testemunhado, experienciado, ou consiga imaginar. Escreva tantas situações quantas se conseguir lembrar.

Por favor escreva pelo menos uma situação.

Respeito pela autoridade:

Moralidade de respeito: deve-se respeitar os mais velhos e a hierarquia das relações.

Descreva situações (eventos/ações) em que a dimensão moral de "respeito pela autoridade" ou é cumprida ou é violada. Descreva situações que tenha testemunhado, experienciado, ou consiga imaginar. Escreva tantas situações quantas se conseguir lembrar.

Por favor escreva pelo menos uma situação.

Pureza:

Moralidade de limpeza: deve-se evitar tudo o que é sujo ou que degrada o sagrado.

Descreva situações (eventos/ações) em que a dimensão moral de "pureza" ou é cumprida ou é violada. Descreva situações que tenha testemunhado, experienciado, ou consiga imaginar. Escreva tantas situações quantas se conseguir lembrar.

Por favor escreva pelo menos uma situação.

Por favor, leias as seguintes afirmações e indique se você concorda ou não com elas:

	discordo bastante	discordo moderadamente	discordo um pouco	concordo um pouco	concordo moderadamente	concordo bastante
A compaixão por quem está sofrendo é a virtude mais importante	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ao fazer leis, a prioridade do governo deve ser garantir que todos sejam tratados de maneira justa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu tenho orgulho da história do meu país	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
O respeito à autoridade é algo que toda criança precisa aprender	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As pessoas não devem fazer coisas nojentas, mesmo que ninguém seja prejudicado	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
É melhor fazer o bem do que fazer o mal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Uma das
piores
coisas que
uma
pessoa
pode fazer
é machucar
um animal
indefeso

A justiça é
a exigência
mais
importante
para uma
sociedade.

As pessoas
devem ser
leais a seus
familiares,
mesmo
quando
eles
fizeram
algo errado

Homens e
mulheres
têm papéis
diferentes
na
sociedade

Eu diria
que
algumas
ações são
erradas
porque elas
não são
naturais

Nunca é
certo matar
um ser
humano

Eu acho
moralmente
errado que
as crianças

ricas
herdem
muito
dinheiro
enquanto
as crianças
pobres não
herdam
nada

É mais
importante
pensar no
bem do
grupo do
que fazer a
minha
vontade

Se eu fosse
um soldado
e
discordasse
das ordens
de meu
superior, eu
obedeceria
mesmo
assim pois
esse seria
meu dever

A castidade
é uma
virtude
importante
e valiosa

APPENDIX A. FIRST SURVEY

Quando tem que decidir se algo é certo ou errado, em que medida as seguintes considerações são importantes para si? Por favor, assinale cada afirmação utilizando a seguinte escala:

	nem um pouco importante (essa consideração não tem nada a ver com minhas avaliações de certo e errado)	não muito importante	quase sem importância	um pouco importante	muito importante	extremamente importante (esse é um dos fatores mais importantes quando julgo se algo é certo ou errado)
Se alguém sofreu emocionalmente ou não	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Se alguém foi ou não tratado de maneira diferente dos outros	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Se a ação de alguém mostrou ou não amor pelo seu país	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Se alguém demonstrou ou não falta de respeito à autoridade	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Se alguém violou ou não os padrões de pureza e decência	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Se alguém foi bom ou não em matemática	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Se alguém cuidou ou não de quem está fraco ou vulnerável	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Se alguém agiu injustamente ou não

Se alguém fez ou não algo que traia seu grupo

Se alguém se adequou ou não às tradições da sociedade

Se alguém fez algo nojento ou não

Se alguém foi cruel ou não

Se os direitos de alguém foram negados ou não

Se alguém demonstrou ou não falta de lealdade

Se uma ação causou ou não caos ou desordem

Se alguém agiu ou não de uma maneira que Deus aprovaria

Género

- Masculino
- Feminino
- Outro
- Prefiro não responder

País de origem

- Angola
- Brasil
- Cabo Verde
- Guiné-Bissau
- Guiné Equatorial
- Moçambique
- Portugal
- São Tomé e Príncipe
- Timor-Leste
- Macau
- Outro _____

País de residência atual

- Angola
- Brasil
- Cabo Verde
- Guiné-Bissau

Guiné Equatorial

Moçambique

Portugal

São Tomé e Príncipe

Timor-Leste

Macau

Outro _____

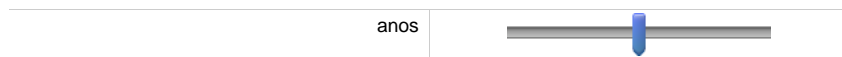
Primeira língua

Português

Outra _____

Idade

0 10 20 30 40 50 60 70 80 90 100



Grau mais alto de educação

- Ensino básico ou inferior
 - Ensino secundário ou equivalente
 - Bacharelato ou Licenciatura
 - Pós-graduação ou Mestrado
 - Doutoramento ou superior
 - Outro. Por favor especifique
-

Profissão

- Apenas estudante
- Empregado por conta de outrem
- Empregado por conta própria
- Reformado
- Desempregado
- Não apto a trabalhar
- Trabalhador estudante

Deixe aqui o seu código de participação:

Se tiver algum comentário, escreva aqui:

| B

SECOND SURVEY

Caro participante,

O presente estudo está a ser conduzido no âmbito de um projecto de investigação da NOVA Information Management School, Universidade Nova de Lisboa.

Este estudo pretende explorar o vocabulário que os portugueses utilizam para falar de moralidade.

O questionário tem um tempo médio de preenchimento de 20 minutos e pede-se o máximo de honestidade e rigor nas respostas, pois o sucesso do estudo está dependente de tal.

A sua participação é livre e voluntária, podendo desistir de responder ao questionário a qualquer momento. Toda a informação recolhida será anónima e confidencial, sendo utilizada apenas para fins académicos.

Caso haja alguma dúvida ou questão, por favor não hesite em contactar o investigador responsável através do e-mail: mzuquete@novaims.unl.pt

Muito obrigada pela sua colaboração!

Neste estudo pretendemos entender como é que as pessoas pensam e descrevem situações morais e imorais.

Na literatura científica, a moralidade é por vezes decomposta em cinco dimensões, adquiridas durante a nossa evolução como indivíduos sociais. Cada dimensão apresenta uma vertente moral e uma imoral.

As dimensões são:

1. Cuidar/Magoar
2. Ser Justo/Ser Injusto
3. Lealdade/Traição
4. Autoridade/Insubordinação
5. Santidade/Degradação

De seguida será apresentada a definição de cada dimensão.

Em cada caso, pedimos que descreva situações (eventos/ações) em que a dimensão moral em causa é respeitada ou violada.

Por situações entendem-se eventos que tenha testemunhado, experienciado, ou consiga imaginar.

Por favor, escreva tantos exemplos quantos conseguir e seja o mais detalhado que conseguir.

Consente participar neste estudo

Sim

Não

Como não consente a participação neste estudo, por favor submeta a sua participação no Prolific selecionando a opção "Stop without completing".

Não está elegível para participar neste estudo, uma vez que providenciou informação inconsistente com o seu perfil no Prolific. Por favor submeta a sua participação no Prolific selecionando a opção "Stop without completing".

Género

- Masculino
- Feminino
- Outro
- Prefiro não responder

País de origem

- Angola
- Brasil
- Cabo Verde
- Guiné-Bissau
- Guiné Equatorial
- Moçambique
- Portugal
- São Tomé e Príncipe
- Timor-Leste
- Macau
- Outro _____

Residente em Portugal

- Sim
- Não

Há quanto tempo reside em Portugal

0 10 20 30 40 50 60 70 80 90 100

Anos



Primeira língua

Português

Outra _____

Idade

0 10 20 30 40 50 60 70 80 90 100

Anos



Grau mais alto de educação que completou

Ensino básico ou inferior

Ensino secundário ou equivalente

Bacharelato ou Licenciatura

Pós-graduação ou Mestrado

Doutoramento

Outro. Por favor especifique

Por favor indique o seu Prolific ID

Dimensão Moral: Cuidar/Magoar

Esta dimensão foi adquirida em resposta ao desafio de cuidar de crianças e indivíduos vulneráveis. Torna-nos sensíveis aos sinais de sofrimento e necessidade; faz com que desprezemos a crueldade e desejemos cuidar dos que sofrem ou dos mais fracos.

Descreva situações (eventos/ações) em que a dimensão moral de Cuidar/Magoar é cumprida ou violada. Descreva situações que tenha testemunhado, experienciado, ou consiga imaginar.

Escreva tantas situações quantas conseguir.

O quão confiante está de que compreendeu o significado da dimensão moral Cuidar/Magoar?

- Nada confiante
- Ligeiramente confiante
- Moderadamente confiante
- Muito confiante

Dimensão Moral: Ser Justo/Ser Injusto

Esta dimensão foi adquirida em resposta ao desafio evolutivo de recolhermos os benefícios da cooperação mútua, sem sermos enganados. Torna-nos sensíveis a sinais de que outra pessoa possa ser um bom, ou mau, parceiro para colaboração e altruísmo recíproco. Faz-nos querer evitar ou punir indivíduos desonestos.

Descreva situações (eventos/ações) em que a dimensão moral de Ser justo/Ser injusto é cumprida ou violada. Descreva situações que tenha testemunhado, experienciado, ou consiga imaginar.

Escreva tantas situações quantas conseguir.

O quão confiante está de que compreendeu o significado da dimensão moral Ser Justo/Ser Injusto.

- Nada confiante
- Ligeiramente confiante
- Moderadamente confiante
- Muito confiante

Dimensão Moral: Lealdade/Traição

Esta dimensão foi adquirida em resposta ao desafio evolutivo de formar e manter coligações. Torna-nos sensíveis aos sinais de que outra pessoa sabe, ou não, trabalhar em equipa. Faz-nos querer recompensar pessoas que nos respeitem a nós e ao nosso grupo. Faz-nos querer magoar, ostracizar, ou mesmo matar aqueles que nos traem a nós ou ao nosso grupo.

Descreva situações (eventos/ações) em que a dimensão moral de Lealdade/Traição é cumprida ou violada. Descreva situações que tenha testemunhado, experienciado, ou consiga imaginar.

Escreva tantas situações quantas conseguir.

O quão confiante está de que compreendeu o significado da dimensão moral Lealdade/Traição.

- Nada confiante
- Ligeiramente confiante
- Moderadamente confiante
- Muito confiante

Dimensão Moral: Autoridade/Insubordinação

Esta dimensão foi adquirida em resposta ao desafio evolutivo de estabelecer relações que nos possam beneficiar em hierarquias sociais. Torna-nos sensíveis a símbolos de posição hierárquica ou status e a sinais de que as outras pessoas, dada a sua posição social e/ou hierárquica, se estão a comportar, ou não, de maneira adequada.

Descreva situações (eventos/ações) em que a dimensão moral de Autoridade/insubordinação é cumprida ou violada. Descreva situações que tenha testemunhado, experienciado, ou consiga imaginar.

Escreva tantas situações quantas conseguir.

O quão confiante está de que compreendeu o significado da dimensão moral Autoridade/Insubordinação.

- Nada confiante
- Ligeiramente confiante
- Moderadamente confiante
- Muito confiante

Dimensão Moral: **Santidade/Degradação**

Esta dimensão está associada ao nosso sistema imunológico comportamental, que nos faz desconfiar de uma grande variedade de ameaças reais (como germes e parasitas) ou respeitar objetos simbólicos (como a cruz, santos ou símbolos patrióticos). Faz com que as pessoas usem objetos com significados irracionais e extremos – tanto positivos como negativos – e desenvolvam reações emocionais fortes (como a adoração ou o nojo) perante os mesmos. Esta dimensão faz-nos evitar tudo o que é sujo ou que degrada o sagrado.

Descreva situações (eventos/ações) em que a dimensão moral de Santidade/Degradação é cumprida ou violada. Descreva situações que tenha testemunhado, experienciado, ou consiga imaginar.

Escreva tantas situações quantas conseguir.

O quão confiante está de que compreendeu o significado da dimensão moral Santidade/Degradação.

- Nada confiante
- Ligeiramente confiante
- Moderadamente confiante
- Muito confiante

Leia as seguintes afirmações e indique o seu nível de concordância.

	discordo bastante	discordo moderadamente	discordo um pouco	concordo um pouco	concordo moderadamente	concordo bastante
A compaixão por quem sofre é a virtude mais importante	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ao fazer leis, a prioridade do governo deve ser garantir que todos sejam tratados de maneira justa	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu tenho orgulho na história do meu país	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
O respeito à autoridade é algo que todas as crianças precisam de aprender	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As pessoas não devem fazer coisas nojentas, mesmo que não faça mal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

a ninguém						
É melhor fazer o bem do que fazer o mal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Magoar um animal indefeso é das piores coisas que uma pessoa pode fazer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A justiça é o requisito mais importante para uma sociedade.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
As pessoas devem ser leais aos seus familiares, mesmo quando estes fazem algo de errado	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Os homens e mulheres têm papéis diferentes na sociedade	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Eu consideraria algumas ações como erradas se estas não forem naturais	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Matar um ser humano nunca é aceitável	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

É importante que preste atenção a este estudo. Selecione a opção "discordo bastante"

Eu acho moralmente errado que as crianças ricas herdem muito dinheiro enquanto as crianças pobres não herdam nada

É mais importante agir em conformidade com o grupo do que expressar-me como indivíduo

Se eu fosse um soldado e discordasse das ordens de meu superior, eu obedeceria às ordens de qualquer maneira pois esse é o meu dever

A castidade é uma virtude importante e valiosa

Quando tem que decidir se algo é certo ou errado, em que medida as seguintes considerações são relevantes para si?

APPENDIX B. SECOND SURVEY

Por favor, utilize a seguinte escala que vai de "nada relevante" (essa consideração não tem nada a ver com as minhas avaliações de certo e errado) a "extremamente relevante" (esse é um dos fatores mais importantes quando julgo se algo é certo ou errado).

	nada relevante	pouco relevante	ligeiramente relevante	moderadamente relevante	muito relevante	extremamente relevante
Se alguém sofreu emocionalmente ou não	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Se alguém foi ou não tratado de maneira diferente dos outros	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Se a ação de alguém mostrou ou não amor pelo seu país	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Se alguém demonstrou ou não falta de respeito à autoridade	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Se alguém violou ou não os padrões de pureza e decência	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Se alguém foi bom ou não a matemática	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Se alguém cuidou ou não de quem está fraco ou vulnerável	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Se alguém agiu injustamente ou não	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Se alguém fez ou não algo que traia seu grupo	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Se alguém se adequou ou não às tradições da sociedade

Se alguém fez algo nojento ou não

Se alguém foi cruel ou não

É importante que preste atenção a este estudo.

Selecione a opção "nada relevante"

Se os direitos de alguém foram negados ou não

Se alguém demonstrou ou não falta de lealdade

Se uma ação causou ou não caos ou desordem

Se alguém agiu ou não de uma maneira que Deus aprovaria

Se tiver algum comentário ou sugestão relativamente às dimensões morais descritas ou relativamente a este questionário, escreva aqui:

MORAL FOUNDATIONS DICTIONARY (MFD)

Harm Virtue: abrig*, benef*, cautela*, cautelo*, compaix*, conserv*, cuid*, defen*, defesa*, empati*, empát*, escuda*, escudo*, guard*, pacifi*, pacífic*, paz, preserv*, protec*, proteg*, protet*, proteç*, refug*, refúg*, segur*, solidari*, solidári*

Harm Vice: abandon*, abus*, agredi*, aniquil*, arruin*, assassin*, assol*, atac*, ataque*, belic*, briga, brigar, brut*, bélic*, combat*, contund*, cruel*, danifi*, dano*, destr*, detrimento*, discut*, doer*, engan*, esmag*, estrag*, explor*, feri*, guerr*, indefes*, inescrupulos*, insult*, lut*, machuc*, magoa*, mata*, nociv*, ofen*, prejudi*, ruin*, ruína*, sofr*

Fairness Virtue: balance*, balanç*, constante*, equil*, equival*, franca, franca-mente, franco, honest*, igua*, imparcia*, just*, razoav*, razoáv*, reciproc*, recíproc*, toler*

Fairness Vice: descrimin*, desigua*, desonest*, exclu*, inescrupulos*, injust*, intoler*, preconceit*, prefer*, segreg*, supremaci*, tendenci*

Ingroup Virtue: agrup*, alia*, associ*, coletiv*, colon*, colónia*, comum*, comuni*, conju*, coop*, dedic*, devot*, devoç*, familia*, família*, gremi*, grup*, grémio*, junt*, lea*, membro*, naciona*, naç*, panelinha*, patriot*, patriót*, pátria*, segreg*, simpatiz*, solidari*, solidári*, tradi*, unid*, unir*

Ingroup Vice: abandon*, desert*, deslea*, discord*, dissid*, dissoci*, engan*, espia*, espion*, espião, estrangeir*, exter*, imigr*, individu*, indivídu*, infie*, inimig*, terror*, trai*

Authority Virtue: alia*, autori*, cargo, casta, castas, classe*, comand*, conserv*, control*, defer*, dever, devot*, devoç*, hier*, honr*, lega*, legitim*, legítim*, lei, leis, licença, lider*, líder*, matern*, mãe*, obedi*, obrig*, orde*, pai, pais, patern*, permi*, posto, preserv*, respeit*, reveren*, reverência, serv*, submiss*, supremaci*, vener*

Authority Vice: agit*, alien*, denunci*, denúncia*, desafia*, desafio*, desert*, desobed*, desorde*, desrespeit*, discord*, discut*, dissid*, herege*, heresia*, herétic*, ilegal*, infie*, infrac*, infrat*, infri*, inimig*, insubordin*, obstr*, protest*, rebel*,

recus*, subver*, transgr*

Purity Virtue: abste*, absti*, auster*, castidade*, casto, celibat*, conserv*, cóneg*, decent*, decência*, devot*, devoç*, elegân*, elegân*, esteril*, estéreis, estéril, igreja, inocen*, inocênc*, integridade, limp*, límp*, modest*, modést*, pied*, preserv*, pur*, refin*, requint*, reveren*, reverência, sacro, sagrad*, sant*, saudáve*, tradi*, virge*, virgindade*, virtuos*

Purity Vice: adoe*, adulter*, adultér*, arruin*, contagi*, contágio*, desgraç*, devass*, doen*, enoj*, estrag*, explor*, herege*, heresia*, herétic*, imund*, indecen*, indecência*, infie*, manch*, miseráve*, nausea*, noj*, náusea*, obscen*, peca*, perver*, profan*, promiscu*, prostitu*, puta, repel*, repuls*, ruin*, ruína*, suja*, sujeir*, sujo*, tarad*

Morality General: bem*, bom, bondad*, bondo*, canon*, caracter*, caráter*, certo, correto, corrig*, cânon*, decent*, decência*, desgraç*, dign*, doutrin*, err*, exempl*, franca, francamente, franco, grav*, harmoni*, harmónico, honest*, honr*, ideal*, imora*, indecen*, indecência*, injust*, inocen*, inocênc*, integridade, irrepreens*, lega*, legitim*, legítim*, lição, lições, louv*, mal, mau, miseráve*, moral*, nobr*, nociv*, ofen*, personalidade, pied*, princípio, razoav*, razoáv*, solidari*, solidári*, val*, étic*

| D

SOME FURTHER ANALYSES

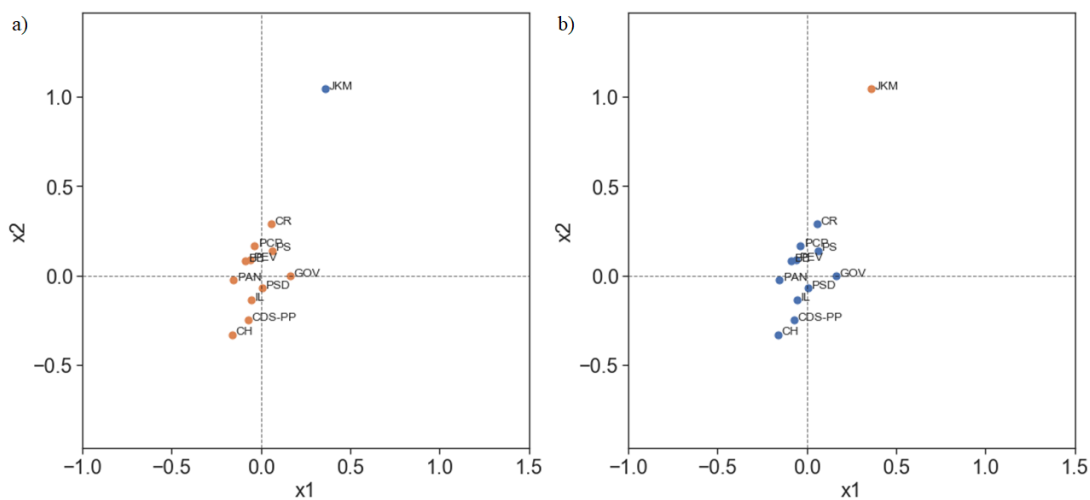


Figure D.1: clustering of the speech of all parties in parliament during the 2nd session of the 14th legislature (2020/21), before (a) and after removing Joacine Katar Moreira (b) (Graham, Haidt, and Nosek (2009))

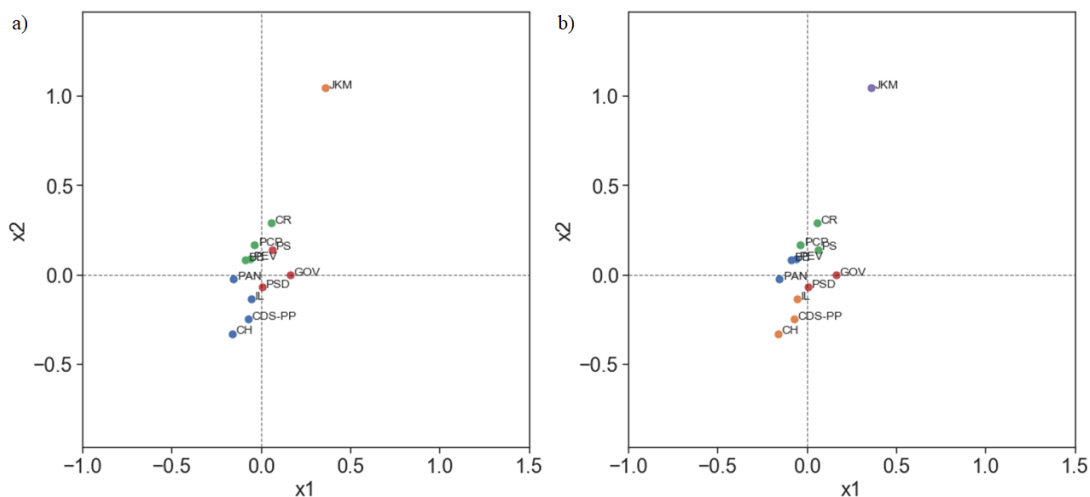


Figure D.2: Spectral clustering of the speech of all parties in parliament during the 2nd session of the 14th legislature (2020/21), before (a) and after removing Joacine Katar Moreira (b) (Graham, Haidt, and Nosek (2009))

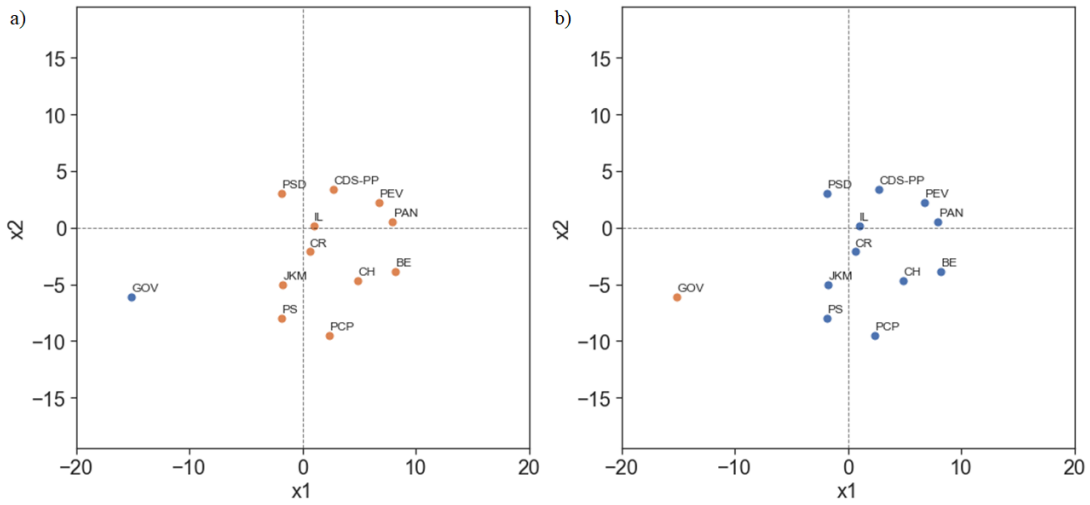


Figure D.3: DBSCAN clustering of the speech of all parties in parliament during the 2nd session of the 14th legislature (2020/21), before (a) and after removing the government (b) (Parker, Sahdra, and Ondaatje (2019))

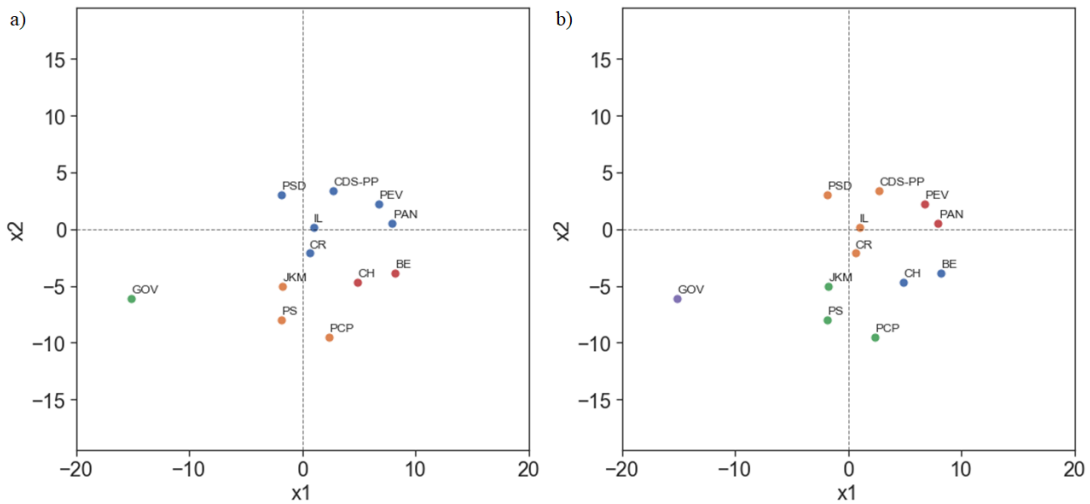


Figure D.4: Spectral clustering of the speech of all parties in parliament during the 2nd session of the 14th legislature (2020/21), before (a) and after removing the government (b) (Parker, Sahdra, and Ondaatje (2019))

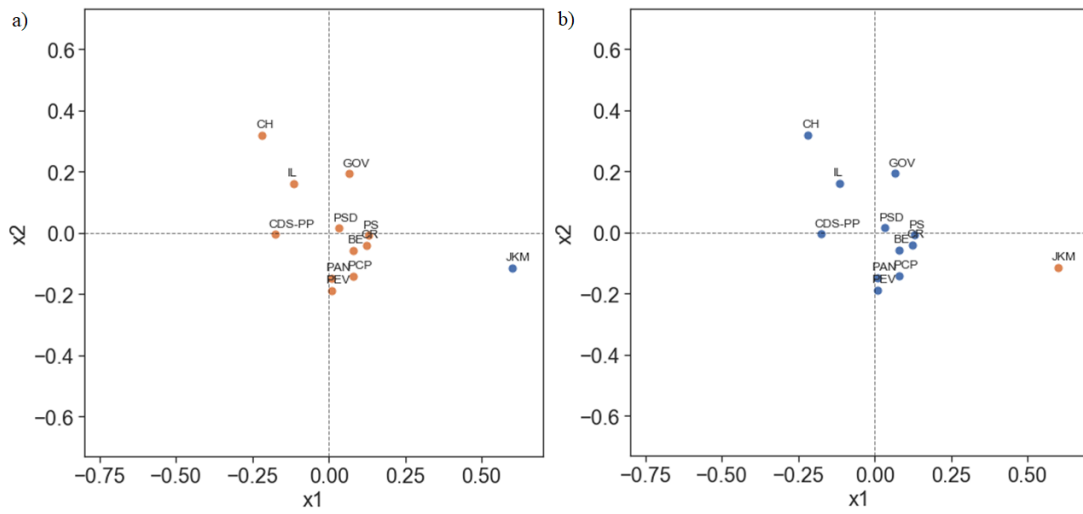


Figure D.5: DBSCAN clustering of the speech of all parties in parliament during the 2nd session of the 14th legislature (2020/21), before (a) and after removing Joacine Katar Moreira (b) (new encoding)

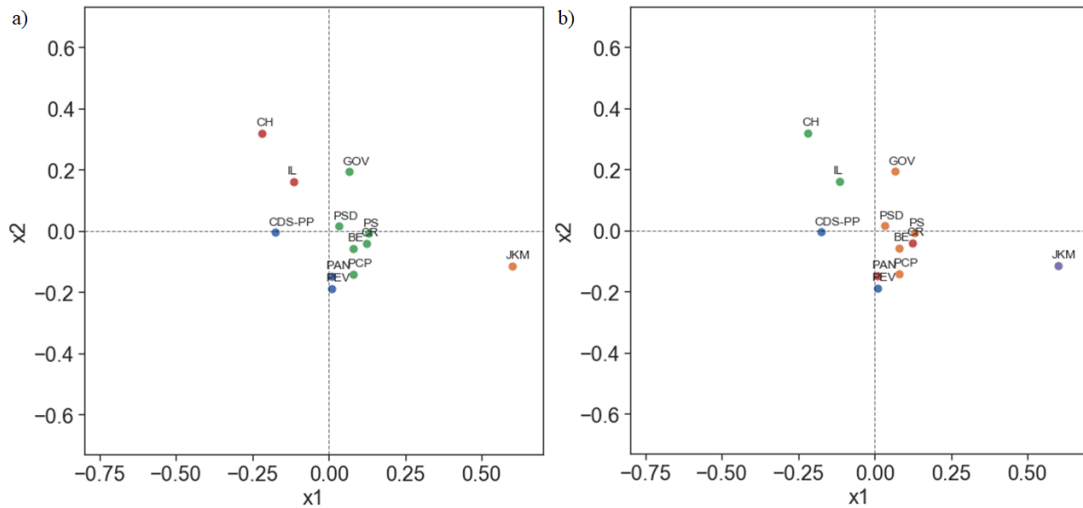


Figure D.6: Spectral clustering of the speech of all parties in parliament during the 2nd session of the 14th legislature (2020/21), before (a) and after removing Joacine Katar Moreira (b) (new encoding)

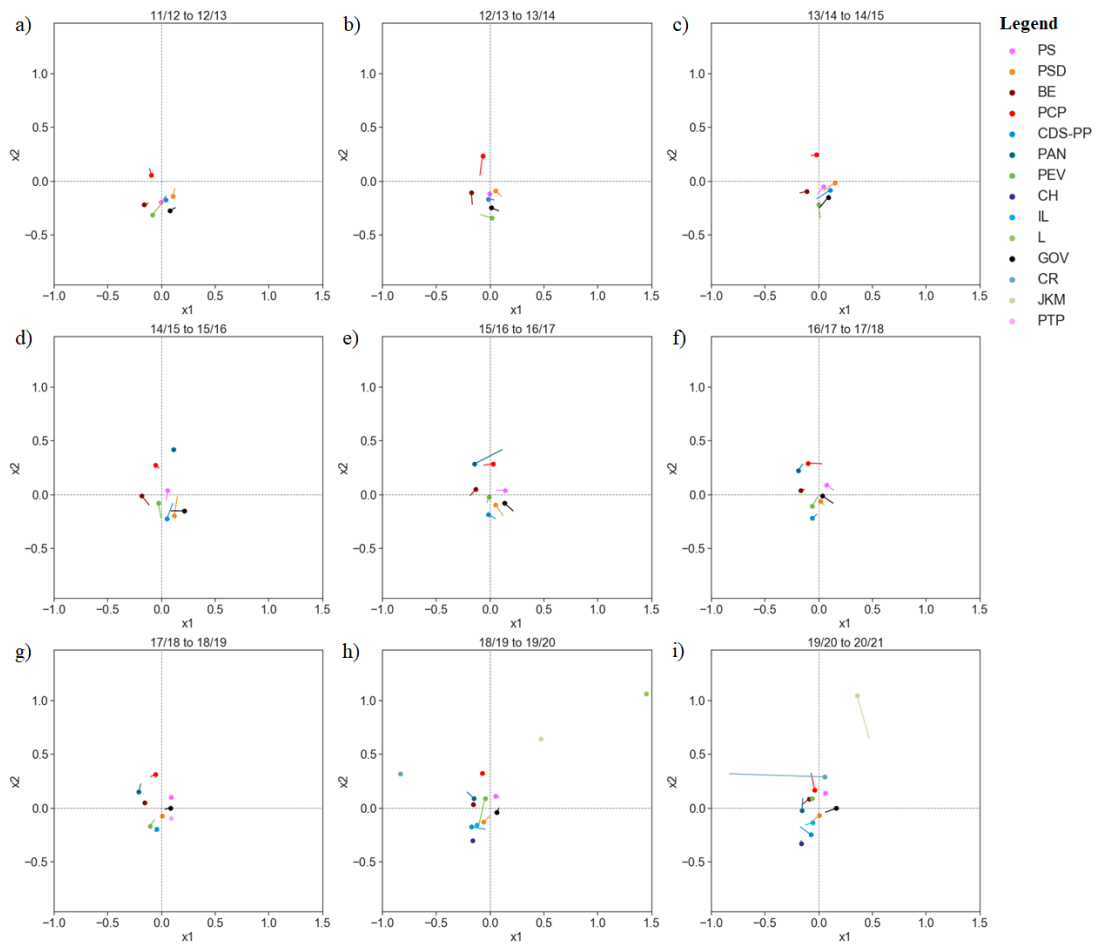


Figure D.7: Yearly evolution of the distance between parties and independent Member of Parliament (MP)s when looking at moral speech (Graham, Haidt, and Nosek (2009))

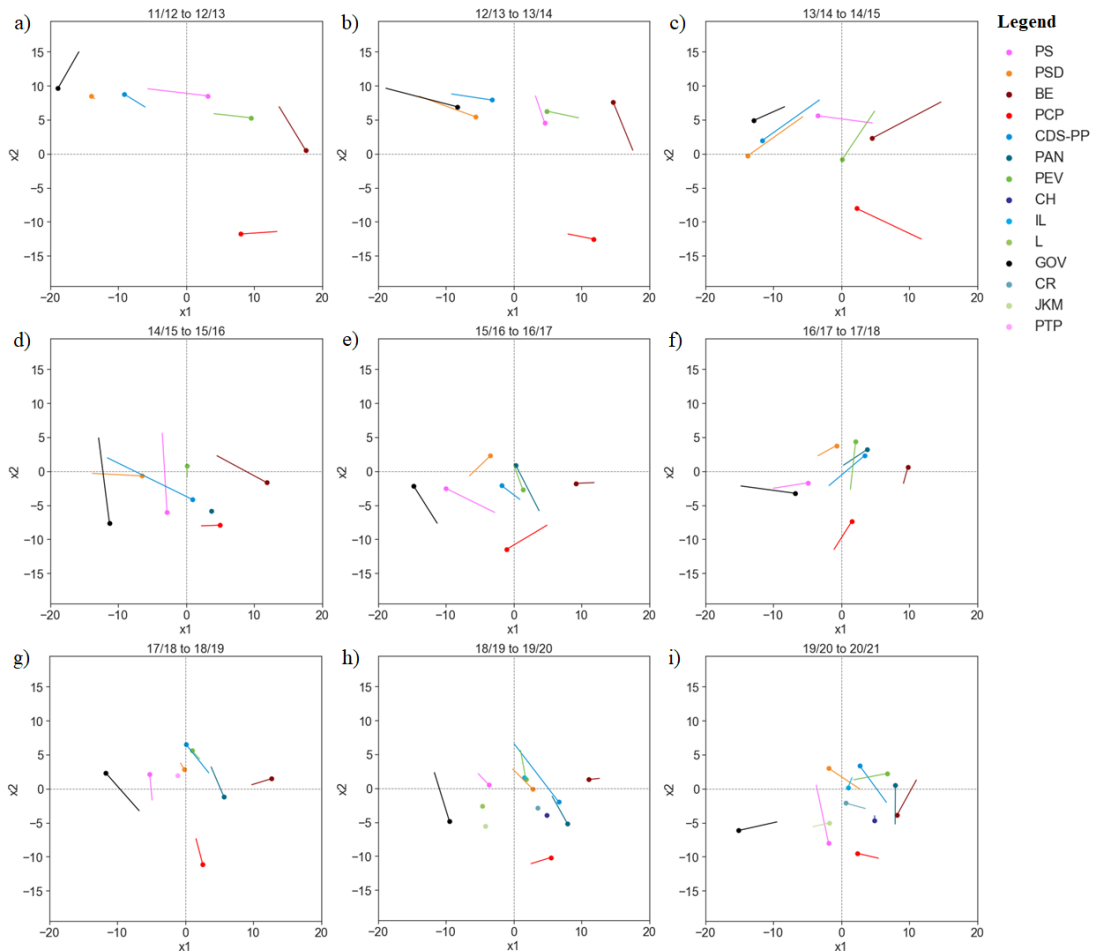


Figure D.8: Yearly evolution of the distance between parties and independent MPs when looking at moral speech (Parker, Sahdra, and Ondaatje (2019))

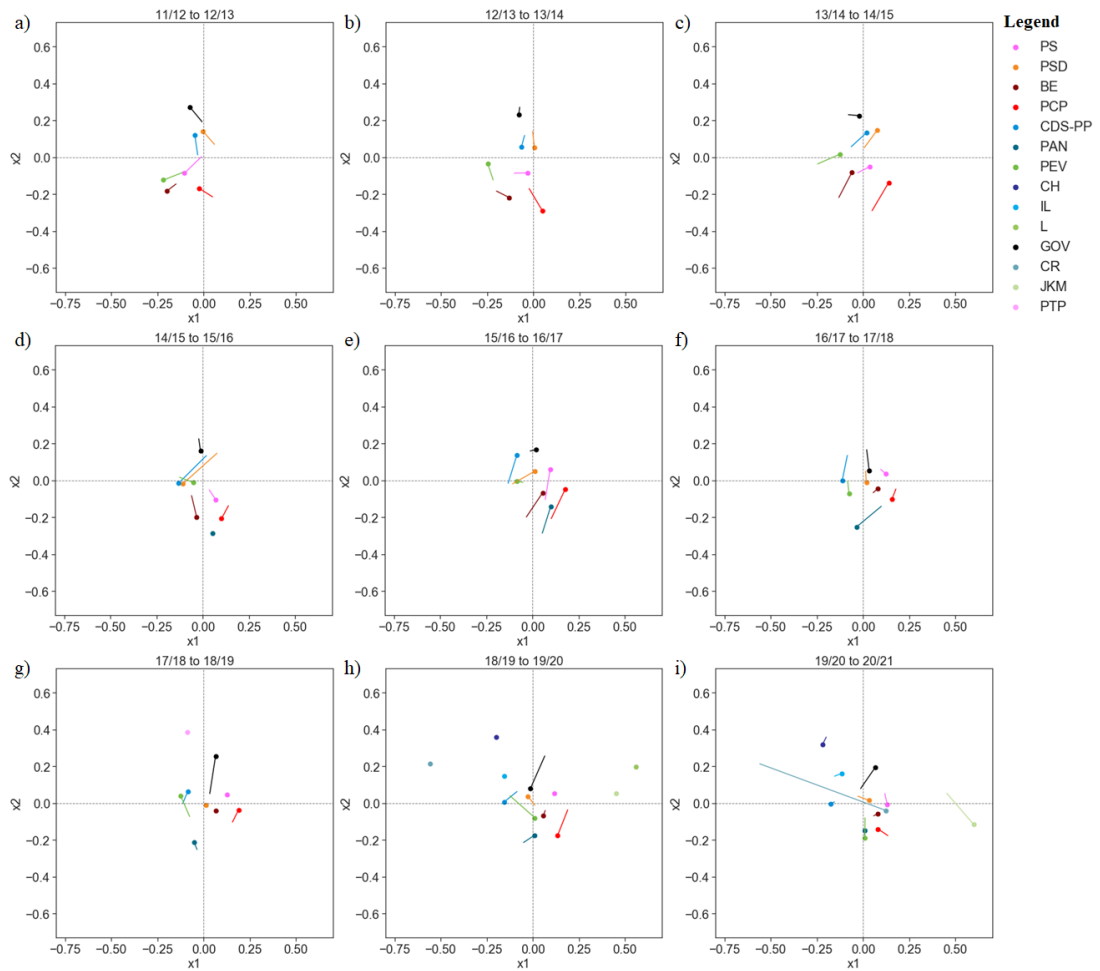


Figure D.9: Yearly evolution of the distance between parties and independent MPs when looking at moral speech (new encoding)

