



UNIVERSIDADE D
COIMBRA

Isabela Hazin Antunes de Souza

**TESTING MORAL ARGUMENT THEORY IN A
DEVELOPING COUNTRY:
A STUDY OF MORAL OPINION DYNAMICS IN BRAZIL**

Dissertation pertaining to the Masters in Human Evolution and Biology, co-supervised by Professor Doctor Paulo Jorge Gama Mota and Doctor Pontus Strimling, and presented to the Department of Life Sciences of the Faculty of Sciences and Technology of the University of Coimbra.

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Abstract

How public opinion on moral issues (e.g., legalization of same-sex marriage) changes through time is a puzzling research topic. The Moral Argument Theory of Opinion Dynamics, suggested by Eriksson and Strimling (2015) and Strimling et al. (2019), proposes that, between opposing issue positions (e.g., “for” and “against” same-sex marriage), the one more strongly supported by harm, fairness and liberty arguments is the one gaining public support over time. Furthermore, the greater the difference between opposing positions in how well they are supported by these arguments, the faster public opinion moves towards the position with such support. Previous studies have shown that the Moral Argument Theory successfully predicts moral opinion trends in the U.S. and the U.K. The present work sought to study the scope of the Moral Argument Theory by investigating whether it also predicts how public opinion on moral issues changes in Brazil, a country that differs from the U.S. and the U.K. from both an economic and a cultural perspective. It also sought to adapt the methodology employed by previous studies to the reality of developing countries, where data on moral issues are less readily available. The set of moral issues analyzed here were retrieved from public opinion polls that had been conducted in Brazil more than two times. Time trends regarding the popularity of moral positions were constructed from the data collected by such polls, while measures of positions’ connection with moral arguments were obtained through the application of an online questionnaire. Notwithstanding the use of a more flexible methodology, the results found here corroborate previous findings: also in Brazil the relative strength of a moral position’s connection with harm, fairness and liberty arguments predicts whether it is gaining popularity over time, and the speed with which public opinion moves towards it. The present work provides evidence that the Moral Argument Theory might indeed be able to predict moral opinion change in any country, as long as it has liberals in its population and freedom of speech. And, by doing so, it helps shed light on the puzzles surrounding the dynamics of moral opinion.

Key words: Moral issues, morality, Moral Foundations Theory

Resumo

Como a opinião pública em relação à questões morais muda ao longo do tempo é um tópico de pesquisa enigmático. A Teoria do Argumento Moral, sugerida por Eriksson e Strimling (2015) e Strimling et al. (2019), propõe que, entre duas posições opostas (e.g., “a favor” e “contra” o casamento homossexual), aquela mais fortemente respaldada por argumentos que giram em torno do cuidado, justiça, e liberdade é a que está ganhando apoio popular com o tempo. Além do mais, quanto maior a diferença entre posições opostas em relação à quão bem elas são respaldadas por estes argumentos, mais rápido a opinião pública muda em direção à posição com maior respaldo. Estudos anteriores demonstraram que a Teoria do Argumento Moral prevê de forma satisfatória a dinâmica da opinião moral tanto nos E.U.A. quanto no Reino Unido. O presente trabalho teve como objetivos: estudar o alcance desta teoria, investigando, para isto, se a mesma também é capaz de prever as mudanças na opinião moral ocorridas no Brasil, um país que difere dos E.U.A. e do Reino Unido tanto econômica quanto culturalmente; e adaptar a metodologia empregada em estudos anteriores à realidade de países em desenvolvimento, onde dados relacionados à questões morais não estão prontamente disponíveis. As questões analisadas aqui foram retiradas de pesquisas de opinião pública conduzidas no Brasil pelo menos duas vezes. Tendências temporais relativas à popularidade das posições morais foram construídas a partir dos dados coletados por tais pesquisas, enquanto que medidas da conexão das posições com argumentos morais foram obtidas a partir de um questionário online. Não obstante o uso de uma metodologia mais flexível, os resultados encontrados aqui corroboram resultados anteriores: também no Brasil a força – relativa – de conexão de uma posição com argumentos universais prevê se a mesma está ganhando popularidade com o passar do tempo, e a velocidade com a qual a opinião pública muda em direção a ela. O presente trabalho fornece evidências de que a Teoria do Argumento Moral é de fato capaz de prever mudanças na opinião moral em qualquer país, contanto que o mesmo possua liberais em sua população e liberdade de expressão. Ao fazer isto, este estudo ajuda a iluminar os questionamentos ao redor da dinâmica da opinião moral.

Palavras-chave: Questões morais, moralidade, Teoria das Fundações Morais

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CHAPTER 1: Introduction

The concept of morality is a tricky one to grasp. Morality is often equated with altruism and fairness. The notorious primatologist Frans de Waal states, for instance, that the rule “Do unto others as you would have them do unto you” sums up the two pillars of morality, that is, empathy and reciprocity (de Waal, 2006, pg. 2). In a similar vein, the psychologist Michael Tomasello states that the essence of morality is the sense of obligation humans feel regarding helping others and being fair (Tomasello, 2018, pg. 3); and the moral psychologist Elliot Turiel that the moral domain concerns “judgements of justice, rights, and welfare pertaining to how people ought to relate to each other” (Turiel, 1983).

Even though non-human primates, and even other mammals, have been suggested to behave in prosocial ways – to feel sympathy, and to reciprocate, for example (de Waal & Luttrell, 1988; de Waal, 2006; Gomes, Mundry & Boesch, 2009; Melis, Hare & Tomasello, 2008; Melis et al., 2011; Warneken et al., 2007; Warneken & Tomasello, 2006) humans are seemingly the only species on the planet with a full-blown morality. While great apes help/collaborate in a very specific manner, like when an individual grooms or consoles another, or when individuals form alliances against alpha-males (Harcourt & de Waal, 1992), humans help/collaborate much more broadly: members of a group often help each other to forage, care for each other’s children, and share important information with each other, for example (for a review, see Tomasello & Vaish, 2013). Importantly, human morality also differs from great apes’ prosociality in that it is uniquely mediated by norms: individuals learn early on what actions are right or wrong, and thus how others expect them to behave. Furthermore, norm violators are often punished through reputational damage, ostracism, or even death (Henrich et al., 2006).

The question of whether morality is a product of biological evolution is often interpreted as whether some components of moral psychology – emotions (e.g., empathy, guilt), cognitive capacities (e.g., norm following and enforcing), and concepts (e.g., right/wrong, good/evil) – and behaviors (e.g., altruism, reciprocity) associated with morality have evolved (Machery & Mallon, 2010). A few studies on the topic include Brosnan and de Waal’s work on whether fairness-related emotions, such as aversion to inequity, are present in non-human primates (Brosnan & de Waal, 2003); Cosmides and Tooby’s research on whether humans possess a cognitive system dedicated

specifically to reason about norms (see Cosmides & Tooby, 2005 for a review); Boyd and Richerson's, and Henrich and Boyd's models of how norms can become stable in a population (Boyd & Richerson, 1992; Henrich & Boyd, 2001); and Triver's work on how reciprocal altruism may have allowed the evolution of altruism among non-related organisms (Trivers, 1971).

As mentioned before, human morality has been traditionally thought of as revolving mainly around the protection of individuals and their individual rights, that is, around the avoidance of harm, and the pursuit of fairness (de Waal, 2006; Gilligan, 1982; Kohlberg, 1969; Tomasello & Vaish, 2013; Turiel, 1983). A few authors, however, have argued that morality also revolves around the needs of groups and institutions, and thus loyalty, respect for authority, and the protection of what is pure/sacred (e.g., national flags, humans' souls, etc.) are also foundational moral concerns (Haidt & Joseph, 2007; Shweder, 1990). In fact, according to Shweder and Bourne (1982), for most of human history these five concerns (i.e., harm, fairness, loyalty, authority, and purity) were relatively *equally* important in moral decision making – only in modern times did some people start to find concerns related to the individual (i.e., harm and fairness) more important than those related to the group (i.e., loyalty, authority, and purity) (Shweder & Bourne, 1982). These people often refer to themselves as “social liberals”; contrastingly, people who find all concerns more or less equally important often refer to themselves as “social conservatives” (Haidt & Graham, 2007). Therefore, for the remaining of this dissertation the terms “liberals” and “conservatives” will be employed in reference to the above-mentioned moral profiles.

Many of today's societies are thus constituted by people who disagree when it comes to what moral concerns are relevant and what are not. These people often clash over how the country should be run, or over which public policies are good and which are bad: a public policy that is in line with liberals' moral concerns might not be in line with conservatives' ones (Koleva et al., 2012). Hunter (1992) argues, for instance, that the United States is undergoing a “culture war” – a conflict pertaining to how people's personal and collective existences should be ordered – due to the profound differences regarding the moral values of the “progressives” and the “orthodox”, as he refers to liberals and conservatives, respectively (Hunter, 1992). The issues at the core of what Hunter called “culture wars” are what the present work deems “moral issues”.

Moral issues can be understood, more specifically, as debates over public policies in which at least one of the opposing sides uses arguments rooted on core moral principles while repelling

any consideration that goes against such principles (Mucciaroni, 2011). For instance, whether or not abortion should be decriminalized is a moral issue, given that at least one of the debating sides (e.g., “against”) places arguments based on core moral values (e.g., “abortion is murder, and murder is wrong”) above any other consideration (e.g., the public health consequences of illegal abortions) (Mucciaroni, 2011). More examples of such issues include discussions around the application of the death penalty, the legalization of same-sex marriage, the regulation of recreational drugs, and so forth. In this work, the opposing sides of a moral issue are deemed “moral positions” (e.g., “for” and “against” the legalization of assisted suicide).

The dynamics of public opinion on moral issues, or how people’s support for moral positions change throughout time, is a puzzling research topic. For instance, studies have shown that, in the past few decades, societies, in general, have leaned towards positions that emphasize individual autonomy and self-expression (Inglehart, 2018; Santos, Varnum & Grossman, 2017; Studlar & Burns, 2015). And, in the United States, more specifically, liberal positions are the ones becoming increasingly popular (Morini, 2017; Mulligan, Grant, & Bennett, 2013). Why is that so?

Furthermore, the speed of public opinion change is not the same for all moral issues: while public opinion on *certain* moral issues has changed considerably over a few decades, on others it hasn’t changed at all (or very little). In the United States, for instance, people’s views on same-sex marriage went from 62% of Americans saying it shouldn’t be recognized by the law in 2000 to 60% saying it should in 2015 (Morini, 2017). In this same time span, however, people’s views on whether abortion should be legal remained stable, with around 45% of Americans saying it is morally acceptable (Morini, 2017).

Eriksson and Strimling (2015) and Strimling et al. (2019) proposed an explanation for such puzzles, a mechanism that predicts both in which direction public opinion on a given moral issue moves, and how fast that happens. According to the authors, between opposing issue positions (e.g., “for” and “against” same-sex marriage), the one that is strongly supported by arguments that promote avoidance of harm and pursuit of fairness (henceforth “harm and fairness arguments”) tends to gain popularity at the expense of the one weakly supported by these arguments and/or strongly supported by other types of arguments, such as those that promote loyalty, respect for authority, and protection of what is pure/sacred (henceforth “loyalty, authority and purity arguments”) (Strimling et al., 2019). Moreover, the speed of public opinion change towards the position better supported by harm and fairness depends on the extent to which the opposing position

is also supported by such arguments: the greater the difference between opposing positions in how well they are connected to harm and fairness arguments, the faster public opinion moves towards the position with a stronger such connection (Strimling et al., 2019).

The advantage the position better supported by harm and fairness has over its opposite supposedly stems from the finding that harm and fairness arguments are appealing to most of the population (because liberals and conservatives alike care about avoiding harm and pursuing fairness), while authority, loyalty, and purity arguments are appealing to only a subset of the population (because conservatives care about being loyal, respecting authority, and protecting the sacred much more than liberals do) (Graham, Haidt & Nosek, 2009; Haidt & Graham, 2007). When moral positions and the arguments behind them are exchanged freely among people, therefore, a person chosen at random is more likely to be swayed by harm and fairness arguments – and to end up endorsing the position better supported by them – than she is to be swayed by other arguments.

This theory, referred to by Strimling et al. (2019) as the Moral Argument Theory, thus explains why it is that liberal positions are the ones becoming more popular: liberals preferentially endorse positions strongly connected to harm and fairness arguments because avoiding harm and pursuing fairness are the most important moral concerns for them. As it happens, these positions are the ones gaining ground among the public because they resonate with most of the population, not just with liberals – unlike positions weakly connected to harm and fairness arguments, or strongly connected to other types of moral arguments.

This theory has gained much support from studies both in the U.S. and in the U.K. (Strimling et al., 2019; Vartanova, Eriksson & Strimling, 2019). It remains a question, however, whether it predicts how public opinion on moral issues changes in other countries.

Several factors have been shown to contribute to cultural differences in morality. There is evidence suggesting, for instance, that economic development leads to the spread of secular and self-expression values (Inglehart, 2018); that prevalence of pathogens leads to a stronger endorsement of loyalty, authority, and purity concerns (van Leeuwen et al., 2012); market integration to more fairness in anonymous interpersonal transactions (Henrich et al., 2010); and exposure to threats (e.g., natural disasters or terrorist attacks) to harsher punishments for those who violate norms related to cooperation (Roos et al., 2015). Besides, whether a country is individualistic or collectivistic seems to be linked to which moral concerns are considered more relevant: those regarding individual rights and independence, and those regarding duty and spiritual

purity, respectively (Buchtel et al., 2015; Guerra & Giner-Sorolla, 2010; Haidt, Koller & Dias, 1993).

According to the Moral Argument Theory, however, none of these factors should affect the direction of moral opinion change: as long as a country has freedom of speech (so that moral positions and arguments are exchanged freely), and liberals in its population (who preferentially endorse and spread positions connected to harm and fairness arguments), public opinion on moral issues moves towards positions strongly supported by harm and fairness arguments (Strimling et al., 2019). For instance, even though economic development supposedly has a long-term impact on the proportion of liberals and conservatives in a population (Inglehart, 2018), such proportion would only affect the *speed* of moral opinion change: in countries with less liberals, moral opinion would change more slowly, since less liberals means individuals are less likely to come across liberal positions, to listen to the arguments supporting them, and to end up adopting them (Strimling et al., 2019).

As mentioned before, the Moral Argument Theory has been tested in two countries only: the U.S. and the U.K. It's not known, therefore, if it can predict moral opinion change in other countries; countries that, albeit having freedom of speech and liberals in its population, are different from the U.S. and the U.K. in areas such as economy and culture, for instance, which influence a society's morality. The aim of the present study is thus to test the scope of the Moral Argument Theory suggested by Eriksson and Strimling (2015) and Strimling et al. (2019), the question asked being "do the predictions of such theory hold in Brazil, a country that differs from the U.S. and the U.K. in both economic and cultural terms?" Because Brazil is a developing country, characterized by values leaning towards religion and both economic and physical security, its citizens might be more inclined to listen to loyalty, authority, and purity arguments – there might be more conservatives than liberals in the population (Inglehart, 2018). Notwithstanding, given that there *are* liberals in Brazil, and that Brazilians enjoy freedom of speech, the hypothesis here is that the Moral Argument Theory is also able to predict moral opinion change in this country.

An important aspect of the present work is that its methodology was adapted from that of Strimling et al. (2019) to account for the reality of developing countries, in which data sources and opportunities of collecting data are less readily available. Specifically, to account for the fact that opinion polls are not often carried out several times over the years. Therefore, if this study shows that the predictions of the Moral Argument Theory do hold in Brazil, the more flexible

methodology employed here could serve as a guide to testing this theory in other developing countries, with similar conditions with respect to data availability.

1.1 Theoretical background

1.1.1 Moral Foundations Theory

The Moral Argument Theory argues that, between two opposing positions (e.g., “for” and “against” the legalization of assisted suicide), the one gaining popularity over time is the one more strongly supported by harm and fairness arguments.

As alluded to before, “harm and fairness arguments” mean arguments based on harm-avoiding and fairness-pursuing concerns, respectively. Similarly, “loyalty, authority, and purity arguments” mean arguments based on loyalty, authority, and purity concerns, respectively. What were heretofore referred to as “concerns”, however, are part of broader concepts: those of *moral foundations*.

According to the Moral Foundations Theory (MFT) (Haidt & Graham, 2007; Haidt & Joseph, 2004), moral foundations are, as the name suggests, the building blocks of the different moralities observed across humans. Each foundation encompasses a set of perceptions, concerns, intuitions, motivations and emotional reactions, and would have evolved so that humans could respond rapidly and effectively to common social problems and opportunities.

The Care/harm foundation, for instance, is described by Haidt and Graham (2007) and Haidt (2012) as an innate preparedness to perceive signs of suffering in others (specially in one’s own children) and to respond with a motivation to aid and protect. It would have evolved to help humans tackle the adaptive problem of caring for very vulnerable babies for a very long time. Those who had such preparedness would have had more descendants than those who did not.

Based on Haidt and Joseph’s and their own work, Haidt and Graham (2007) suggested that there are five foundations behind the moralities observed across human cultures, each one of them with its own evolutionary history: Care/harm (henceforth “Harm”), Fairness/cheating (henceforth “Fairness”), Loyalty/betrayal (henceforth “Loyalty”), Authority/subversion (henceforth “Authority”), and Purity/degradation (henceforth “Purity”). Later on, Liberty/oppression (henceforth “Liberty”) was added to this list (Haidt, 2012).

Strimling et al. (2019) thus made use of the framework provided by the Moral Foundations Theory (MFT) to categorize the arguments behind moral positions. They categorized each argument based on the moral foundation from which it derives. Harm arguments, for instance, are those that explore the Care/harm psychological system, an example being “[Something is wrong] because then someone suffers.”

An overview of the adaptive challenges, original and current triggers, characteristic emotions, and relevant virtues pertaining to each moral foundation, and examples of the moral arguments used by Strimling et al. (2019) can be seen in Table 1 below.

Table 1 – The six moral foundations and examples of moral arguments, as described by Haidt (2012). Adapted from Haidt (2012, pg. 139).

	Harm	Fairness	Loyalty	Authority	Purity	Liberty
Adaptive challenges	Protect and care for children	Reap benefits of two-way partnerships	Form cohesive coalitions	Forge beneficial relationships within hierarchies	Avoid contaminants	Deal with would be alpha-males
Original triggers	Suffering, distress, or neediness expressed by one's child	Being cheated on by/cooperate with a partner	Threats or challenges to one's group	Signs of dominance or submission from group members	Waste products, diseased people, corpses	Aggressive and controlling behavior from group members
Current triggers	Suffering of others (including non-human animals and fictional characters)	Marital infidelity, broken vending machines, etc.	Threats from rival sports teams, business competitors, terrorist groups, etc.	Perceived authority of bosses, political or religious leaders, the elderly, etc.	Sexual behaviors, ideological differences, etc.	Authoritarian leaders or regimes
Characteristic emotions	Compassion	Anger, gratitude, guilt	Group pride, rage at traitors	Respect, fear	Disgust	Righteous anger
Relevant virtues	Caring, kindness	Fairness, justice, trustworthiness	Loyalty, patriotism, self-sacrifice	Obedience, deference	Temperance, chastity, piety, cleanliness	Egalitarianism
Examples of moral arguments	"[Something is wrong] because then someone suffers emotionally."	"[Something is wrong] because then someone acts unfairly."	"[something is wrong] because then someone does something to betray his/her group."	"[Something is wrong] because then someone does not conform to the traditions of society."	"[Something is wrong] because then someone does something disgusting."	"[Something is wrong] because then someone's freedom of choice is restricted."

Sections A.1 – “Assumptions of the theory” and A.2 – “The moral foundations” of Appendix A discuss the assumptions behind the MFT and gives more details about each of the foundations.

1.1.2 The Moral Argument Theory of Opinion Dynamics

The Moral Argument Theory account of public opinion dynamics rests on two assumptions. The first is that, in the case of morally charged issues, the connection between positions and arguments is not malleable, that is, a given position can *only* be supported by given arguments, not by all of them. In other words, which arguments support a given position depends on the particularities of such position and is thus not subjected to individual opinion.

Taking the legalization of gay marriage as an example: the position that homosexual couples should have the same rights as heterosexual ones is inherently linked to fairness – it evokes the argument “it is not fair that some couples can marry while others can’t.” On the other hand, the position against same-sex marriage is *not* linked to fairness – it is not common to hear the argument “it is not fair to allow gay couples to marry.” In fact, people who are against same-sex marriage usually use other types of arguments to justify their position (Jowett, 2014).

The second assumption is that, when discussing a moral issue, people are influenced more easily by the arguments they find intuitively acceptable. As mentioned before, researches in the field of moral psychology have shown that there is an *asymmetry* in which moral concerns people find intuitively more relevant, and thus in which types of arguments they listen to. While liberals are mainly open to harm and fairness arguments, conservatives are more or less equally open to *all* moral arguments, including authority, loyalty, and purity ones (Graham, Haidt & Nosek, 2009; Graham, Nosek & Haidt, 2012; Graham et al., 2011; Haidt & Graham, 2007; McAdams et al., 2008). Section A.3 “MFT and political ideology” of Appendix A discusses this finding in more detail.

Taking into account these assumptions and findings, Strimling et al. (2019) proposed that, between two opposing positions, that which is connected (or more strongly connected) to harm and fairness is the one gaining popularity because, while both liberals and conservatives are likely to be swayed by harm and fairness arguments and to endorse the position connected to such

arguments, only conservatives are likely to be swayed by other arguments and to endorse the position connected to them.

In simpler terms, positions linked (or more strongly linked) to harm and fairness arguments have an advantage over their opposites in that they spread more easily, given that the whole population is likely to adopt it, once they have come into contact with it, while only a subset of the population is likely to adopt its opposite.

According to the Moral Argument Theory, for instance, the strong trend towards the legalization of same-sex marriage across the U.S. is due to the “for” position being much more often supported by arguments concerning fairness (e.g., “it is unjust that gay couples don’t have the same rights as straight ones”) than the opposite “against” position, which is more often supported by other kinds of arguments (e.g., “gay marriage is impure/God does not approve of it”) (Strimling et al., 2019).

Whereas both liberals and conservatives who are “against”, when they come across the arguments supporting the “for” position, are willing to acknowledge them, and to change sides, conservatives who are “for” are far more likely to acknowledge the arguments supporting the “against” position and to change their minds than liberals who are “for”. Since more people flip to the “for” position’s side than to the “against” position’s one, with time public opinion on the issue steers increasingly towards the “for” position.

Strimling et al. (2019) also argues that the bigger the difference between a position and its opposite in how strongly they are supported by harm and fairness arguments, the faster the swing towards the position with greater such support.

Strimling et al. (2019) believes this explains why public opinion on certain moral issues changes so fast, while on others it remains stable. Taking the abortion issue as an example, these authors propose that the lack of significant change in American public opinion over the last fifteen years is due to both positions being strongly linked with harm and fairness arguments: when people argue in favor of the legalization of abortion they often use arguments such as “it is not fair to women; they should have control over their bodies”, or “women suffer and die in clandestine abortion clinics”; and, when they argue against it they often say “it is not fair to the fetus, who is being deprived of a life” or “abortion is tantamount to murdering a child” (Jones & Chaloner, 2007; Mucciaroni, Ferraiolo & Rubado, 2019).

In this case, one set of arguments is not that much more persuasive than the other since they are both based on harm and fairness. People thus are less likely to abandon their current position on behalf of its opposite.

1.1.3 The model of public opinion dynamics and the predictions of Moral Argument Theory

In their paper, Strimling et al. (2019) derived the predictions of the Moral Argument Theory from a model of public opinion dynamics. Such model assumes a large population comprised of liberals and conservatives discussing a moral issue, and an asymmetry in which arguments each group listens to: while liberals can be swayed mainly by harm and fairness arguments, conservatives can be swayed by any moral argument. The issue being discussed has two positions: “for” and “against”, each with the same number of supporting arguments – the “for” position, however, is more strongly linked to harm and fairness arguments than the “against” one (it has what Strimling and colleagues dubbed “**harm-fairness connection advantage**”).

At each time step individuals are paired randomly, and one of them listens to the arguments supporting the other’s position. The probability that the listener will change her mind regarding the position she endorses depends on how well the arguments presented by the talker can persuade her, which in turn depends on the nature of such arguments and on the listener’s moral profile.

When a liberal who is “for” listens to the arguments supporting the “against” position, the probability that she will end up changing her mind is small (given that “for” has harm-fairness connection advantage). When a liberal who is “against” listens to the arguments supporting the “for” position, however, she is very likely to change her mind. Regarding conservatives, the probability they will end up switching positions is more or less the same be them listening to “for-” or “against-arguments”.

Analyzing such model Strimling et al. (2019) predicted that, over time, liberal opinion moves towards the position with harm-fairness connection advantage (Figure 1). Furthermore, conservative opinion moves in the same direction, although at a slower pace: since at each time step the number of people who are “for” increases, so do the chances that a conservative will be paired up with one such person and be swayed by “for-arguments”.

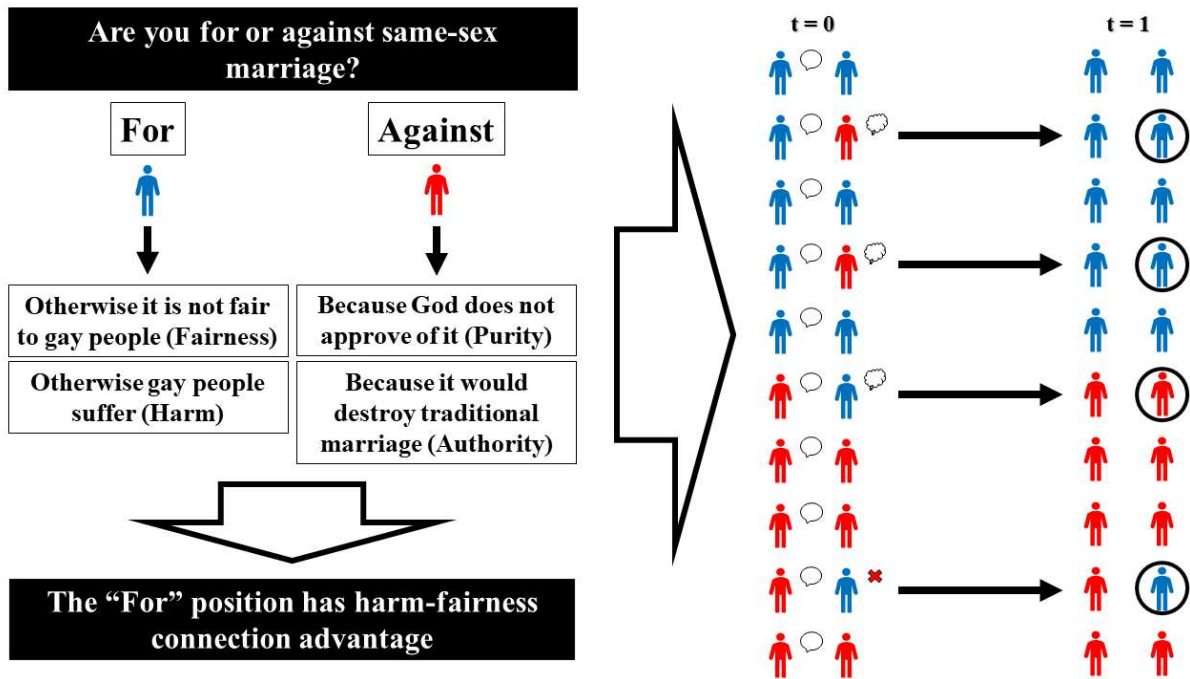


Figure 1: An example of how the model of public opinion dynamics of Strimling and colleagues (2019) works. The issue being discussed here is the legalization of same-sex marriage. Blue people hold the “for” position, while red ones hold the “against” one. Whether someone is liberal or conservative is not specified. The “for” position has harm-fairness connection advantage, given that it is more commonly supported by harm and fairness arguments than its opposite. Liberals who are “for” are thus not likely to abandon their position in favor of the “against” one, while liberals who are “against” are likely to change positions. Irrespective of the positions they currently hold, conservatives are more or less equally likely to change or not their minds. As a result of this dynamic, at each time step more people adopt the “for” position than the “against” one.

Regarding the speed of opinion change, the bigger the discrepancy between opposing positions in how well they are supported by harm and fairness arguments, the more persuasive the position with harm-fairness connection advantage, and thus the bigger the probability that liberals will side with it, increasing the speed with which liberals, and then conservatives, move towards it.

Strimling et al. (2019)’s model of public opinion dynamics yielded three testable predictions:

1. For any given issue, the liberal position tends to be the one with harm-fairness connection advantage.
2. Public opinion moves towards the liberal position.
3. The bigger the harm-fairness connection advantage of the liberal position, the faster the speed with which public opinion moves towards it.

1.1.4 The findings of Strimling et al. (2019)

To test the predictions mentioned above, Strimling et al. (2019) made use of the U.S. data gathered by the *General Social Survey* (GSS) since 1972. The GSS is a sociological research devised and managed by The University of Chicago whose mission is to monitor Americans' beliefs and attitudes regarding certain issues.

Each question posed by the GSS shows the respondent an issue position (e.g., “for” gun ownership) and asks whether she agrees with it. Such positions were dubbed “default positions” by Strimling et al. (2019). For instance, the GSS question “Do you think the use of marijuana should be made legal?” asks whether the respondent agrees with the issue position “the use of marijuana should be made legal”. Thus, “the use of marijuana should be made legal” is the default position, while “the use of marijuana should NOT be made legal” is its opposite.

For each question's default position Strimling et al. (2019) calculated a harm-fairness connection advantage, or how strongly the default position connects with harm and fairness arguments *minus* how strongly its opposite connects with the same arguments. Thus, harm-fairness connection advantages are relative, not absolute, values.

Harm-fairness connection advantage values range from -1, when the default position has no connection to harm and fairness arguments, and its opposite has maximum such connection, to +1, when the default position has maximum connection, and its opposite has none.

In other words, a **positive** advantage value means that the **default** position is more tightly connected to harm and fairness arguments than the opposite one, and a **negative** advantage value that the **opposite** position is more tightly connected to such arguments than the default one.

Once in possession of the harm-fairness connection advantage value pertaining to the default position of each of the moral issues addressed by them, Strimling et al. (2019) investigated whether the default positions with a positive advantage value were the ones becoming more

popular. That is, whether the positions more strongly linked to harm and fairness were the ones trending.

Given that the GSS asks the same questions year after year, Strimling et al. (2019) was able to construct time trends of public opinion change on moral issues, and thus assess how popular default positions have become since 1972.

The results of their analysis confirmed all three of the model's conjectures:

1. In 64 out of 74 moral issues, the liberal position is the one with a positive harm-fairness connection advantage value (i.e., liberals more often than not adopt the position more tightly linked to harm and fairness arguments).
2. In 58 out of 74 moral issues, public opinion moved towards the liberal position (i.e., the position more tightly linked to harm and fairness arguments is the one gaining popularity).
3. Variation in harm-fairness advantage values explained *half* of total variation in how public opinion on moral issues changed in the last 40 years (i.e., the bigger the harm-fairness advantage of a position, the faster it gains popularity).

Importantly, besides testing the predictions derived from the model of public opinion dynamics, Strimling et al. (2019) also examined the assumption that positions' connection with arguments is not arbitrary (i.e., it does not depend on individual opinions).

As expected, they found a high agreement among Americans from both ends of the political spectrum about which moral arguments justify the adoption of which positions. Most individuals agreed, for instance, that arguments based on Fairness (e.g., "otherwise some people are treated differently than others") are more relevant in the defense of the "pro-gay marriage" position than in the defense of the "against-gay marriage" position. Similarly, most individuals agreed that arguments based on Purity (e.g., "otherwise someone does something that God disapproves of") are more relevant in the defense of the "against-gay marriage" position than in the defense of the "pro-gay marriage" one (Strimling et al., 2019).

1.1.5 Expanding the scope of the Moral Argument Theory: the findings of Vartanova, Eriksson, and Strimling (2019)

Overall, the studies conducted by Strimling et al. (2019) provided tremendous support for the Moral Argument Theory. When tested with U.S. data, the theory's predictions were shown to be highly accurate: positions with harm-fairness connection advantage tend to be the liberal positions, *and* are the ones becoming more popular over time, with the speed of this increase in popularity depending on the size of positions' advantage.

It follows from the assumptions of Moral Argument Theory, however, that as long as there are liberals in the population (who preferentially adopt positions tightly linked to harm and fairness, and introduce such positions in the public dialogue), and people are allowed to speak their minds (and thus exchange moral arguments) freely, countries should see a trend towards liberalization of moral opinions.

In an attempt to investigate whether the predictions of the Moral Argument Theory hold in countries other than the U.S., Vartanova, Eriksson, and Strimling (2019) carried out similar analysis as those of Strimling et al. (2019), but this time with data from the United Kingdom, apart from the United States (Vartanova, Eriksson & Strimling, 2019).

Noting that the set of arguments addressed by Strimling et al. (2019) did not encompass all arguments relevant to moral issues, Vartanova, Eriksson, and Strimling (2019) used arguments relating to physical harm (i.e., violence), liberty, and government efficiency in their analysis, as well as Strimling et al. (2019)'s harm, fairness, authority, loyalty, and purity ones (Vartanova, Eriksson & Strimling, 2019).

In light of Iyer et al.'s research, which suggests that everybody (i.e., both liberals and conservatives) is persuaded by liberty arguments (Iyer et al., 2012), as is the case with harm and fairness arguments, Vartanova and colleagues dubbed the group comprised by harm, violence, fairness, and liberty as “**universal arguments.**” Therefore, instead of calculating, for each default position, a harm-fairness connection advantage value, they calculated a “**universal arguments advantage value**” (U.A.A.), or how strongly the default position connects with universal arguments minus how strongly its opposite connects with such arguments.

The results found by Vartanova, Eriksson, and Strimling (2019) corroborated the findings of Strimling et al. (2019). Also in the U.K. the strength of a position's universal arguments

advantage predicts opinion trends. The direction and speed of such trends exhibited the same pattern across countries: the greater the universal argument advantage of a position, the faster public opinion moves towards it (Vartanova, Eriksson & Strimling, 2019) (Figure 2).

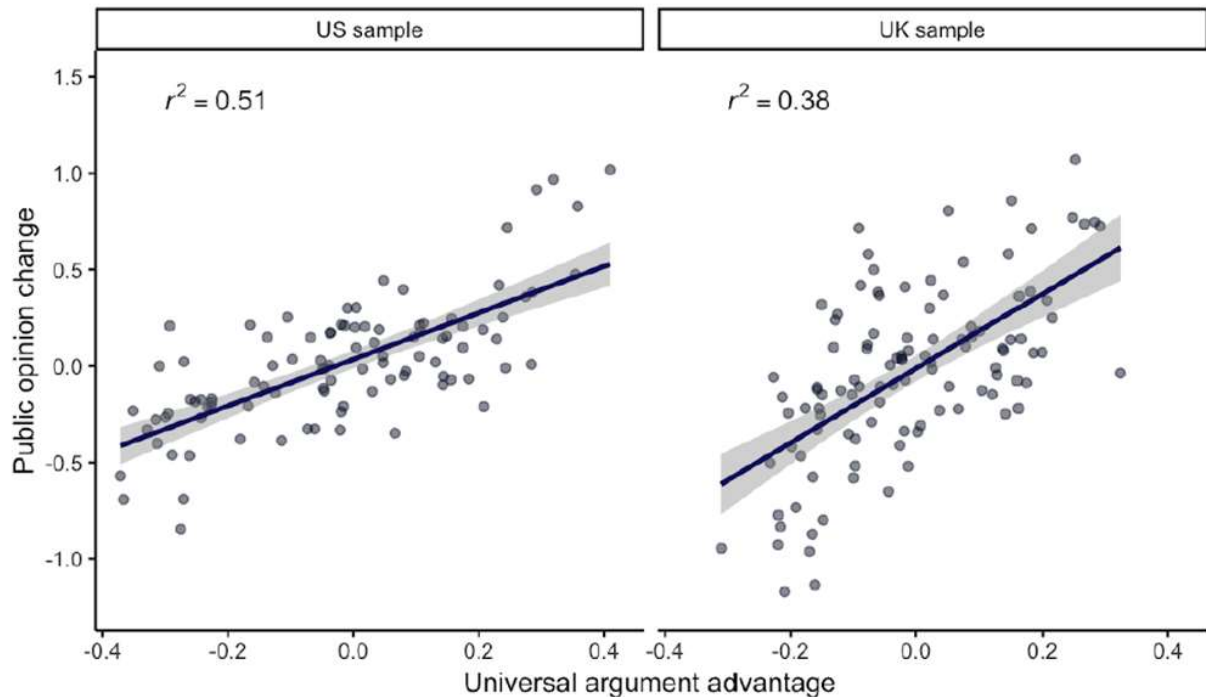


Figure 2: Scatter plots of public opinion change (in percentage points per year) against universal arguments advantage values. The left panel contains 98 moral items obtained from the General Social Survey in the United States, and the right panel 108 items from the British Social Attitudes Survey in the United Kingdom. The gray area around the regression lines portrays 95% confidence intervals. Adapted from Vartanova, Eriksson, and Strimling (2019).

1.1.6 Testing the Moral Argument Theory in a developing country

Combining Strimling et al. (2019)'s and Vartanova, Eriksson, and Strimling (2019)'s researches, the predictions of the Moral Argument Theory have been tested in two countries so far, both of which are developed, with relatively similar values (Strimling et al., 2019; Vartanova, Eriksson & Strimling, 2019).

In the discussion of their work, Vartanova, Eriksson, and Strimling (2019) wonder whether the dynamics of public opinion – as explained by the Moral Argument Theory – observed among

American and British citizens is also a feature of more distinct countries, from an economic and/or cultural perspective (as predicted by the theory).

The present work aims precisely at tackling this question. More specifically, it aims at testing whether both the assumption that positions are inherently linked with arguments, and the predictions of the Moral Argument Theory hold in Brazil.

How different is Brazil?

Brazil differs from the U.S. and the U.K. in important aspects. From an economic point of view, according to both the United Nations Development Programme (UNDP) and the International Monetary Fund (IMF), the U.S. and the U.K. are developed countries, while Brazil is a developing one (IMF, 2018, p. 130-135; UNDP, 2019). While the U.S. and the U.K. are tied in the 15th position in the UNDP's 2019 Human Development Index Ranking, Brazil occupies the 79th position (UNDP, 2019, p. 300-303).

Regarding cultural differences, Inglehart (2006) suggests that, of the many dimensions in which cultures vary two are particularly important: the polarization between Traditional and Secular-Rational values, and that between Survival and Self-expression ones (Figure 3).

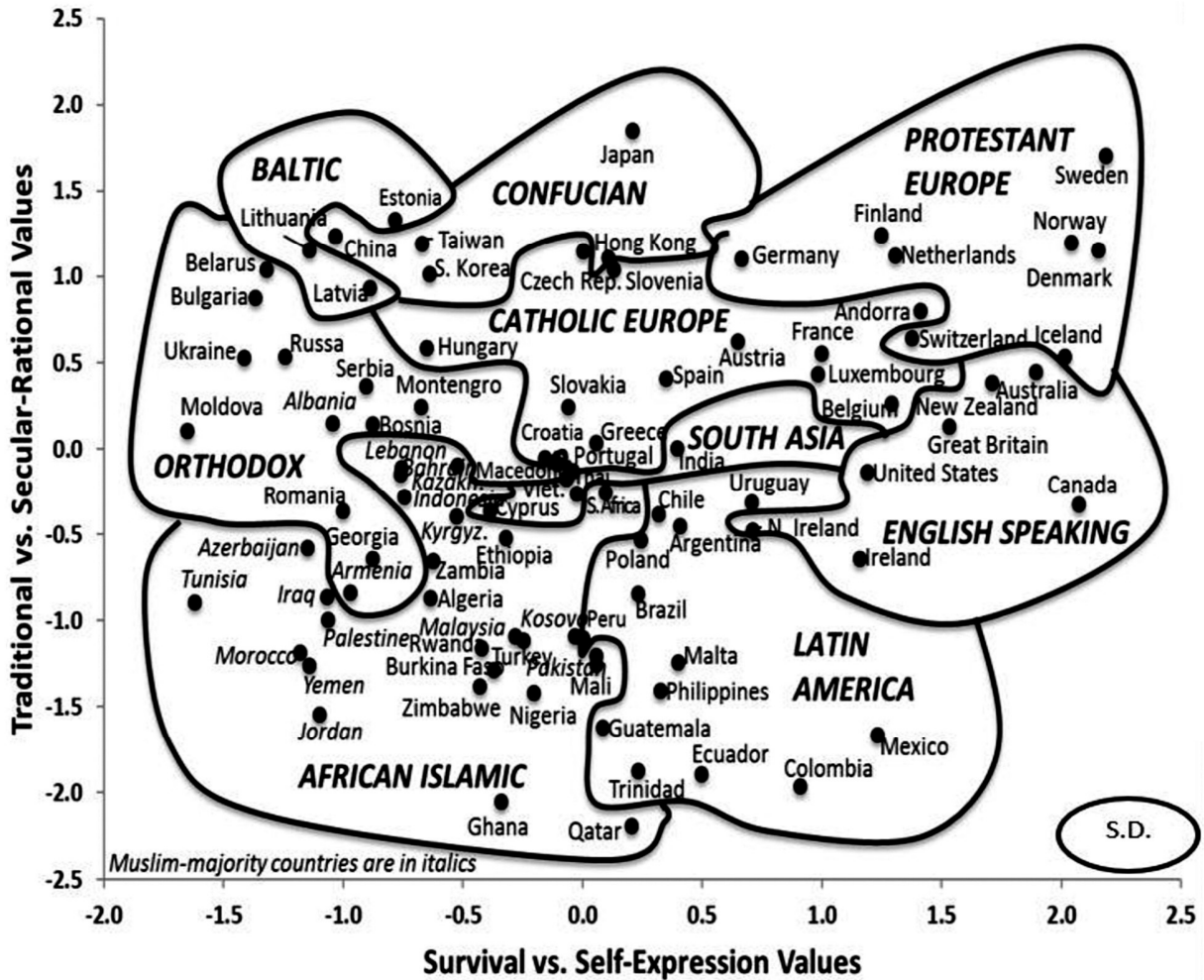


Figure 3: Global cultural map, constructed by Inglehart (2018) from the results of European Values Surveys and World Values Surveys conducted between 2008 and 2014. The map displays where 94 countries are situated along the “Traditional vs. Secular-Rational values” and “Survival vs. Self-expression values” dimensions. Brazil is included in the “Latin American” group, while the U.S. and the U.K. in the “English speaking” one. Adapted from Inglehart (2018).

According to Inglehart (2006), the Traditional/Secular-Rational axis represents the contrast between the traditional and religious values characteristic of agrarian societies, and the secular and rational values characteristic of industrialized ones. The Survival/Self-expression axis, on the other hand, represents the difference between the emphasis industrial societies give to physical and economic security, and the emphasis post-industrial ones give to self-expression, subjective well-being, and quality of life (Inglehart, 2006).

Both these dimensions are thus fundamentally linked to economic development. Inglehart's Evolutionary Modernization theory states that economic growth leads to the feeling of existential security, and that the generations that grow up feeling secure tend to take survival for granted and to emphasize self-expression values instead of survival ones (Inglehart, 2006; Inglehart, 2018).

But even though Inglehart argues that cultural values are tightly linked to economic development, he also firmly believes that the values system of a society is largely influenced by its sociocultural history. The values of Latin-American societies, therefore, which share a past as colonies of Iberic countries, are more similar among themselves than predicted only by levels of economic development, and the same is true for English-speaking societies (Inglehart, 2006; Inglehart, 2018).

In Figure 3, taken from Inglehart (2018), it can be observed that while Brazil is characterized by very traditional/religious values and by a mix of survival and self-expression ones (henceforth "Latin-American" values), the U.S. and the U.K. are characterized by more secular values and by a strong emphasis on self-expression ones (henceforth "English-speaking" values).

Therefore, Brazil differs substantially from the United States and United Kingdom from an economic perspective as well as from a cultural one. Given the predominance of Latin-American values in Brazil, more of its citizens would be susceptible to conservative arguments, which would slower opinion change in general. Nonetheless, according to the Moral Argument Theory the main pattern (i.e., positions with U.A.A. being the ones trending) should remain the same.

Methodological issues

As explained elsewhere, testing the Moral Argument Theory involves calculating how strongly positions connect with universal arguments, constructing time trends depicting how popular positions have become, and then studying how these two measures interact.

Strimling et al. (2019) made use of 40 years of U.S. data to produce reliable time trends. However, many developing countries, Brazil amongst them, don't inquire the population about moral issues on a regular basis. Besides, only some polls are repeated over the years, making it difficult for one to assess which positions have been gaining strength.

To deal with such lack of data, the present work intends to employ a more flexible approach, especially regarding the methods used to gather data, than that employed by Strimling et al. (2019). If the results obtained here are similar to that of Strimling et al. (2019) and Vartanova, Eriksson,

and Strimling (2019) no matter what, this adjusted methodology could be of use in testing the Moral Argument Theory in a number of other developing countries.

1.2 Objectives

The detailed objectives of the present work are thus:

1. To adapt the data collection methods employed by Strimling et al. (2019) to the reality of Brazil.
2. To measure how much Brazilians agree about which moral arguments can be used to support which positions (i.e., to check on the validity of one of the assumptions of the Moral Argument Theory).
3. To test whether two of the predictions of the Moral Argument Theory hold in Brazil, namely:
 - The prediction that the positions with positive universal arguments advantage values (i.e., more tightly linked to universal arguments) are the ones that become more popular over time.
 - The prediction that the greater the universal arguments advantage of a position, the faster public opinion moves towards it.

CHAPTER 2: Methods

The sections that follow depict the obtainment of time trends and universal arguments advantage values, that is, of how popular positions have become over time, and how strongly positions connect with universal arguments, respectively.

At the end, the “Analysis” section depicts the test of whether individuals agree about which moral arguments support which positions, and the calculus of correlation coefficients between rates of change in public opinion and U.A.A. values.

Figure 4 below offers a schema of the methodology.

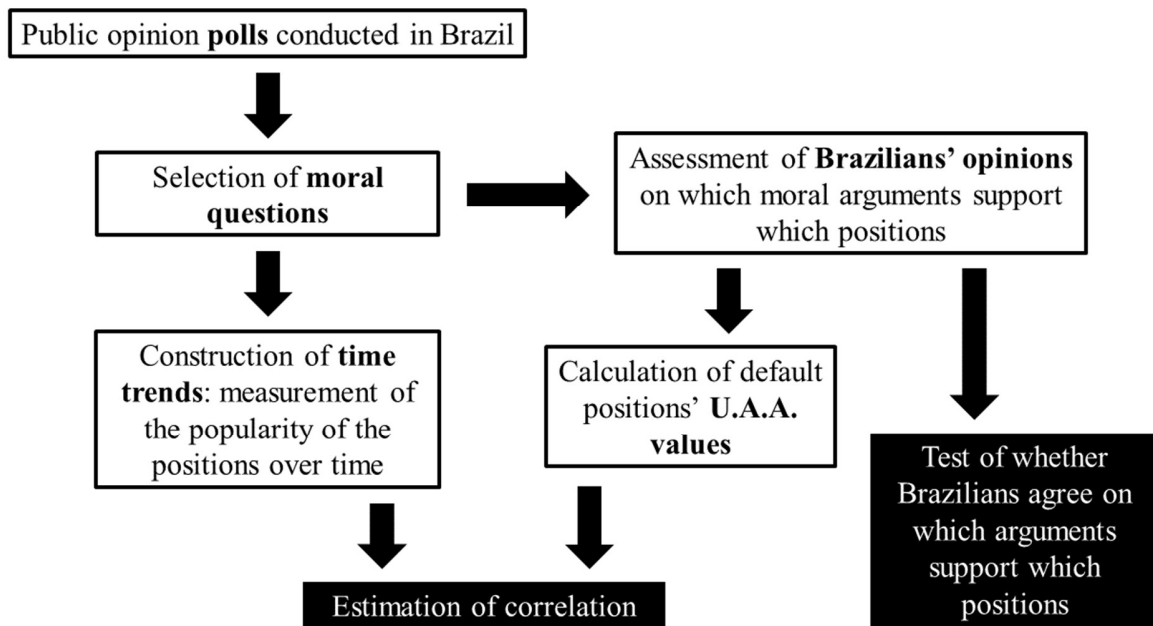


Figure 4: Schema of the methodology employed in the present study. “U.A.A.” stands for “Universal arguments advantage”.

2.1 Selecting moral issues

The moral issues studied here were chosen from those regularly included in public opinion polls. The information gathered by polls over the years provides the material from which time trends of positions' popularity can be built.

For time trends to be reliable, it is important that they include measurements taken in several years. Strimling et al. (2019), for instance, used only answers to moral questions that had been included in at least seven iterations of the General Social Survey. This kind of data, collected over many decades by one institution only, is often not available in developing countries, however.

For that reason, the set of moral issues analyzed in this study came from two databases of public opinion polls: the World Values Survey (WVS), an investigation of human beliefs and values that is conducted every few years in several countries, and Datafolha, one of the most important Brazilian institutes devoted to assessing public opinion.

Furthermore, the criteria used in the selection of issues from the above-mentioned databases were modified from those of Strimling et al. (2019): Questions had to be about moral issues still, but, instead of seven iterations of a given poll, they had to have been included in a minimum of three iterations. Besides, questions in any kind of format were selected, not only those in a “yes/no” or “pro/against” format.

By expanding the sources consulted and using slightly different criteria in the selection process it was possible to obtain a good number of issues: 23 from the WVS (Inglehart et al., 2014), and 12 from Datafolha (Datafolha, 2017a, 2017b); 35 in total.

2.2 Rewriting the moral issues

Similarly to Strimling et al. (2019) and Vartanova, Eriksson, and Strimling (2019), in the present work time trends and universal arguments advantage values were calculated for **default positions**. In order to clearly define which ones, of the pairs of opposing positions, are the default positions, the 35 issues selected were rewritten so that all were in a “yes/no” or “pro/against” format: default positions were then defined as “yes/for” answers, while opposite positions as “no/against” ones.

For instance, the issue “With which of the following statements do you agree more: ‘citizens should have the right to own a legalized gun in order to defend themselves’; ‘gun ownership should be forbidden since it represents a threat to other people’s lives’; ‘don’t know’” was rewritten as “Do you think citizens should have the right to own a legalized gun?”. The default position here is “Yes, I think citizens should have the right to own a legalized gun”, and the opposite “No, I don’t think citizens should have the right to own a legalized gun”.

After the rewriting, it was conducted an evaluation of whether changing the structure of the questions in this way significantly alters people’s answers to them. This procedure is detailed in Appendix B. In the end, only the issues whose answers to original and modified versions correlated well were kept, which amounted to 24. Table 1 in Appendix B shows both versions of the finalist issues.

2.3 Constructing time trends

The time trends represent how public opinion on the default “yes/for” positions has changed. They were constructed from the results of the polls conducted by WVS and Datafolha over the years.

Since the questions have different formats, the answers collected are in different scales (e.g., “strongly agree to strongly disagree”, “1-never justifiable to 10-always justifiable, agreeing with one statement over the other, etc.). But, for time trends to be *comparable* it is necessary that the answers be in the same scale. For that reason, the answers were standardized in the following way: if the respondent held the default position, that is, if she answered “yes” (or “agree”, “approve”, “always justifiable”, etc.), her answer was coded as “1”, if not (answered “no”, “disagree”, “disapprove”, “never justifiable”, etc.), her answer was coded as “0”. Appendix C elaborates on the dichotomization procedure adopted for each type of question.

For each one of the moral issues, the proportion of respondents who held the default position in a given year was then calculated as the proportion of answers coded as “1”. This measure will be henceforth referred to as “Public opinion [on default positions]”. The time shift of each question (i.e., the years in which WVS or Datafolha collected answers) can be consulted in Table 6 in Appendix G.

Consider the “weed illegal” issue, for example. The original question, the one assessed by Datafolha, asked the respondent to choose between the statements “[smoking weed] should keep being considered a crime” and “it should stop being considered a crime”. It was rewritten as “Do you think smoking weed should be illegal?”, and the default position defined as “Yes, I think it should be illegal”. Thus, Brazilians’ endorsement of the default position, per year, was determined as the proportion of respondents who chose “it should keep being considered a crime”. Table 2 below depicts Public opinion per year for this issue.

Table 2 - Data collected by Datafolha pertaining the “weed illegal” issue. The values in column “Public opinion” represent the proportion of Brazilian respondents who hold the default “yes” position (i.e., who answered “it should keep being considered a crime”) in a given year.

Year	Public opinion
1995	0.83
2006	0.81
2008	0.79
2012	0.79
2017	0.67

Estimates of the rate with which the popularity of default positions changes were obtained through regressions of the *log-odds* of Public opinion as a function of time (in blocks of ten years). Logistic regressions are preferable in this context since Public opinion, as a proportion, can only go from 0 to 100%, and since Brazilian Public opinion approaches these edges on a number of the issues studied here.

Regarding the “weed illegal” issue, the estimate of how public opinion on the default position changed is -0.36, meaning that in 10 years the odds of someone holding the default position decreases by a factor of $e^{(-0.36)} = 0.7$ (Figure 5).

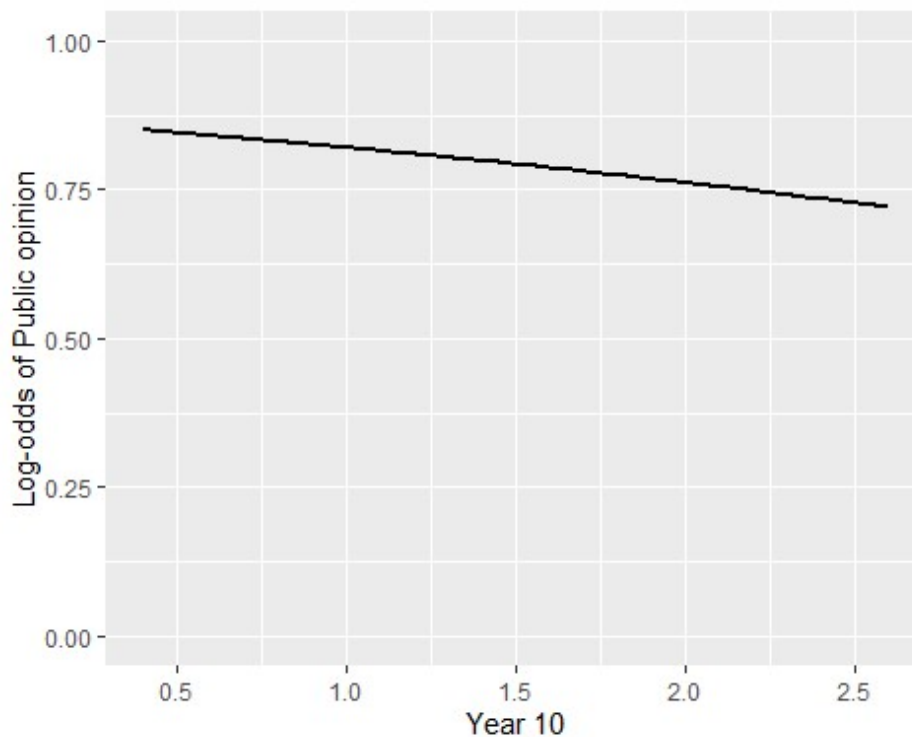


Figure 5: Logistic regression of Public opinion on the default position “Yes, I think smoking weed should be illegal” as a function of time (in blocks of ten years), or the probability (in log-odds) of someone holding the default position over time.

Table 7 in Appendix H depicts the estimates found for all issues.

2.4 Obtaining positions’ Universal Arguments Advantage values

Once in possession of time trends regarding the popularity of default positions, the next step was to assess the relative strength of these positions’ connection to universal arguments. The Universal Arguments Advantage value pertaining to a default position is a measure of how strongly such position is connected to universal arguments (i.e., harm, violence, fairness, and liberty ones), *in comparison* to how strongly its opposite is connected to these same arguments – hence the use of the word “advantage”.

Strimling et al. (2019) obtained Universal Arguments Advantage measures by asking people what kind of moral arguments they think are connected to which positions. Likewise, the

present study asked Brazilians about their opinion on the link between moral arguments and positions.

2.4.1 Collecting moral arguments

The survey designed to assess the connection of default and opposite positions with moral arguments consisted of the *rewritten* (“yes/no”) versions of the moral issues retrieved from Datafolha and WVS polls. It also included questions regarding participants’ nationality, country of residency, age, gender, race, level of schooling, and political inclination (left, right, or center). To avoid fatigue, this survey was split into two parts, each with 12 questions. After answering a sub-questionnaire, respondents could choose whether they wanted to answer 12 more questions or not.

In the absence of a platform like the Amazon Mechanical Turk (mTurk) in Brazil, the Facebook “boost post” tool was used to recruit respondents. Through this tool, a post containing the link to the survey appeared on the *Newsfeed* of 92,438 people living in Brazil, chosen based on a set of interests, namely ethics, morality, social issues, social science, science, politics, and religion.

After answering “yes/for” or “no/against” to a given question, respondents were asked to choose *all* of the ten generic arguments presented that could be used to support their answers. Furthermore, respondents were also asked to choose which arguments they thought were chosen by the people who answered differently than them. For instance, if a participant answered “No” to the question “Do you think the death penalty should be adopted in this country?”, after selecting the arguments she/he thinks support her/his position, she/he was asked about the arguments people who answered “Yes” selected to support their position. This way, *every* respondent evaluated the connection of *every* position with the ten moral arguments, not just the positions endorsed by them.

Figures 1, 2 and 3 in Appendix D, demonstrate how the questionnaire was structured.

Each of the ten arguments was based on one of the moral foundations previously discussed: Harm/Violence, Fairness, Loyalty, Authority, Purity, and Liberty; there were two arguments pertaining to Fairness, two to Loyalty, and two to Authority, however (see Table 3). The list of arguments used in the present study was derived from that used by Vartanova, Eriksson, and Strimling (2019), which contains 24 arguments, three from each foundation, plus three from the

Government “foundation”. For detailed account of how the moral arguments were chosen among the original 24 see Appendix E.

Table 3 - Arguments used in the survey and the foundations from which they derive. This list was adapted from the one used by Vartanova, Eriksson, and Strimling (2019).

Argument <i>[Yes/No...]</i>	Moral foundation
Otherwise some people would be cruel	Harm
Otherwise some people would be treated differently from others	Fairness 1
Otherwise some people would act unfairly	Fairness 2
Otherwise the freedom of choice of some people would be restricted	Liberty
Otherwise some people would be physically harmed/killed	Violence
This way the traditions of society are respected	Authority 1
Otherwise some people would disrupt the order in our country	Authority 2
Otherwise some people would act in an indecent/impure way	Purity
This way some people show love for our country	Loyalty 1
Otherwise some people would betray their groups/act in a disloyal way	Loyalty 2

Another feature of this questionnaire was that participants had access to a feedback after answering all the questions: by clicking on a question, one could see how many people (in percentage) answered “yes/for” and “no/against” to that question (Figure 4 in Appendix D). The main objective of including such feedback was to make people more interested in completing the questionnaire.

462 Brazilians answered either half or the whole of the survey. In total there were 9078 answers. Given that each answer constitutes a data point, the demographics are presented with respect to answers rather than individuals. The mean age of respondents *per response* was 39.1 years old, and women accounted for 42.3% of responses. Regarding levels of schooling, participants who did not finish high school accounted for 1.7%, with a high school degree for 40.6%, and with a college degree for 57.7% of responses. Finally, 40% of responses came from

left-winged participants, 16.1% from right-winged, 21.6% from those in the center, and 22.2% from those with no political inclination.

2.4.2 Calculating Universal Arguments Advantage values

Universal Arguments Advantage values refer to how strongly a position is linked with universal arguments *in relation* to how strongly its opposite is linked with such arguments. Therefore, U.A.A. values of default positions were obtained through subtracting the strength of their opposites' connection with universal arguments from the strength of their own connection:

$$\text{U.A. advantage}_{\text{default}} = \text{Connection to U.A.}_{\text{default}} - \text{Connection to U.A.}_{\text{opposite}}$$

In this equation, Connection to U.A._{default} is calculated by averaging the strength of the default position's connection with each of the five universal arguments:

$$\text{Connection to U.A.}_{\text{default}} = \frac{\text{Con.}_{\text{Harm}} + \text{Con.}_{\text{Viol}} + \text{Con.}_{\text{Fair1}} + \text{Con.}_{\text{Fai}} + \text{Con.}_{\text{Libe}}}{5}$$

Similarly, Connection to U.A._{opposite} is calculated by averaging the strength of the *opposite* position's connection with each of these arguments.

Since Brazilians pointed both the arguments they think support their own positions, and those they think support the positions opposite to theirs, all participants ended up evaluating the link of all positions (default and opposite alike) to the ten moral arguments presented. The strength of a default position's connection to a specific moral argument (e.g., Con._{Harm} in the equation outlined above) was then given by the proportion of respondents who pointed this argument as supporting this position.

For instance, for the “Death - penalty” issue (“Do you think the death penalty should be adopted in Brazil?”), the connection of the default “Yes” position with the harm argument (“Otherwise some people would be cruel”) is simply the proportion of Brazilians who believe this argument can be used to justify this position. Thus, in Table 4, “Default” and “Opposite” values indicate the proportion of respondents who pointed the universal argument to the left as supporting the default “Yes, I think the death penalty should be adopted in Brazil” and opposite “No, I don't

think the death penalty should be adopted in Brazil” positions, respectively – while 23% of Brazilian respondents believe the Harm argument is connected to the default position, 28% believe it is connected to the opposite one (underline in Table 4).

Table 4 - An example of estimating the U.A.A of the default position pertaining to the “Death - penalty” issue (i.e., “Yes, the death penalty should be adopted in Brazil”). The first five rows of the “Default” and “Opposite” columns represent the proportion of respondents who chose a given universal argument (in the column “Argument”) as relevant to justify the default and opposite positions, respectively. The values in the row “Connection to U.A.” are the average of the proportions directly above them, and the value in the row “U.A.A. of default position” the subtraction of Connection to U.A.*opposite* from Connection to U.A.*default*.

Argument	Default	Opposite
Fairness 1	0.054	0.381
Fairness 2	0.160	0.455
<u>Harm</u>	<u>0.234</u>	<u>0.285</u>
Liberty	0.035	0.103
Violence	0.221	0.282
Connection to U.A.:	0.141	0.301
U.A.A. of default position	-0.160	

In possession of these data, the connection to universal arguments of the Death - penalty issue’s default and opposite positions can then be calculated. Respectively:

$$\text{Connection to U.A.}_{\text{default}(\text{death penalty})} = \frac{0.054 + 0.160 + 0.234 + 0.035 + 0.221}{5} = 0.141$$

$$\text{Connection to U.A.}_{\text{opposite}(\text{death penalty})} = \frac{0.381 + 0.455 + 0.285 + 0.103 + 0.282}{5} = 0.301$$

And thus, the default position’s Universal Arguments advantage:

$$\text{U.A. advantage}_{\text{default}} = 0.141 - 0.301 = -0.160$$

Appendix H contains the U.A. advantage value obtained for all the 24 default positions. U.A.A. values can range from -1 to 1:

- When the universal arguments advantage of a default position is -1, it means none of the respondents think universal arguments support this position, *and* all respondents think universal arguments support the opposite position. Taking the death penalty issue as an example: The negative U.A.A. value means that more Brazilian respondents believe universal arguments more strongly connected with the opposite “No, I don’t think the death penalty should be adopted in Brazil” position than with the default “Yes” one.
- On the other hand, when the universal arguments advantage of a default position is +1, it means all of the respondents think universal arguments support this “yes” position, *and* none of them think universal arguments support the opposite “no” position. Positive U.A.A. values mean thus that more Brazilian respondents believe universal arguments more strongly connected with the default position than with the opposite one.
- Lastly, when the universal arguments advantage of a default position is zero, the average connection of the default position to universal arguments is the *same* as the average connection of the opposite position to these arguments. Or, on average, Brazilian respondents believe universal arguments to be equally connected to both positions.

2.5 Analysis

2.5.1 Testing the assumption of a general agreement about which arguments support which positions

One of the assumptions of the Moral Argument Theory is that the connection between positions and moral arguments depends mostly on the particularities of positions (and thus not on the opinions of individuals, for instance). Strimling et al. (2019) U.S. findings corroborated this assumption: Americans across the political spectrum seem to agree on which moral arguments support which positions.

To check if this also happens in Brazil, intra-class correlations (ICC) were conducted on Brazilians’ answers to the moral arguments’ survey, regarding whether a given argument supports a given position.

For each moral argument, ICC measured the proportion of the answers' total variance that is explained by differences between individuals, between positions, between issues, and between opinions (i.e., which position an individual endorses). For a more detailed explanation on how these analyses were carried out refer to Appendix F.

A high ICC for positions, plus a low ICC for individuals, issues, and opinion would indicate that **differences between positions** are the main drivers of variation in answers – differences between individuals, between issues, or the opinion of the respondents not accounting for much of the total variation. In other words, this result would indicate that there is a general agreement among respondents with respect to which arguments support which positions – the assumption of the Moral Argument Theory.

2.4.2 Calculating correlations

Lastly, the correlation between default positions' universal arguments advantage values and rates of public opinion change was calculated. r values were also calculated for plots including issues from one of the sources only (either Datafolha or WVS). The R package *stats* (v3.6.2) by R-core (R-core@R-project.org) was used for both above-mentioned analysis.

CHAPTER 3: Results

3.1 On individuals agreeing about which arguments support which positions

Consistent with the assumption that people agree on which moral arguments support which moral positions, variation between positions explains a substantial proportion of the total variance in participants' answers: intra-class correlations ranging from 0.02 (Loyalty 2) to 0.26 (Liberty) (Figure 6). Interestingly, individuals also account for a good amount of the total: ICC from 0.12 (Loyalty 2) to 0.19 (Fairness 1 and Violence). Variation between issues and between opinions, on the other hand, explain a negligible proportion of the total variance: ICC from 0.00 (Authority 1 and 2, Fairness 1, Loyalty 1, Liberty, and Purity) to 0.06 (Violence), and from 0.00 (Loyalty 2) to 0.08 (Authority 1), respectively.

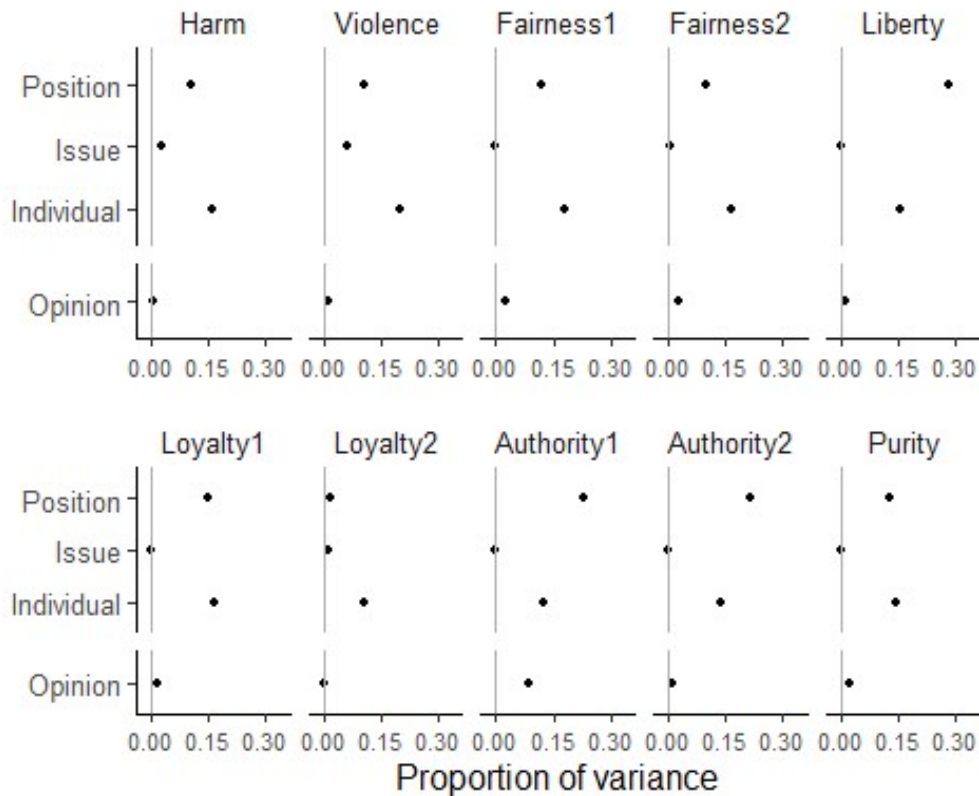


Figure 6: Proportion of the answers’ total variance that can be explained by differences between positions, between issues, between individuals, and between opinions, for each moral argument. Individuals account for a substantial proportion of the total variance in answers pertaining to all arguments. Positions as well, except for the Loyalty 2 foundation. The proportion explained by issue or by opinion are negligible, on the other hand.

3.2 On how U.A.A. influences public opinion dynamics.

Consistent with the hypothesis that, also in Brazil, universal arguments advantage values predict the direction and speed of moral opinion change, U.A.A. values correlated fairly well with rates of change (in log-odds): $r = 0.46[0.07, 0.73]$ (Figure 7). Furthermore, differences in U.A.A. explain 21% of the total variance in how public opinion changes with respect to the moral positions addressed here ($r^2 = 0.21$). The U.A.A. as well as the rates of public opinion change obtained for each of the 24 default positions can be found in Table 7 in Appendix H.

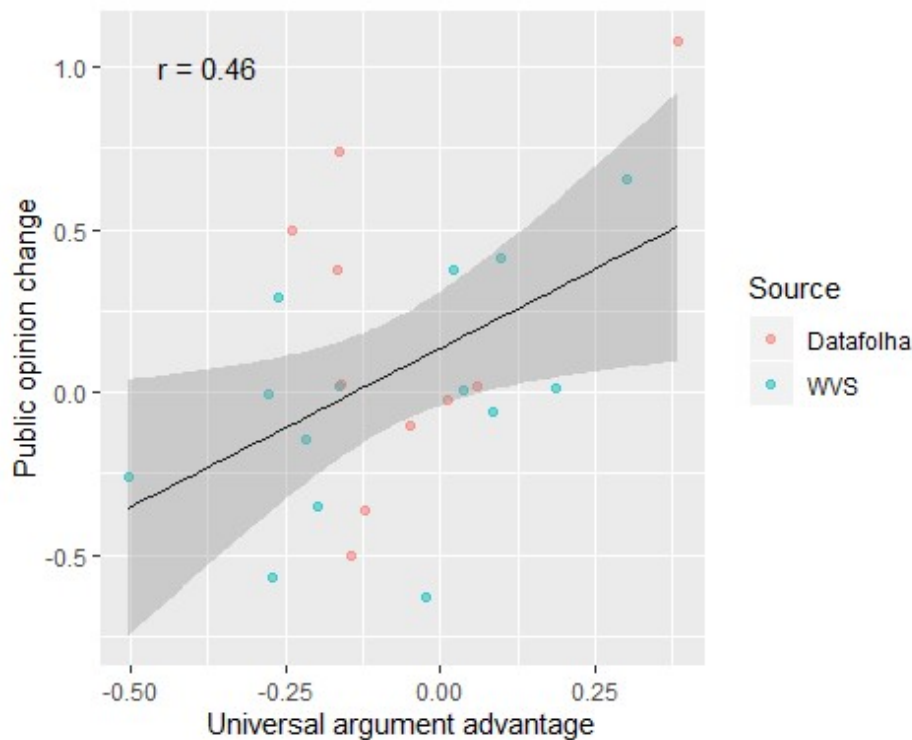


Figure 7: Correlation between universal argument advantage (U.A.A.) and public opinion change (in log-odds). U.A.A. values are measures of how much a sample of Brazilians believe arguments derived from the Harm, Fairness, and Liberty foundations support a given position, in comparison to the opposite position, on a given issue. Public opinion change values, in turn, are measures of how the proportion of agreement with the default position changed over a given time shift. The issues retrieved from Datafolha are shown in pink, while the ones retrieved from WVS are shown in blue. The gray area indicates 95% confidence intervals.

Removing the outlier “abortion-crime” from the plot in Figure 7 yields a higher correlation coefficient: $r = 0.53[0.14, 0.77]$. There are reasons to believe the time trends pertaining to this issue were wrongly reported by its source – Datafolha has reported different values regarding the proportion of Brazilians who, in 2016, believed women who abort should go to jail: 56% in Datafolha (2016), and 64% in Datafolha (2017a). The present work treated the proportion reported by Datafolha (2016) – 56% – as the correct one. The proportion reported by Datafolha (2017a) – 64% – was considered a typo error, since it was identical to the proportion of Brazilians who, in 2013, believed women who abort should face jail time.

Regarding the plots including issues of either one of the sources: for Datafolha issues $r = 0.41$ [-0.29, 0.83], while for WVS ones $r = 0.52$ [-0.02, 0.82]. The plots can be observed in Figure 8.

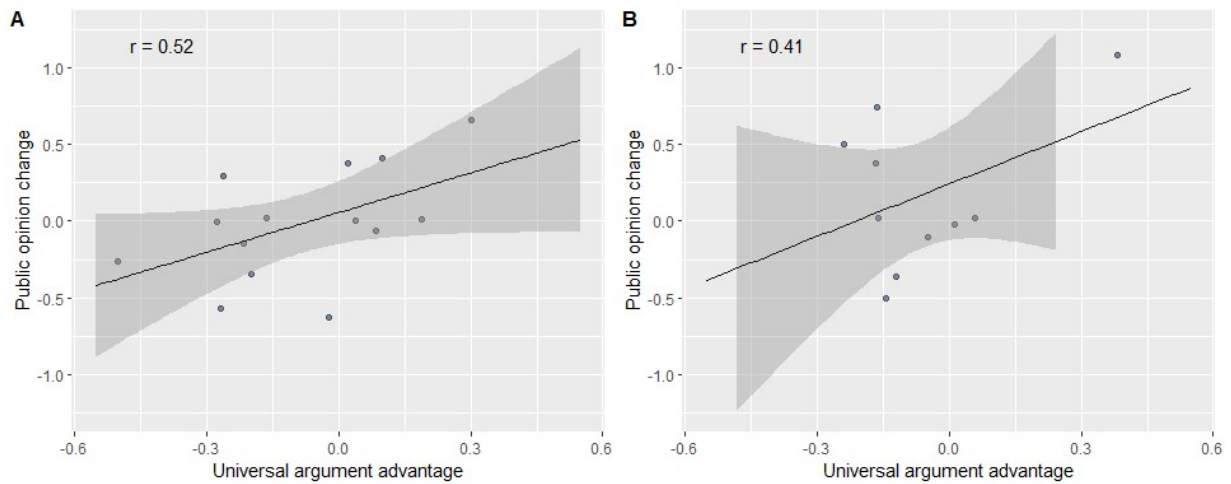


Figure 8: Correlation between universal argument advantage (U.A.A.) and public opinion change for either the WVS issues only (panel A), or the Datafolha issues only (panel B). Panel A depicts 14 issues, while panel B depicts 10. A list containing which issues were obtained from which source can be observed in Table 1, in Appendix B. The gray area indicates 95% confidence intervals.

CHAPTER 4: Discussion

For most of their history, humans have lived in small groups, in which there was no doubt about what was right and what was wrong, given that the right way to do things was that taught by older generations. The large and complex societies of today, however, house people with distinctive moral matrices (Haidt & Graham, 2007). This distinctiveness regarding which moral values fundament one's personal life often leads to disagreements over which moral values should fundament society as a whole, and thus people often clash over which public policies are good and which are bad (i.e., the “culture wars” of Hunter (1992)) (Hunter, 1992; Koleva et al., 2012). The issues at the core of this type of conflict is what this study calls “moral issues.”

When it comes to moral issues, people usually take one of two sides (e.g., “for” or “against” the existence of a death penalty), here dubbed “moral positions”. Interestingly, public support seems to be moving towards *specific* positions, namely those advocating individual autonomy and self-expression (Inglehart, 2018; Morini, 2017; Mulligan, Grant & Bennett, 2013; Santos, Varnum & Grossman, 2017; Studlar & Burns, 2015). Besides, while public opinion regarding certain positions has changed a lot over the last few decades (e.g., the positions pertaining to the legalization of same-sex marriage), opinion regarding other – equally controversial – positions has not changed at all (or changed very little) (e.g., the positions pertaining to the decriminalization/legalization of abortions) (Morini, 2017).

The Moral Argument Theory (Eriksson & Strimling, 2015; Strimling et al., 2019) proposed an explanation to these phenomena – a moral argument-based explanation. According to this theory, given a pair of opposing positions, the one connected, or more strongly connected, to universal arguments (i.e., arguments derived from the Harm, Fairness, and Liberty moral foundations), gains popularity more easily, given that these arguments resonate with liberals and conservatives alike. Furthermore, the bigger the difference between a position and its opposite regarding the strength of connection to universal arguments, the faster the position with stronger such connection gains popularity. Such predictions have been proven correct in the U.S. and the U.K. – both developed countries, with English-speaking values (IMF, 2018, p. 130-135; Inglehart, 2018; UNDP, 2019, p. 300-303).

The present study tried to answer the question of whether the Moral Argument Theory also explains how public opinion on moral issues changes in Brazil, a developing country, with values characteristic of Latin-American countries (IMF, 2018, p. 130-135; Inglehart, 2018; UNDP, 2019, p. 300-303). The first step towards reaching this goal was to investigate the theory's assumption that people agree on which arguments support which positions, that is, that the connection between arguments and positions does not depend on individual points of view/preferences – it depends mainly on particularities of positions.

Overall, differences between positions accounted for a substantial amount of the total variation in what arguments Brazilians judged relevant to support a given position, while differences between issues and between opinions did not. To put it simply, it seems that respondents' choice of arguments depend more on the position in question (e.g., “for” the existence of a death penalty) than on the issue being discussed (e.g., whether or not there should be a death penalty) or on the respondents' opinions (e.g., whether or not a respondent holds the “for” position).

The amount of variation accounted for by differences between individuals, however, was higher than that found by Strimling et al. (2019) (ranging from 0.12 to 0.19 in the former, and from 0.06 to 0.08 in the later). This result indicates that a number of Brazilians had personal preferences for certain arguments. Such preferences might have been a consequence of respondents choosing from a *fixed* list of arguments: it is likely that after going through the list a couple of times individuals start looking for specific arguments, the ones they found more relatable. By comparison, in Strimling et al. (2019)'s research, each question was followed by a *different* list of five arguments (one for each foundation), which had been randomly selected from a – more comprehensive – list of 15 arguments (three for each foundation). That way, it is harder for respondents to acquire preferences, and thus differences between individuals are likely to drive less variation in answers.

All things taken into consideration, the results reported here are in line with Strimling et al. (2019)'s ones: in both studies variation between positions accounted for a considerable amount of the total variation in respondents' answers. This suggests that the assumption that there is a general agreement among participants concerning which arguments justify the adoption of which positions is a sound one.

Regarding then the predictions of the Moral Argument Theory: as can be seen in Figure 7, there is a strong positive relationship between universal arguments advantage values and rates of

moral opinion change. This suggests that, as hypothesized: (i) the positions more strongly linked with universal arguments – when compared to their opposites – are the ones gaining popularity in Brazil; and (ii) the greater the universal arguments advantage value of a position, the faster Brazilian public opinion moves towards it.

The correlation coefficient found here is not as strong as the one obtained by Strimling et al. (2019) ($r = 0.46$ versus $r = 0.73$), although similar to the ones obtained by Vartanova, Eriksson, and Strimling (2019) ($r = 0.51$ in the U.S. sample, and $r = 0.38$ in the U.K. one). A weaker correlation was already expected, however, given the methodological changes conducted here. The flexibilization of the criteria used in the selection of questions from Datafolha and WVS polls, the use of modified versions of such questions in the survey answered by Brazilians, and the decision to ask respondents to choose from a fixed list of arguments, all most likely contributed to increase the noise and thus make the correlation between U.A.A. values and rate of change in position popularity weaker.

Relaxing the criteria used to select moral items resulted in the inclusion of items that had been assessed by polls only a few times, and/or over a time span of less than ten years. For instance, five of the ten issues taken from Datafolha were assessed over a time span of four years only (Appendix G). The effect of short time trends can be seen in Figure 8, which depicts correlation coefficients calculated from either Datafolha or WVS issues. In contrast to Datafolha issues, all of the WVS issues were assessed over a time span of fifteen years or more. It is likely that this discrepancy between Datafolha and WVS is the reason why r values are so different: the one pertaining to WVS issues being stronger than the one pertaining to Datafolha issues ($r = 0.52$ and 0.41 , respectively).

According to the Moral Argument Theory, if a country has liberals in its population – people who more often than not refuse to listen to arguments other than harm, fairness, and liberty ones – and freedom of speech, then public opinion on moral issues should move towards the positions better supported by universal arguments.

Employing a more flexible methodology may have resulted in more noise, but the findings of the present work nonetheless suggest that the Moral Argument Theory successfully predicts moral opinion change in Brazil. Because Brazil is a developing country, with Latin-American values (i.e., values leaning towards religion and both economic and physical security), Brazilians, in general, might be more inclined to listen to conservative arguments (i.e., loyalty, authority, and

purity ones). Nevertheless, as predicted by the Moral Argument Theory, the direction of moral opinion change in Brazil is the same as that in the U.S. and the U.K.: towards positions strongly connected to universal arguments. Such results provide evidence that the Moral Argument Theory is indeed able to predict the direction and speed of public opinion change regarding moral issues in any country, as long as it has liberals in its population, and freedom of speech.

Importantly, the model of public opinion dynamics of the Moral Argument Theory has some limitations. For instance, in real life people do not meet and discuss moral issues at random – exchange of moral arguments happens mostly between people already acquainted with each other. Besides, opinion change does not happen exclusively through exchange of moral arguments, and when it comes to which moral concerns are relevant and which are not, there are individuals who do not fall neatly into either the “liberal” or “conservative” categories (Haidt, Graham & Joseph, 2009; Iyer et al., 2012). It is thus paramount that the Moral Argument Theory be tested in more countries, preferentially ones that differ in economic and/or cultural terms from the U.S., the U.K., and Brazil, where the theory was already put to test. In this regard, the methodology used here can be of much assistance since it provides a guide on how to test the predictions of the before-mentioned theory in countries where data pertaining to moral issues are scarce.

Future studies should also be able to illuminate the impact of recent technological innovations, especially the widespread use of smartphones and social media, on the dynamics of moral opinion. In a number of countries, political polarization has reached an unprecedented level in the last few years, for which many scholars believe social media is to blame (see Tucker, 2018, for a review). Even though social media users are more exposed to both sides of moral issues than non-users, the former tend to be more polarized than the latter – Iyengar et al. (2012) suggested that the harsh nature of online interactions between people with dissenting opinions might explain this paradox (Iyengar et al., 2012). Duggan and Smith (2016) have shown that for most social media users in the U.S., discussing controversial issues online with people with whom they disagree is often a very stressful and frustrating experience (Duggan & Smith, 2016). Iyengar et al. (2012) argues then that such negative experiences reinforce biased views of the opposing side, which increases polarization (Iyengar et al., 2012). Amicable conversations between people holding opposing positions, however, is an important requisite for public opinion change on moral issues, according to the Moral Argument Theory (Strimling et al., 2019). It can be hypothesized, therefore, that, in case political/moral bubbles are not burst any time soon, public opinion might start

changing at a slower pace, even for pairs of opposing positions that differ substantially regarding the strength of their connection with universal arguments.

Furthermore, as of today, most of the world is experiencing major sanitary and economic crises due to the coronavirus pandemic (a few countries are also experiencing a political crisis on top of those). The effects of such crises are most likely going to be felt for years to come (Nicola, 2020). According to Inglehart (2018)'s Evolutionary Modernization Theory, people who grow up not feeling secure, from an existential point of view, tend to adopt positions that tap into traditional and survival values – they tend to be more religious, have more national pride, and respect for authority, and less tolerance against positions that tap into individual-choice values (Inglehart, 2018). In other words, they tend to be more conservative (i.e., to rely on all moral foundations). If the ongoing crises result in a generation of more conservative people, and thus less liberals in the population, then it can be predicted that public opinion change towards positions linked with universal arguments will slow down – with less liberals around, the likelihood a given person will encounter liberals, listen to their positions (and the universal arguments behind them), and consequently adopt such positions herself is smaller.

CHAPTER 5: Conclusion

As hypothesized, the Moral Argument Theory was able to predict how public opinion pertaining to moral issues changes in Brazil. According to this theory, issue positions are inherently connected to certain arguments, and those positions that have positive universal arguments advantage (i.e., that are more connected to arguments stemming from universal moral foundations than their opposites) are the ones gaining ground among the public, the speed of popularization depending on the size of said advantage.

That's exactly what the present work found: 1. Brazilians seem to agree on which arguments can be used to support which positions, and 2. among the moral issues studied here, those issue positions judged by Brazilians to be more strongly linked with universal arguments are the ones becoming more popular in Brazil, and the stronger the link, the faster Brazilian public opinion moves towards the position.

An important aspect of the study reported here was that it adapted the methodology used by Strimling et al. (2019) and Vartanova, Eriksson, and Strimling (2019) to address the limitations of developing countries regarding the availability of data on moral issues. Despite creating more noise in the results, the use of a more flexible methodology fulfilled its purpose of allowing the gathering of enough data to test the Moral Argument Theory in Brazil. It seems thus that the methodology employed here could also be helpful in the testing of said theory in other countries with similar shortage of data on moral issues.

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CHAPTER 7: Appendix

A. Moral Foundations Theory

The MFT was developed by Jonathan Haidt and Craig Joseph (2004), and by Haidt and Jesse Graham (2007). Haidt and Joseph (2004) sought to find the foundations of human morality, the set of concerns behind most moral codes. They surveyed the literature looking for works describing social norms that are common among such codes, and from there made a list of the social occurrences that motivate the creation of these norms: occurrences that consistently elicit *automatic* reactions of liking or disliking in people (e.g., cheating, disobedience, spiritual or physical pollution, etc.). They also combed the literature in search of evolutionary explanations for the existence of these intuitive reactions (Haidt & Joseph, 2004).

Building on the work of Haidt and Joseph (2004), Haidt and Graham (2007) then concluded that human morality is rooted in five psychological systems, each one of them with its own evolutionary history: Care/harm, Fairness/cheating, Loyalty/betrayal, Authority/subversion, and Purity/degradation (Haidt & Graham, 2007). Liberty/oppression was later added to this list (Haidt, 2012).

A.1 Assumptions of the theory

According to the MFT, moral knowledge is innate in the sense that every human being is born with a “draft” of a moral mind, a preparedness to feel flashes of approval or disapproval in the face of certain events involving other people (Haidt & Graham, 2007; Haidt & Joseph, 2004). As the child grows, this draft is revised and refined through cultural learning so that she can successfully handle the particularities of the moral context she experiences (Haidt & Joseph, 2007).

Haidt and Joseph used the “massive modularity hypothesis” as a framework to explain how moral knowledge could be innate (Haidt & Joseph, 2007). According to this hypothesis, the mind is composed of several information-processing mechanisms, the modules, which have evolved to respond rapidly and effectively to all kinds of recurrent problems and opportunities faced by a species over many generations (Sperber, 1994; Sperber, 2005). Those who had such modules would

have had an advantage compared to those who had to make use of their general intelligence to deal with threats (Haidt, 2012). These cognitive modules are what the moral foundations of the MFT are made of (Haidt & Joseph, 2007).

Another pillar of the MFT is the Social Intuitionist Model (SIM), also developed by Jonathan Haidt (Haidt, 2001). The SIM posits that moral judgements are a product of automatic, effortless, associative thinking, and not of deliberative reasoning (Haidt, 2001). That is, evaluations of the character or actions of another person (or of oneself) are intuitive; feelings of approval or disapproval pop into consciousness as one sees or hears about what someone did or thinks about what to do next. There is no awareness of the mental processes that lead to these feelings.

To Haidt, Joseph, and Graham, therefore, moral knowledge is largely intuitive, and moral intuitions are both innate (i.e. products of specialized cognitive modules) and shaped by the cultural context within which the individual has been raised, and by the arguments she hears from others throughout her life (Haidt & Graham, 2007; Haidt & Joseph, 2004; Haidt & Joseph, 2007).

A.2 The moral foundations

Harm: The reproductive strategy of primates involves having fewer babies at a time, when compared to other mammals, and caring for them for a while, so as to increase their chances of survival (Charnov & Berrigan, 1993; Martin, 1995). Human babies are so especially vulnerable for such a long time that keeping them alive constitutes a big adaptive problem (Emery Thompson, 2013; Martin, 2007). According to the MFT, ancestral women who happened to be born prepared to perceive signs of suffering from their children and to react automatically to such signs fared better than those who were not so sensitive. The Harm foundation thus would be a psychological system that connects perceiving distress from offspring with the motivation to nurture and protect (Haidt & Joseph, 2007).

Haidt also argues that, since early humans lived in small groups composed mainly of kin, as time went by natural selection favored people who responded automatically to signs of suffering from *any* children in the vicinity, not just from their own (Haidt, 2012).

Fairness: While it is expected that animals cooperate with kin to enhance each other's fitness (Hamilton, 1964), it is hard to think of a framework in which cooperation among non-kin is

beneficial for all the parties involved. However, when the threat of being taken advantage of is small (due to knowledge of others' reputations or the possibility of ostracizing/punishing cheaters, for instance), cooperating with individuals outside one's family can improve odds of survival (for a review of human cooperation see Melis & Semmann (2010)). Trivers (1971) proposed that reciprocal altruism would have evolved in humans as a response to the adaptive challenge of reaping the products of cooperation without being cheated on. More specifically, moral emotions that compel humans to play "tit for tat" would have evolved (Trivers, 1971).

Thus, the Fairness foundation would be comprised of innate cognitive modules that make a person sensitive to opportunities of cooperation and to evidence of cheating, and that motivate reciprocal altruism (mainly through the moral emotions of anger, guilt, and gratitude) (Haidt & Joseph, 2007). Whoever had such modules would have had an advantage over who had to use general intelligence to think about how to act next.

Loyalty: For many millennia humans lived in groups of just a few dozen people, most of which were kin. These groups had to compete for scant resources, and the more cohesive the group, the greater its chances of success in such struggle for survival (Choi & Bowles, 2007; García & Bergh, 2011; Traulsen & Nowak, 2006). Cohesiveness, in turn, is a result of several group members recognizing, trusting, and cooperating with one another, and, equally important, distrusting and being wary of outsiders (Haidt & Graham, 2007). Consequently, individuals who were born equipped with a psychological system that makes it easy for them to have such strong feelings for familiar and unfamiliar people would have formed closer-knit coalitions, and won inter-group conflicts more often than not (Haidt & Graham, 2007). The cognitive modules associated with the Loyalty foundation would thus have evolved for humans to deal with the adaptive challenge of forming cohesive groups (Haidt, 2012).

Authority: Given that social animals are naturally inclined to try and dominate others, and given that individuals differ in strength, skill, and luck, dominance hierarchies are a feature of many species that live in groups: chickens, dogs, and chimpanzees, for example (Boesch & Boesch-Achermann, 2000; Gottier, 1968; Noë, de Waal & van Hooff, 1980; van Kerkhove, 2004; Wittig & Boesch, 2003). Human societies are no exception. Even though cultures vary greatly on how much deference they show to authority figures, in all of them there is at least some agreement on rank and some respect for authority – otherwise, there wouldn't be much abiding by social rules.

Since the emergence of some form of ranking in human communities seems to happen no matter what, Haidt and Joseph argue that a psychological system that prepares one to live in hierarchical groups would have been highly advantageous in ancestral times (Haidt & Joseph, 2007). That is, individuals whose minds were structured in advance of experience to both show signs of deference, respect, and obedience to those of upper ranks, and form allegiances with those of lower ranks, would have been better able to rise in status and leave more descendants. The Authority foundation concerns exactly such psychological preparedness; it tackles the adaptive challenge of how to thrive in the complex reality of dominance hierarchies (Haidt, 2012).

Purity: The history of hominids is marked by a series of changes in lifestyle that increased their contact with pathogens and parasites. Abandoning the trees to live on the ground most of the time, consuming meat with greater frequency, the development of agriculture (and thus the formation of larger, denser groups) all made humans more susceptible to die from vector-borne diseases (Pearce-Duvel, 2006; Smith et al., 2015). The emotion of disgust is thought to have evolved in humans as a response to the adaptive challenge of avoiding contact with vectors of disease (Rozin, Haidt & McCauley, 2008). It is the main component of what the psychologist Mark Schaller calls “behavioral immune system” – It is the emotion that make people stay away from feces, vomits, corpses, scavenger animals, etc. (Schaller & Park, 2011).

The Purity foundation comprises thus cognitive modules that evolved to keep humans healthy in the midst of a multitude of dangerous microbes – people who were born with a preparedness to recognize sights and smells associated with the presence of pathogens, and to avoid the sources of these sensations, would have had more children than those who were not (Haidt, 2012). Moreover, Haidt and Joseph also believe that the various rules addressing bodily functions and practices worldwide (e.g., menstruation, sex, eating, bathing, and so forth) sprang up from the Purity foundation and its emotion of disgust, as well as the very concepts of sanctity and pollution/sacred and profane, that form the basis of religious beliefs (Haidt & Joseph, 2007).

Liberty: Even though humans are purportedly hard-wired to live in hierarchies of dominance, accounts of nomadic hunter gatherers who live in egalitarian societies abound in the anthropological literature. In fact, archaeological records support the notion that hierarchies only became widespread when humans took up agriculture and domestication of animals; until then groups were mainly egalitarian (Hayden, 2001). According to the anthropologist Christopher

Boehm, the development of weapons for hunting, which started around five hundred thousand years ago, alongside the emergence of language, made it easier for group members to unite to shun or kill anyone who tried to be an alpha male – the resulting political system would then be a “reverse dominance hierarchy” (Boehm, 1999). Taking into account this context, Haidt proposes that the Liberty foundation is an evolutionary response to the adaptive challenge of living in groups with individuals who would try and dominate the others, if given the opportunity (Haidt, 2012). Those who were prepared in advance of experience to recognize bullies and would-be alpha males, and to respond appropriately – to feel righteous anger, and to unite with other oppressed individuals against the threat – ended up with more access to vital resources than those who bowed to aggressive and controlling individuals.

The Liberty and Authority foundation are somewhat opposites. Haidt explains that while humans are prepared to recognize authority figures, they are also prepared to recognize the contexts when authority is not legitimate, when it is imposed by would-be leaders who failed to earn the trust of their would-be subordinates (Haidt, 2012).

A.3 MFT and political ideology

As mentioned before, Strimling et al. (2019)’s Moral Argument Theory is based on researches showing that liberals and conservatives differ in which moral arguments they find intuitively acceptable: harm and fairness ones for liberals; all of them for conservatives.

That is the case because liberals and conservatives differ on which *moral foundations* constitute their moralities. Whereas liberals’ moral matrix is primarily composed of the Harm and Fairness foundations, conservatives’ one encompasses the Loyalty, Authority, and Purity foundations as well as the Harm and Fairness ones (Graham, Haidt & Nosek, 2009; Haidt & Graham, 2007).

The study conducted by Haidt and Graham (2007) was the first to show that the moral matrices of liberals and conservatives are not the same. By asking participants how relevant moral foundations-related concerns were to their judgements of whether something is right or wrong, Haidt and Graham observed that while liberals rated only harm and fairness concerns as highly relevant to their moral judgements, conservatives rated not only harm and fairness, but also loyalty, authority, and purity concerns as highly relevant. In 2009, these authors conducted four other

studies also aimed at examining the moralities of conservatives and liberals. The results of all four corroborated the findings of 2007: liberals' moral matrix is based primarily on the Harm and Fairness foundations, while conservatives' one is based on Harm, Fairness, Loyalty, Authority, and Purity (Graham, Haidt & Nosek, 2009). Since then, this basic difference in the structure of liberals and conservatives' moralities has been seen in other studies as well, with different methodologies (Graham, Nosek & Haidt, 2012; Graham et al., 2011; McAdams et al., 2008).

In 2012, the study conducted by Iyer et al. showed that both liberals and conservatives care about Liberty, a finding that catalyzed the inclusion of this concern in the original group of moral foundations (Iyer et al., 2012). Thus, in his book, "The Righteous Mind: Why Good People are Divided by Politics and Religion", Haidt states that while liberals' moral matrix is rooted in the Harm, Fairness, and Liberty foundations, conservatives' one is rooted in all six foundations (Haidt, 2012).

B. Rewriting questions

The 35 moral issues initially selected from WVS and Datafolha were rewritten in a “yes/no” or “for/against” format so that default and opposite positions could be clearly defined. Most issues ended up with one modified version, but in some cases, issues were broken down into two or more different questions. For example, some issues ask the respondent to choose with which of two statements she agrees most, but the statements presented by a subset of these issues are not quite opposites. In this case, the two statements were treated as two different issues.

Take the following Datafolha issue: “With which of the following statements do you agree more: ‘the death penalty is the best punishment for individuals that commit serious crimes’; ‘it is not up to the judicial system to kill a person, even if she has committed a serious crime’; ‘don’t know’?”. Because it is not unlikely for a person to believe both that justice **should** have the right to execute a criminal, but the death penalty is **not** the best punishment for those who commit serious crimes, this issue was broken down into two: “Do you think the death penalty is the best punishment for individuals that commit serious crimes?” and “Do you think justice should have the right to execute a person?”.

Another example of issues with more than one modified version concerns those that ask the respondent to say which of a list of things is the most important one, and which is the next most important. Such issues were broken down into questions that compare two things at a time.

Take the following WVS issue: “If you had to choose, which one of the things in this card would you say is most important? And which would be the next most important? Maintaining order in the nation/Giving people more say in important government decisions/Fighting rising prices/Protecting freedom of speech.” In this case the issue was broken down into six others: “Do you think maintaining order in the nation is more important than giving people more say in important government decisions?”, “Do you think maintaining order ... is more important than fighting rising prices?”, “Do you think maintaining order ... is more important than protecting freedom of speech?”, “Do you think giving people more say ... is more important than fighting rising prices?”, “Do you think giving people more say ... is more important than protecting freedom of speech?”, and “Do you think fighting rising prices is more important than protecting freedom of speech?”.

To evaluate whether changing the structure of the original issues alters answers in a significant manner, the original and modified versions of the 35 issues were included in a questionnaire, which was submitted to workers from the Amazon Mechanical Turk platform.

81 Americans answered the first half of the questionnaire, while 77 the last half (totaling 178 participants). 43.7% of all respondents were female. 64.6% had a college degree, and 34.8% a high school degree. Respondents' mean age was 41.5 years old.

For each issue, it was assessed the correlation coefficient between the answers to its original version and the answers to its modified version. For issues with more than one modified version, a correlation coefficient was assessed for each pair original-modified. In the end, only original-modified pairs whose answers showed a correlation of 0.7 or higher were kept, which amounted to 24. An issue code was assigned to each of the finalist pairs. Table 1 below contains the original questions and their modified versions, the codes attributed to, and the correlation coefficient obtained for each pair.

Table 1 – Questions as originally assessed by public opinion polls, their modified versions, the code assigned for, and the correlation between each pair original-modified. Below original versions, in parenthesis, is the source from which each question was retrieved.

Issue code	Question	Correlation
Job - women	<p>Original: Do you agree, disagree or neither agree nor disagree with the following statements? 'Jobs scarce: Men should have more right to a job than women'. (agree/neither/disagree/don't know) (WVS: Inglehart et al., 2014)</p> <p>Modified: If jobs are scarce, should men have more right to a job than women?</p>	0.8
Job - immigrants	<p>Original: Do you agree, disagree or neither agree nor disagree with the following statements? 'Employers should give priority to (nation) people than immigrants'. (agree/neither/disagree/don't know) (WVS: Inglehart et al., 2014)</p>	0.95

Issue code	Question	Correlation
	Modified: If jobs are scarce, should employers give priority to hiring nationals over immigrants?	
Child - parents	Original: If someone says a child needs a home with both a father and a mother to grow up happily, would you tend to agree or disagree? (agree/disagree/don't know) (WVS: Inglehart et al., 2014)	0.91
	Modified: Do you think a child needs a home with both a father and a mother to grow up happily?	
Single - mother	Original: If a woman wants to have a child as a single parent but she doesn't want to have a stable relationship with a man, do you approve or disapprove? (approve/depends/disapprove/don't know) (WVS: Inglehart et al., 2014)	0.94
	Modified: Do you think it should be acceptable for a woman to have a child even though she doesn't want to be in a stable relationship?	
Order - say	Original: If you had to choose, which one of the things on this card would you say is most important? And which would be the next most important? (maintaining order in the nation/giving people more say in important government decisions/fighting rising prices/protecting freedom of speech/don't know) (WVS: Inglehart et al., 2014)	0.71
	Modified: Do you think maintaining order in the nation is more important than giving people more say in important government decisions?	

Issue code	Question	Correlation
Economy - society	<p>Original: Here is another list. In your opinion, which one of these is most important? And what would be the next most important? (a stable economy/progress toward a less impersonal and more humane society/progress toward a society in which ideas count more than money/the fight against crime/don't know)</p> <p>(WVS: Inglehart et al., 2014)</p> <p>Modified: Do you think that establishing/maintaining a stable economy is more important than progressing toward a less impersonal and more humane society?</p>	0.72
Respect - authority	<p>Original: I'm going to read out a list of various changes in our way of life that might take place in the near future. Please tell me for each one, if it were to happen, whether you think it would be a good thing, a bad thing, or don't you mind?</p> <p>'Future changes: greater respect for authority'. (good thing/don't mind/bad thing/don't know)</p> <p>(WVS: Inglehart et al., 2014)</p> <p>Modified: Do you think people should start paying greater respect for authority?</p>	0.77
Homosexual - sex	<p>Original: Please tell me for each of the following statements whether you think it can always be justified, never be justified, or something in between, using this card.</p> <p>'Justifiable: homosexuality'. (1 – never justifiable/10 – always justifiable/don't know)</p> <p>(WVS: Inglehart et al., 2014)</p> <p>Modified: Do you think it's acceptable for people who want to have homosexual sex to do so?</p>	1

Issue code	Question	Correlation
Prostitution	<p>Original: Please tell me for each of the following statements whether you think it can always be justified, never be justified, or something in between, using this card. 'Justifiable: prostitution'. (1 – never justifiable/10 – always justifiable/don't know) (WVS: Inglehart et al., 2014)</p> <p>Modified: Do you think that, under certain circumstances, it should be acceptable for someone to prostitute oneself?</p>	0.81
Abortion	<p>Original: Please tell me for each of the following statements whether you think it can always be justified, never be justified, or something in between, using this card. 'Justifiable: abortion'. (1 – never justifiable/10 – always justifiable/don't know) (WVS: Inglehart et al., 2014)</p> <p>Modified: Do you think it should be acceptable for someone to have an abortion?</p>	0.76
Army	<p>Original: I'm going to describe various types of political systems and ask what you think about each as a way of governing this country. For each one, would you say it is a very good, fairly good, fairly bad or a very bad way of governing this country? 'Political system: having the army rule'. (very good/fairly good/fairly bad/very bad/don't know) (WVS: Inglehart et al., 2014)</p> <p>Modified: Do you think it would be good if the army ruled the country?</p>	0.89

Issue code	Question	Correlation
Euthanasia	<p>Original: Please tell me for each of the following statements whether you think it can always be justified, never be justified, or something in between, using this card. 'Justifiable: euthanasia'. (1 – never justifiable/10 – always justifiable/don't know) (WVS: Inglehart et al., 2014)</p> <p>Modified: Do you think that, under certain circumstances, euthanasia should be acceptable?</p>	0.72
Taxes - pollution	<p>Original: I'm now going to read out some statements about the environment. For each one read out, can you tell me whether you strongly agree, agree, disagree or strongly disagree? 'Increase in taxes if used to prevent environmental pollution'. (strongly agree/agree/disagree/strongly disagree/don't know) (WVS: Inglehart et al., 2014)</p> <p>Modified: Are you for or against an increase in taxes with the aim of preventing environmental pollution?</p>	0.89
Protection - environment	<p>Original: Here are two statements people sometimes make when discussing the environment and economic growth. Which of them comes closer to your own point of view? ("Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs"/"economic growth and creating jobs should be the top priority, even if the environment suffers to some extent") (WVS: Inglehart et al., 2014)</p> <p>Modified: Do you think that protecting the environment should be given priority over economic growth and creating jobs?</p>	0.88

Issue code	Question	Correlation
Abortion - crime	<p>Original: In your opinion, should a woman that terminates a pregnancy be prosecuted and go to jail? (yes, she should/no, she shouldn't/don't know) (Datafolha, 2017a)</p> <p>Modified: Do you think abortion should be considered a crime no matter the circumstances?</p>	0.7
Death - penalty	<p>Original: If there was a public referendum, would you vote for or against the adoption of the death penalty in Brazil? (for/against/indifferent/other answers/don't know) (Datafolha, 2017a)</p> <p>Modified: Do you think the death penalty should be adopted in this country?</p>	0.92
Age - jail	<p>Original: If there was a public referendum today, would you vote for or against reducing the minimum age someone can go to jail from 18 to 16 years old? (for/against/indifferent/don't know) (Datafolha, 2017a)</p> <p>Modified: Do you think the minimum age someone can go to jail for a crime should be 16 years old, instead of 18?</p>	0.84
Gun	<p>Original: With which of the following statements do you agree more? (“citizens should have the right to own a legalized gun in order to defend themselves”/“gun ownership should be forbidden since it represents a threat to other people’s lives”/“don't know”). (Datafolha, 2017a)</p> <p>Modified: Do you think citizens should have the right to own a legalized gun?</p>	0.85

Issue code	Question	Correlation
Weed - illegal	<p>Original: Nowadays it is a crime to smoke weed. In your opinion, to smoke weed should continue a crime or should it stop being considered as such? (“it should keep being considered a crime”/“it should stop being considered a crime”/indifferent/don’t know). (Datafolha, 2017a)</p> <p>Modified: Do you think smoking weed should be illegal?</p>	0.91
Death - crimes	<p>Original: With which of the following statements do you agree more? (“the death penalty is the best punishment for individuals that commit serious crimes”/“it is not up to the judicial system to kill a person, even if she has committed a serious crime”/don’t know) (Datafolha, 2017b)</p> <p>Modified 1: Do you think the death penalty is the best punishment for individuals that commit serious crimes</p>	0.83
Justice - execution	<p>Modified 2: Do you think justice should have the right to execute a person?</p>	0.95
Homosexuality - acceptance	<p>Original: With which of the following statements do you agree more? (“homosexuality must be accepted by all society”/“homosexuality must be discouraged by all society”/don’t know) (Datafolha, 2017b)</p> <p>Modified: Do you think homosexuality should be accepted by society?</p>	0.96

Issue code	Question	Correlation
Teens - jail	<p>Original: With which of the following statements do you agree more? (“teenagers that commit crimes should be re-educated”/“teenagers that commit crimes should be punished like adults”/don’t know) (Datafolha, 2017b)</p> <p>Modified 1: Do you think that teenagers that commit crimes should be punished like adults?</p>	0.85
Teens - reeducation	<p>Modified 2: Do you think that teenagers that commit crimes should be re-educated rather than go to jail?</p>	0.86

C. Dichotomization strategies

The first step to calculate the time trends was the *dichotomization* of the answers to the moral issues given by the respondents of WVS and Datafolha polls over time. Different strategies were used in the process, depending on the original format of the issue. This Appendix explains each of the strategies employed.

The issues whose answers express different degrees of agreement or disagreement (e.g., from “Strongly disagree” to “Strongly agree”) were dichotomized so that all degrees of agreement were coded “1” and of disagreement “0”. The same thing was done regarding issues whose answers express degrees of approval/disapproval, or whose answers range from (the situation posed by the question would be) “Very bad” to “Very good”. All neutral responses were omitted.

Regarding the issues that ask the respondent to choose, from 1 to 10, whether something is justifiable or not (“Never justifiable”, 2, 3 ..., 8, 9, “Always justifiable”), responses were dichotomized the following way: from “4” to “Always justifiable” were coded “1”, and from “Never justifiable” to “3” were coded “0”.

One of the issues asks the respondent to choose between two statements expressing different points of view: “Protecting the environment should be given priority, even if it causes slower economic growth and some loss of jobs”/“economic growth and creating jobs should be the top priority, even if the environment suffers to some extent”. In this case, the first statement was arbitrarily chosen as the default position (i.e., the modified version asked “Do you think that protecting the environment should be given priority over economic growth and creating jobs?”). Thus choosing “Protecting the environment should be given priority...” was coded as “1”, while choosing the other statement was coded as “0”.

Two questions ask the respondent to choose with which of two statements that are not quite opposites she agrees most. For instance: “With which of the following statements do you agree more? ‘teenagers that commit crimes should be re-educated’/‘teenagers that commit crimes should be punished like adults’/‘don’t know’”.

In this scenario, each question was broken down into two (e.g., “Do you think teenagers that commit crimes should be re-educated rather than go to jail?” – “Teens - reeducation”, and “Do you think that teenagers that commit crimes should be punished like adults?” – “Teens - jail”), and the answers were accounted for twice in the following way: regarding “Teens – reeducation”,

choosing “teenagers that commit crimes should be re-educated”, was coded “1”, otherwise it was coded “0”; regarding “Teens – jail”, however, choosing “teenagers that commit crimes should be punished like adults”, was coded “1”, otherwise “0” (Table 2).

Table 2 – Schema of how the answers to the issue “With which of the following statements do you agree more? ‘teenagers that commit crimes should be re-educated’/‘teenagers that commit crimes should be punished like adults’/‘don’t know’” were dichotomized.

Individual	Answer	Coding – Teens - reeducation	Coding – Teens - jail
1	teenagers that commit crimes should be re-educated	1	0
2	teenagers that commit crimes should be punished like adults	0	1
...

Finally, two of the issues ask the respondent to say which of a list of aims is the most important one, and which is the next most important. For instance: “If you had to choose, which one of the things in this card would you say is most important? And which would be the next most important? Maintaining order in the nation/Giving people more say in important government decisions/Fighting rising prices/Protecting freedom of speech.” During the process of rewriting, these issues were broken down into several questions, each comparing two statements only.

For both the example at hand and the other issue of this type (i.e., “Economy - society”), only one of the modified versions was included in the survey answered by Brazilians, however, since the others did not pass the test of correlation – Americans’ answers to them did not correlate well with their answers to original versions.

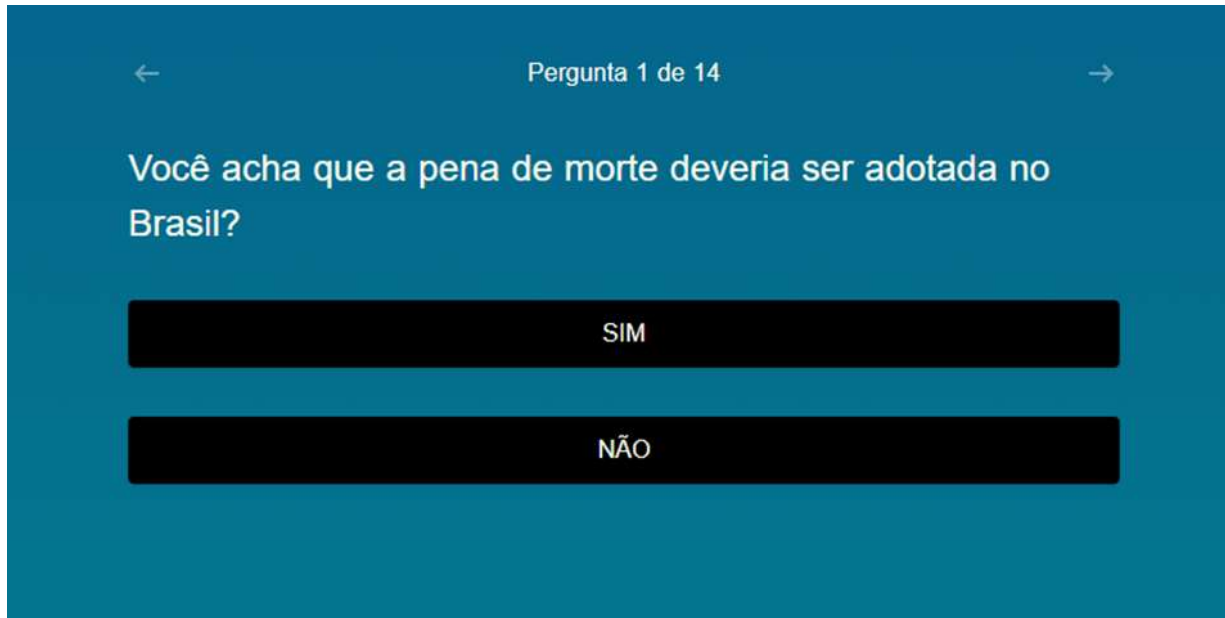
Considering the above example, the version kept was the following: “Do you think maintaining order in the nation is more important than giving people more say in important government decisions?”. Since “Maintaining order in the nation” is the default position, choosing 1. “Maintaining order...” as the most important aim, *or* 2. as the second most important, but *not* choosing “Giving people more say...” as the first most important (and thus more important than “Maintaining order...”) was coded as “1”. On the other hand, choosing 1. “Giving people more say...” as the most important aim, *or* 2. as the second most important, but *not* choosing “Maintaining order...” as the first most important was coded as “0”. In other words, if the

respondent thinks that “Maintaining order...” is more important than “Giving people more say...”, then her answer was coded as “1”, otherwise “0”. The two other scenarios were omitted (e.g., choosing “Fighting rising prices” as the most important aim, and “Protecting freedom of speech” as second most important) (Table 3).

Table 3 – Schema of how the answers to the issue “If you had to choose, which one of the things in this card would you say is most important? And which would be the next most important? Maintaining order in the nation/Giving people more say in important government decisions/Fighting rising prices/Protecting freedom of speech.” were dichotomized.

Most important	Second most important	Coding
Maintaining order...	Giving people more say...	1
Maintaining order...	Fighting rising prices.	1
Maintaining order...	Protecting freedom of speech.	1
Fighting rising prices.	Maintaining order...	1
Protecting freedom of speech.	Maintaining order...	1
Giving people more say...	Maintaining order...	0
Giving people more say...	Fighting rising prices.	0
Giving people more say...	Protecting freedom of speech.	0
Fighting rising prices.	Giving people more say...	0
Protecting freedom of speech.	Giving people more say...	0
Fighting rising prices.	Protecting freedom of speech.	Omitted
Protecting freedom of speech.	Fighting rising prices.	Omitted

D. Survey



A screenshot of a survey question displayed on a teal background. At the top, there is a navigation bar with a left arrow, the text "Pergunta 1 de 14", and a right arrow. Below this, the question is written in white text: "Você acha que a pena de morte deveria ser adotada no Brasil?". Underneath the question are two black rectangular buttons with white text. The top button is labeled "SIM" and the bottom button is labeled "NÃO".

Figure 1: Extract from questionnaire 2. The question reads “Do you think the death penalty should be adopted in Brazil?”, “YES”, and “NO”.

Você acha que a pena de morte deveria ser adotada no Brasil?

Não...

Quais dos argumentos genéricos listados abaixo são mais relevantes na defesa da sua resposta? (você pode escolher mais de um!)

Caso contrário algumas pessoas seriam cruéis

Caso contrário algumas pessoas seriam tratadas de forma diferente das outras

Caso contrário algumas pessoas agiriam de forma injusta

Caso contrário a liberdade de escolha de algumas pessoas seria restringida

Caso contrário algumas pessoas se machucariam fisicamente

Dessa maneira respeita-se as tradições da sociedade

Caso contrário algumas pessoas gerariam desordem no nosso país

Caso contrário algumas pessoas agiriam de forma impura/indecente

Dessa maneira demonstra-se amor pelo nosso país

Caso contrário algumas pessoas trairiam o seu grupo/ agiriam de forma desleal

Outros

Figure 2: Extract from questionnaire 2. It exemplifies a subject answering “No” to the death penalty issue. The text reads “Do you think the death penalty should be adopted in Brazil?”, “No...”, “Which of the generic arguments below are more relevant in the defense of your answer? (you can choose more than one!)”, and then it proceeds to show all ten moral foundation-based arguments plus “Others”.

Você acha que a pena de morte deveria ser adotada no Brasil?

Qual(quais) dos argumentos abaixo você acha que são escolhidos pelas pessoas que respondem **SIM**?

Caso contrário algumas pessoas seriam cruéis

Caso contrário algumas pessoas seriam tratadas de forma diferente das outras

Caso contrário algumas pessoas agiriam de forma injusta

Caso contrário a liberdade de escolha de algumas pessoas seria restringida

Caso contrário algumas pessoas se machucariam fisicamente

Dessa maneira respeita-se as tradições da sociedade

Caso contrário algumas pessoas gerariam desordem no nosso país

Caso contrário algumas pessoas agiriam de forma impura/indecente

Dessa maneira demonstra-se amor pelo nosso país

Caso contrário algumas pessoas trairiam o seu grupo/ agiriam de forma desleal

Outros

Figure 3: Extract from questionnaire 2. The text reads “Do you think the death penalty should be adopted in Brazil?”, and “Which of the arguments below do you think are chosen by people who answer YES?” – since the subject answered “No” herself to the death penalty issue, she is asked about the arguments chosen by who answers “Yes”, i.e., the opposite of her. The text then proceeds to show all ten moral foundation-based arguments plus “Others”.

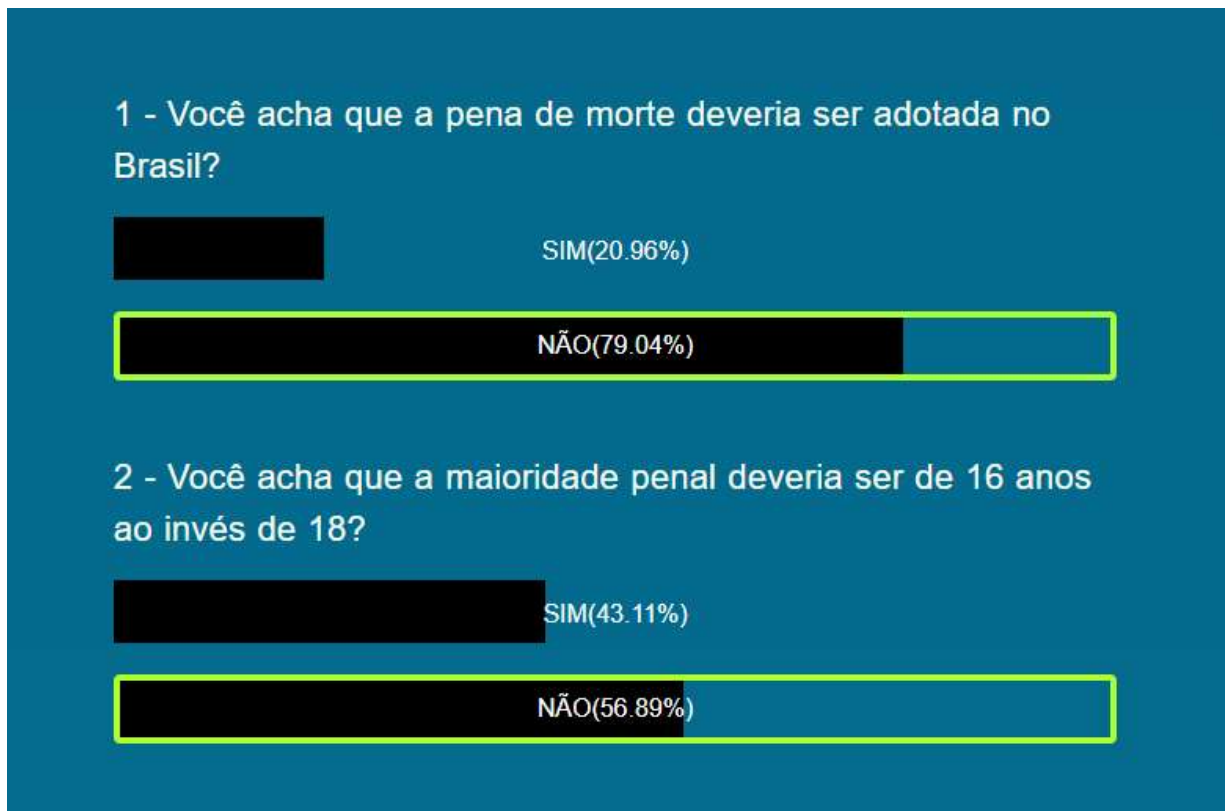


Figure 4: Extract from questionnaire 2. It exemplifies the “Feedback” section of the questionnaire. The text reads “1 - Do you think the death penalty should be adopted in Brazil?”, “YES(20.96%)”, “NO(79.04%)”, “2 - Do you think the legal age for someone to be tried like an adult should be 16 instead of 18 years old?”, “YES(43.11%)”, and “NO(56.89%)”. The answers circled in green are the ones given by the subject in question. The feedback includes all the questions answered by a given subject, with the respective percentage of participants who answered “YES” or “NO”.

E. Moral arguments

The ten moral arguments present in the survey answered by Brazilians were selected from the twenty-four used by Vartanova, Eriksson, and Strimling (2019) – three from each of eight foundations, namely Harm, Violence, Fairness, Liberty, Loyalty, Authority, Purity, and Government.

First, the three arguments pertaining to the Government foundation were dropped.

The argument “Someone is denied his or her rights”, from the Fairness foundation, was also dropped since the relevance of such argument is tied to the legal definition of human rights, which can vary from country to country.

The remaining twenty arguments were divided into two groups: eleven universal arguments, comprising those pertaining to the Harm, Violence, Fairness, and Liberty foundations; and nine conservative ones, comprising those of the Loyalty, Authority, and Purity foundations.

From the data collected by Vartanova, Eriksson, and Strimling (2019) in the U.S. and in the U.K. (regarding which arguments support which positions), it was calculated the proportion of respondents who chose a certain argument as supporting a certain issue position (henceforth referred to as “Support”). For instance, if 60% of American respondents chose the Harm argument “Otherwise some people would be cruel” as supporting the position “for assisted suicide”, the Support this argument provides to this position equals 0.6:

$$\text{Sup.}_{(Harm1)} = 0.6$$

Given a sample and a position, a mean support value was calculated for *all* possible combinations of five **universal** arguments (henceforth “Combined support”). Taking the U.S. sample and the “for assisted suicide” position as an example: for a combination 1 containing two Harm arguments, one Fairness argument, one Liberty argument, and one Violence argument, the Combined support these arguments provide to the “for assisted suicide” position equals:

$$\text{Combined sup.}_{(Comb.1)} = \frac{\text{Sup.}_{(Harm1)} + \text{Sup.}_{(Harm2)} + \dots + \text{Sup.}_{(Violence1)}}{5}$$

An “Universal support” value was also calculated, from the combination of *all* eleven universal arguments.

$$\text{Universal support} = \frac{\text{Sup}_{\text{Harm1}} + \text{Sup}_{\text{Harm2}} + \text{Sup}_{\text{Harm3}} + \dots + \text{Sup}_{\text{Libe3}}}{11}$$

Finally, for each combination of five universal arguments the correlation between Combined support values (one per issue position) and Universal support values (also one per issue position) was calculated.

Table 4 below exemplifies the process described above.

Table 4 – Example of how the five universal arguments used in the present study were chosen from the eleven ones used by Vartanova, Eriksson, and Strimling (2019): Taking the U.S. sample, for each possible combination of five universal arguments (e.g., Comb.1, Comb.2, etc.), it was calculated (i) a Combined support value for each position (i.e., an average of the support each argument in the combination provides to a given position), and (ii) a Universal support value, also for each position (i.e., an average of the support each of the eleven universal arguments provides to a given position). For each combination of five universal arguments the correlation between Combined support and Universal support values was then calculated.

Combination of five arguments	Positions	Combined support	Universal support	Correlation
Comb. 1 (e.g., Harm1, Harm2, Fairness1, Liberty1, Violence1)	Position 1 (e.g., “for assisted suicide”)	a (e.g., 0.55)	x (e.g., 0.35)	Cor. 1
	Position 2	b	y	
	
Comb. 2	Position 1	c	x (e.g., 0.35)	Cor. 2
	Position 2	d	y	
	
...

The combination that included at least one argument from each universal foundation (such as the Comb.1) and yielded the highest correlation (after averaging the values obtained in the U.S. and U.K. samples) was the one used in the survey (Pearson $r = 0.95$; 0.97 in the U.S. sample and 0.93 in the U.K. one).

CHAPTER 7: Appendix

The same process was carried out with regard to the group of nine conservative arguments. The highest correlation between Combination support values and Conservative support values was 0.96 (0.97 in the U.S. sample and 0.95 in the U.K. one).

F. Intra-class correlations

For each of the 10 moral arguments, the answers of Brazilians can be organized at the level of individual (“Individual...” columns in Table 5), of position (“...-pro” and “...-against” rows in Table 5), and of issue (“Issue code” rows in Table 5). Thus, for each of such moral argument data-sets, ICC values representing the fraction of the total variance that is due to differences between individuals, between positions, between issues, and between opinions (i.e., whether or not the respondent endorses a position) were calculated.

Table 5 - Example of how the answers pertaining to the Harm argument can be grouped: by respondent, by position, or by issue. $y_{i,j}$ represents whether the subject believes the Harm argument can be used to support the position in question. For instance, if Individual 1 believes the Harm argument can be used to support the “abortion-pro” position on the issue “abortion”, then $y_{1,1} = 1$, otherwise $y_{1,1} = 0$.

Issue	Positions	Individual 1	Individual 2	Individual 3	...
abortion	abortion-pro	$y_{1,1}$	$y_{1,2}$	$y_{1,3}$...
	abortion-against	$y_{2,1}$	$y_{2,2}$	$y_{2,3}$...
gun	gun-pro	$y_{3,1}$	$y_{3,2}$	$y_{3,3}$...
	gun-against	$y_{4,1}$	$y_{4,2}$	$y_{4,3}$...
...

All ICC values were estimated in the R statistical software, through the package rptR (Stoffel, Nakagawa and Schielzeth, 2017). For each data-set (e.g., Table 5) a generalized mixed effect model like the one below was fitted: grouping variables (i.e. individuals, positions, and issues) were fitted as random effects, while “opinion” was fitted as a fixed effect:

$$Pr(y_{ind,pos,iss} = 1) = \text{logit}^{-1} (\beta_0 + \beta_1 x_{ind,pos,iss} + \alpha_{ind} + \alpha_{pos,iss} + \alpha_{iss})$$

$Pr(y_{ind,pos,iss} = 1)$, the dependent variable, refers to the probability that an individual ind believes a given argument supports a position pos on issue iss , and $x_{iss,pos,ind}$, the independent variable, refers to “opinion”, which equals 1 when the individual ind holds position pos and 0 when she holds the opposite position.

G. Time shifts

Table 6 – Years in which the moral issues studied here were assessed by either WVS or Datafolha public opinion polls.

Issue code	Years	Time span (years)
WVS issues:		
Taxes - pollution	1991, 1997, 2006	15
Protection - environment	1997, 2006, 2014	17
Job - women	1991, 1997, 2006, 2014	23
Job - immigrants	1991, 1997, 2006, 2014	23
Child - parents	1991, 1997, 2006	15
Single - mother	1991, 1997, 2006	15
Order - say	1991, 1997, 2006, 2014	23
Economy - society	1991, 1997, 2006, 2014	23
Respect - authority	1991, 1997, 2006, 2014	23
Army	1997, 2006, 2014	17
Homosexual - sex	1991, 1997, 2006, 2014	23
Prostitution	1991, 1997, 2006, 2014	23
Abortion	1991, 1997, 2006, 2014	23
Euthanasia	1991, 1997, 2006, 2014	23
Datafolha issues:		
Abortion - crime	2007, 2013, 2016, 2017	10
Age - jail	2003, 2006, 2015, 2017, 2018	15
Death - Crimes	2013, 2014, 2017	4
Death - penalty	1991, 1993, 1995, 2000, 2002, 2003, 2006, 2007, 2008, 2017	26
Gun	2013, 2014, 2017, 2018, 2019	6
Homosexuality - acceptance	2013, 2014, 2017	4
Justice - execution	2013, 2014, 2017	4
Teens - jail	2013, 2014, 2017	4
Teens - reeducation	2013, 2014, 2017	4
Weed - illegal	1995, 2006, 2008, 2012, 2017	22

H. U.A.A. values and rate of public opinion change estimates

Table 7 – Universal arguments advantage values and rates of public opinion change (in log-odds) pertaining to the default position of each moral issue.

Issue code	U.A. advantage	Rate of change
WVS issues:		
Army	-0.503	-0.260
Order - say	-0.276	-0.002
Job - women	-0.269	-0.566
Economy - society	-0.262	0.294
Job - immigrants	-0.215	-0.144
Child - parents	-0.199	-0.348
Respect - authority	-0.163	0.020
Protection - environment	0.022	0.379
Euthanasia	0.038	0.005
Abortion	0.086	-0.061
Prostitution	0.098	0.412
Single - mother	0.187	0.013
Homosexual - sex	0.301	0.658
Datafolha issues:		
Justice - execution	-0.238	0.501
Gun	-0.167	0.378
Abortion - crime	-0.163	0.739
Death - penalty	-0.160	0.024
Death - Crimes	-0.142	-0.501
Weed - illegal	-0.121	-0.360
Age - jail	-0.047	-0.105
Teens - jail	0.013	-0.021
Teens - reeducation	0.060	0.021
Homosexuality - acceptance	0.382	1.081