Murky Morality: Lack of Evidence for the Moral Foundations Hypothesis in an Online Dataset

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Abstract

Moral Foundations Theory uses a taxonomy of five moral foundations to categorise individuals. The Moral Foundations Hypothesis (MFH) (Graham, Haidt, & Nosek, 2009) predicts that individuals identifying as politically liberal will be more concerned with the individualising foundations of Harm/Care and Fairness/Reciprocity than the binding foundations of Ingroup/Loyalty, Authority/Subversion and Purity/Sanctity. It also predicts that those identifying as politically conservative will be evenly concerned with all five foundations, while simultaneously showing more concern for the three binding foundations than liberals. This relationship can be assessed, as is the case in the current study, using the Moral Foundations Questionnaire, a descriptive measure of morality (Graham et al., 2009). This study sought to establish whether the prediction made by the MFH would be supported using a large sample (N = 1261) gathered through the online Facebook research application myPersonality.org. Several different statistical strategies were used to test the hypothesis: pre-registered structural equation modelling (including confirmatory factor analysis); case-based analysis; exploratory correlational analysis, and exploratory factor analysis. Results of the analysis did not support the predictions of the MFH. The confirmatory models did not reach acceptable levels of fit, based on the fit index thresholds set in the study preregistration. However, the regression estimates from the Structural Equation Model were in the predicted directions. Additionally, the exploratory case-based analysis revealed tentative support for the MFH predictions.

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A low risk notification was processed for this study through the Massey Human Ethics Committee (44000020141).

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Abbreviations

MFQ – Moral Foundations Questionnaire

MFT – Moral Foundations Theory

MFH – Moral Foundations Hypothesis

CFA – Confirmatory Factor Analysis

SEM – Structural Equation Model

ML – Maximum Likelihood

RMSEA – Root Mean Square Error of Approximation, absolute fit index

CFI – Comparative fit index, incremental fit index

TLI/NNFI – Tucker Lewis Index/Non-Normed Fit Index, incremental fit index

PMH – Parallel Morality Hypothesis

PCM – Person-centred Morality

SIM – Social Intuitionist Model

DMT – Dyadic Morality Theory

Literature Review

There has been a dramatic increase in research in moral psychology over the past couple of decades, propelling the field into becoming a significant part of modern psychological science. The current study is an attempt to solidify theory and progress the field through replication using empirical data. The study is situated within the framework of Moral Foundations Theory (MFT) and specifically addresses the Moral Foundations Hypothesis (MFH). MFT is a descriptive model, proposed by Graham et al. (2013, 2018), and characterises an individual's moral beliefs. Derived from factor analyses, the model's current structure places individuals on spectrums of five *foundations*, which each represent a different facet of morality (Graham et al., 2013); detailed in Chapter 2 of this review. The MFH makes a specific claim that individuals who identify as politically liberal have different moral motivations and beliefs than those who identify as politically conservative; detailed in Chapter 3. The present research aims to assess the current thinking in this area by replicating the findings from Graham, Haidt, and Nosek (2009). It will attempt this by applying the same statistical technique used by these researchers in the form of a latent variable model, to a previously unused, large, existing data set.

This literature review is separated into six chapters:

Chapter 1: will discuss the state of modern moral psychology. The most relevant theories will be assessed to set the context for the current study.

Chapter 2: will detail Moral Foundations Theory (MFT); the theoretical framework for this research.

Chapter 3: will focus on the political divide of liberals and conservatives. This will be analysed mostly as a function of the different moralities observed in these groups. The Moral Foundations Hypothesis will also be explained here.

Chapter 4: will assess the structure and validity of the Moral Foundations Questionnaire (MFQ). This is the measure used in the current research and the most prominent tool in the study of morality in psychology.

Chapter 5: will discuss the myPersonality.org project and the origins of the existing dataset used in this study. It will also address social media research in general and whether it is a good source of data.

Chapter 6: will discuss the current study; making a note on the reproducibility crisis in psychology, discuss structural equation modelling, the statistical technique used for the analysis in this research, and end the literature review with a description of the research questions and hypotheses of the study.

Chapter 1: Current State of Moral Psychology

It is important to address some of the popular theories of morality and assess their relevance to the current research. This is also useful in grounding moral foundations theory (MFT) and the moral foundations hypothesis (MFH) within the current thinking on morality in general. When discussing morality in a psychological context, we are talking about the beliefs, ideas, and values about others and the world that motivate an individuals' actions and opinions. The main goal of moral psychology researchers is to attempt to explain how and why individuals behave in line with specific moral values. Most theories in the field are descriptive, attempting to explain behaviour, rather than normative, making specific claims about how individuals should behave (Haidt, 2012). One of the recent trends in psychology is to situate behaviour or specific findings in a neurobiological context; usually using functional magnetic resonance imagery (fMRI). However, there does not currently appear to be a specific area of the brain dedicated to moral thinking; morality seems rather to be an amalgamation of many different processes at work, such as risk analysis, imagination of outcomes of behaviour, tracking of others thoughts (e.g. theory of mind), and beliefs, among others (Greene, 2014; Ruff & Fehr, 2014; Young & Dungan, 2012). While neurobiological evidence will be referenced, since this evidence is at such a transition phase, it is more relevant and useful to deal mainly with the cognitive and behavioural aspects of morality, which the current review will do.

How to define morality and moral judgement is still debated in the field. A distinction is made by some moral psychology researchers between moral judgements and conventional judgements (Turiel, 2018; Killen & Dahl, 2018); whereby *moral* judgements concern issues of fairness, welfare/harm, and rights, as opposed to *conventional* judgements which consider

authority, rules, and social traditions. While this separation of moral and conventional judgements was common in moral psychology in the mid to late stages of the twentieth century, it is significantly different to MFT (Haidt & Graham, 2009); which encompasses all of these under the umbrella of moral foundations. Prominent moral theorists Turiel (2018) and Killen and Dahl (2018) seem to discount aspects of morality which are critically important to eastern cultures and conservative westerners. not deeming them worthy of being included as being morally relevant. MFT also emphasises the importance of innate structure predisposed to develop moral reasoning, which is also contested. Killen and Dahl (2018) claim morality arises solely from social interaction and cognitive reflection, a constructivist model. It is difficult to interpret the distinction here, as both social interaction and cognitive processes arise due to evolutionary and biological predisposition, basically making the argument that morality is formed through social interaction and cognitive reflection alone redundant. There are two recent intriguing variations on the structure of moral judgement that are worth extrapolating at this point: the parallel morality hypothesis (PMH) (van den Bos, 2018), and person-centred morality (PCM) (Landy & Uhlmann, 2018).

The PMH proposes that, rather than deliberate reasoning following slowly after intuition, as in the social intuitionist model (Haidt, 2001), which will be discussed in chapter 2, these processes work alongside each other to form moral judgement (van den Bos, 2018). It is similar to the dual process model (Green, 2007), however the relationship between the two processes are more mutually compatible in PMH, rather than combative as in the dual process model. In this manner, intuitive thinking is not left to its own devices in the moment; rather it is reined in by concordant complex reasoning. Two systems are at work in the brain; they are operating independently, allowing for simultaneous function (Strack & Deutsch, 2003; Kahneman & Frederick, 2002). This assertion is supported by neurobiological evidence: Knoch, Pascual-Leone, Meyer, Treyer, and Fehr (2006) observed that impaired

functioning of the dorsolateral prefrontal cortex (DLPFC), achieved through transcranial magnetic stimulation, resulted in a reduction in individuals' willingness to reject unfair offers in an ultimatum game; suggesting a significant amount of cognitive control is necessary for judgements of fairness. A more practical example of this parallel operation could be the case of self-interest versus fairness; whereby self-interest is automatic and enticing; while appreciation of fairness is a slower, thoughtful process (Moore & Loewenstein, 2004). This would generally only be relevant in situations concerning the individual, not others.

Taking a different approach, Person-Centred Morality focuses more on the motivations of moral judgement. Landy and Uhlmann (2018) argue that judgements are more about assessing people themselves, rather than actions. This is achieved through nuanced automatic judgements of character, followed by deliberate analysis of an individual's character, which can alter the original automatic assessment (Landy and Uhlmann, 2018). Virtue ethics, assessing character and goodness as opposed to the 'right' action such as this, originated with the thinking of Aristotle (Aristotle, trans. 1998). Temporally speaking, it is constructed very similarly to the Social Intuitionist Model; intuitions first, deliberate reasoning second (Haidt, 2001). Important to note, Landy and Uhlmann (2018) identify trustworthiness and compassion as core elements of *good character*. There is also evidence that assessment of character is an innate skill in humans. Hamlin, Wynn and Bloom (2007) observed that infants of only 6 months showed a preference, in the form of looking behaviour, for helping characters over hindering characters. Adults will even make judgements of aggression and trustworthiness after seeing a face displayed for only 100 milliseconds (Willis & Todorov, 2006). Studies by Goodwin, Piazza and Rosen (2014) using obituaries in newspapers have shown that people attend more to moral attributes of others, even when presented with more information about their abilities and achievements. The evidence for person-centred morality has been building in recent years: a pre-publication

independent replication project undertaken by Schweinsberg et al. (2016) demonstrated consistent reproducibility of the effects of person-centred morality. While individuals vary in how they judge values, the roots of these judgements, their personal morality, is critical to how their identity is defined.

An interesting insight into the development of morality comes from evolutionary biology, claiming that animals must be able to track one another's actions in order to set in motion the construction of morals; reciprocal altruism comes from this ability, as individuals can distinguish who to help (Trivers, 1971). Building on this, Strohminger, (2018) notes that moral continuity appears to be one of the driving forces of diachronic (developing and evolving over time) identity. She goes on to extend this to how we judge others; contending that essentialism allows humans to see underlying and hidden characteristics, which are then applied when assessing the progression of an individual's identity over time. When allowing for the possible existence of a soul, participants in multiple studies were more likely to suggest moral traits when asked what parts of a person would remain if their soul were to transfer to another body (Strohminger & Nichols, 2014). This effect held for U.S participants, Hindu Indians, and even Buddhists (Garfield, Nichols, Rai, & Strominger, 2015). These effects indicate that individuals acknowledge morality as a permanent and structural piece of a person, more important than their other traits. Moral beliefs are even seen as the most important aspect of identity in late childhood. 8-10-year olds said a pill altering moral beliefs would change an individual more than other traits or preferences (Heiphetz, Strohminger, Young, & Gelman, 2016). Most interestingly, Strohminger (2018) found that patients suffering from frontotemporal dementia, which in early to middle stages impairs moral thinking, are seen as losing more of their identity by family members than those with more memory-based impairments, like Alzheimer's dementia (Strohminger, 2018). Again, morality is seen here as fundamental to identity. It is curious that even when people may not recognise

their family, the family are comforted by their loved one remaining *themselves*, in moral terms at least. On a similar note to Strohminger; Conway (2018) sees *moral self-perception* and *social perception* as the crucial drivers of morality; including judgements, behaviour, and decision making.

Moral self-perceptions are relative, in the sense that they are formed not just by how an individual sees themselves, but how they think others see them, and how they judge others (Conway, 2018). In this manner it is as much group-focused/defined as individually. These ideas are part of moral self-theory (MST): a functionalist and integrative model (Conway, 2018). Research has demonstrated that individuals with a stronger sense of moral identity, defined by scores on the Moral Identity Scale, are more likely to want to avoid harm to others, but also maximise group outcomes (Conway and Gawronski, 2013), somewhat bridging the individualist-collectivist gap. Priming moral identity has been shown to influence prosocial behaviour by predicting everyday task behaviour and actively increasing prosocial acts (Reed, Aquino, & Levy, 2007; Hoffman, Wisnecki, Brandt, & Skitka, 2014). This moral identity priming has also been shown to reduce immoral behaviour like cheating (Bryan, Adams, & Monin, 2013). The practical elements of this research complement Strohminger (2018) effectively and would be useful as a combined theoretical construct. The use of moral identity naturally extends to the political realm, relevant to the current study. Van Zant and Moore (2015) found that people prefer political policies that are supported by a moral argument. Of course, it is important to remember that this style of argument has limits, as voters can become cynical of the motivations of politicians, not trusting that the sentiment is genuinely morally motivated. Alternately, people are also more likely to express their thoughts freely when an issue is moralised (Effron & Miller, 2013). Perhaps this is a reason why the partisan divide is so visceral; every political issue in the modern landscape can be linked to each side's values and moral beliefs, invoking voter's individual moral identity and

forcing them to fight for their moral-selves constantly (Andris et al., 2015; Abramowitz & Webster, 2018). Political groups can often become literally distant groups, with more rurally located people identifying as more conservative and those in highly populated urban areas as more liberal (Haidt, 2012). This can create fundamentally different ways is which we see each other.

Waytz and Young (2018) propose that moral cognition is applied in fundamentally different ways towards those who are close to the individual versus those who are distant. They see theory of mind as the key to conceptualising others morality; viewing others as moral actors and assessing whether they are friend or foe. Rather than simply judging an individual on their actions, a more complete assessment of their mental state is required (Waytz & Young, 2018). An *us* versus *them* dynamic is created through this variation in moral cognition. Specifically, the authors claim that individuals focus more on purity and loyalty when assessing close others; while focusing on harm and fairness when assessing distant others. This type of variation in cognition would likely occur when liberals are assessing fellow liberals versus conservatives, and vice versa. Studies conducted by Waytz and Young (2014; 2018) supported the idea that distant others are seen as moral agents responsible for their actions, as opposed to close others having actions done to them, moral patients. Waytz, Young, and Ginges (2014) assessed the motivations of conflict in groups of American democrats/republicans, and Israelis/Palestinians: all four groups saw their own side (ingroup) as motivated by love for their ingroup, but saw their opposing side (outgroup) as motivated by hate for them. These variations have also been observed for other moral foundations. Duncan, Chakroff, and Young (2017) found that individuals judged their own group more harshly on issues involving purity, while judging their outgroup more harshly on harm violations. In this manner, morality gains its real-world meaning through interaction

with others. This leads into another recent model: side-taking theory (DeScioli & Kurzban, 2018).

DeScioli and Kurzban (2018) see moral judgement as evolving from the need to choose sides during conflict. Side-taking theory allows for the development of new moral rules/beliefs in response to new sources of conflict. The theorists acknowledge that moral cognition is therefore seen as universal, with variations in moral rules across cultures/groups. Side-taking theory also holds that moral judgement is largely unconscious and then motivated to persuade others to agree and be part of the same side. There does appear to be some support for this view in past literature. Theories of morality, such as those based on cooperation and/or reciprocal altruism (Trivers, 1971; de Waal, 1996; Wright, 1994) are often predicated on moral judgement leading to increase in welfare, however severe punishment is often sought for those supposedly breaking moral rules. The dominant side reacts to threats to their moral thinking, judging in the way they see as morally consistent. Blasphemy, homosexuality, and premarital sex appear on the surface to be harmless offences, despite still being punishable by death in some societies (Appiah, 2010: Sarhan & Burke, 2009). For extreme binding cultures (i.e. those that are highly concerned with authoritarian societal structures and spiritual purity) these are not seen as harmless and violations must be dealt with in order to maintain continuity in their moral structure (Haidt, 2012). Sides are often defined by hierarchy, with the few who are in charge being arbiters of the public moral will. This could be applied to the modern westernised political divide, as individuals progressively feel tied to their *side* and vociferously defend it. Side taking theory seems insufficient however to explain moral judgement in its entirety. This is particularly true in the cases of moral judgment in young children (Bloom, 2013) who have no concept of assessing which side is best to join and defend. Clearly with the depth of current research, descriptive claims of morality are far from settled. The current study utilises the framework of moral

foundations theory to attempt to move the field forward. The following chapter will explain the theory in detail.

Chapter 2: Moral Foundations Theory

Historical Background

Moral foundations theory (MFT) is a pluralistic model of human morality. It consists of a multi-factor structure which can be applied to an individual to make a descriptive claim about how their moral beliefs can be defined. MFT has roots in three separate fields: evolutionary psychology, cultural anthropology, and social psychology, specifically, what is known as the *automaticity revolution,* a term that refers to the increase in research identifying *automatic* cognitive responses (i.e. intuitive and not controlled by deliberate conscious mechanisms) (Graham, Haidt, Motyl, Meindl, & Moojiman, 2018). It also draws directly from three previous theories: Shweder, Much, Mahapatra, and Park's (1997) three ethics; Fiske's (1992) four models of sociality; and Schwartz's (1992) ten value types. Most early moral psychology theories were individualist and dominated by Western ideology. The focused on harm, individual rights, and justice, or care and compassion (Kohlberg, 1969; Turiel, 1983; Gilligan, 1982; Hoffman, 1982). It wasn't until the work of Shweder and colleagues (2008; Shweder, Much, Mahapatra, & Park, 1997) that the moral realm was extended to encompass foundations important to Eastern and collectivist cultures. Shweder et al. (1997) proposed three ethics, which were termed the three moral languages of the world: *autonomy*, which encompasses concerns of harms, rights and justice; *community*, relating to loyalty and duty; and *divinity*, representing the spiritual and divine, including purity and the sanctity of the body. Alan Fiske's (1991) four relational models of social relationships are: communal sharing, market pricing, equality matching, and authority ranking. While Schwartz's (1992) ten values types are: benevolence, universalism, self-direction, security, conformity, hedonism, achievement, tradition, stimulation, and power. MFT does not directly

reconcile these taxonomies as they are motivated by different concepts: discourse for Shweder, relationships for Fiske, and motivations for Shwartz. Instead, it utilises the evolutionary psychology progress guided by Barkow, Cosmides, and Tooby (1992), and forms a separate, overarching theory of morality. In this manner, MFT brings the fields together without eliminating the original intent of each theory. Many monist theories, which seek to define a concept based on a single source, have come before, boiling morality down to a single element. For Kohlberg (1971), this was justice. For others, including current theorists, it is harm or wellbeing (Gray, Young, & Waytz, 2012; Harris, 2010). The authors of MFT see this as an unnecessary simplification of morality. Aristotle is perhaps one of the earliest influential pluralists, but more recently was Carol Gilligan (1982), who challenged Kohlberg and his followers, contending that care should be considered separate to justice. This resulted in debates in the literature which left a lasting mark on the landscape of moral psychology. Kohlberg eventually conceded that the two exist and are distinct (Kohlberg, Levine, & Hewer, 1983). It is important that the literature can sometimes move forward in an agreed direction, rather than constant disagreement, whereby the field makes no progress. The level of appreciation and incorporation of evolutionary theory sets MFT apart in the field. Naturally, there is much more to the theory than evolution.

Theoretical Structure

There are four main underlying theoretical networks, upon which MFT is structured: nativism, cultural learning, intuitionism, and pluralism (Graham et al., 2018). Theoretical networks in this context are the empirical findings which have been linked together to form a wider theory. Each of these make an individual claim central to the conceptualisation of MFT. First, and most important for positioning the theory, is nativism, which proposes that

the ability to use moral thinking is innate, and a *first draft* of the moral mind was provided by the stresses and adaptation of human evolution (Graham et al., 2018). The first draft metaphor is useful here in emphasising the idea that the parts of the brain responsible for moral thinking will later be edited and significantly changed. An early example of predisposition to moral thinking comes from developmental psychology. Very young children exhibit pleasure in response to fairness, then conversely exhibit displeasure in response to unfairness (Tooby, Cosmides, & Barrett, 2005). It could be argued that this is merely a cultural response to learned ideas of fairness, however, similar responses are seen in infants as young as 6 months (Bloom, 2013), not yet capable of such complex understanding of their external world. Evolutionary theorists have long argued that cognitive adaptations have emerged in response to historical pressures and opportunities that humans have faced (Tooby & Cosmides, 1992; Pinker, 1997). Haidt (2007) then made the link between these adaptations and innate structures of moral thinking. While nativism may create the first draft, cultural learning provides the bulk of the story.

Cultural learning is the idea that experience in one's culture edits and develops the innate moral potential of the mind (Graham et al., 2018). It is through this learning process that moral minds become culturally specific e.g. emphasis of individual rights and freedoms in California, U.S.A, versus strict respect for patriarchal hierarchy in rural China. Cultural learning provides additional evidence for nativism as well. Despite the obvious differences, remarkable similarities in morality arise universally, evidenced by the same foundational concerns across cultures (Haidt, 2012). It also demonstrates that if learning did not take place, then all cultures would be identical, driven only by their evolutionary draft (Haidt, Koller, & Dias, 1993; Shweder, Mahapatra, & Miller, 1987). Sperber (2005) sees many of the cognitive modules created through evolution as *learning modules*, primed to develop and multiply, depending on experience. Graham et al. (2013) see this as an effective explanation of the

impact of cultural learning on nativist modules like preparedness (Seligman, 1971). An example of this learning process can be seen in greetings, with kisses on each cheek in France compared to the embrace and hongi of traditional Māori New Zealanders. Both become automatic and ingrained behaviours, performing similar functions, but manifest differently. Nativism and cultural learning provide the explanation for the construction of moral thinking, while intuitionism focuses on the process of moral judgement itself.

Intuitionism is the view that moral judgement is guided first by intuitions and later followed by slower deliberate reasoning, often post-hoc rationalisation, known as the social intuitionist model (SIM) (Haidt, 2001; Haidt, 2012). These automatic responses to actions or individuals often rely on heuristics, thinking rules of thumb, and are fast effortless processes sometimes referred to as system 1 thinking (Kahneman, 2011; Haidt, 2012). System 2 is then the slower, conscious and more complex processes, utilising the prefrontal cortex (Kahneman, 2011). In this model, moral judgement is heavily influenced by affective responses over conscious reasoning (Haidt, 2001). It is important to note, however, that the SIM does not disregard deliberate reasoning, rather seeing deliberate reasoning as socially motivated and used to justify or rationalise judgements and arguments (Haidt, 2012). Moral reasoning is then seen as motivated (Ditto, Pizarro, & Tannenbaum, 2009). MFT seeks to explain why these intuitions occur in response to such specific situations/stimuli. Certain psychologists, most notably Greene and colleagues (2008), disagree with the dominance of affect-laden intuitions over deliberate moral reasoning. They propose that the two are locked in a constant battle within the brain, what they term the *dual process model.* Greene notes, however, that in emotionally salient situations, the affect-laden intuitions often drive reasoning. Multiple critiques of intuitionism have also come from developmental psychology, noting the lack of appreciation for the development of moral reasoning over an individual's life, which can alter how intuitions manifest (Navarez, 2010; Bloom, 2010). Graham et al.

(2013) welcome this critique and agree that moral development should be incorporated more in MFT. Finally, pluralism acknowledges that there are multiple different foundations that make up morality, not just one, as in the case of moral monistic theories (Kohlberg, 1969; Turiel, 1983). MFT sees each of the foundations as interrelated but unique adaptations to evolutionary pressure on humans. Graham et al. (2013) are confident in their belief that more than five foundations exist, however the following are the five with the best current empirical evidence. The bulk of this evidence, which will be discussed in detail further on, comes from the divide between political liberals and conservatives in terms of foundation concerns, the focus of the current study. In this framework, each foundation represents a portion of an individual's morality, with each attempting to describe certain motivations for reasoning and judgement. Each foundation has been shown to have evolutionary and biological roots (Graham et al., 2018).

Five Foundations

1. *Harm/Care*: represents aversion to harm from others and caring for others. This foundation originates from the lengthy period in which mammals, humans in particular, are dependent upon their caregivers (Graham et al., 2018). Caring for the needs of offspring meant they were more likely to survive and reproduce, and this care gradually extended to our wider kin groups and communities. It is clear from the intuitive response of mothers across all species, that some form of innate preparedness is present and can't simply be learned each generation.
2. *Fairness/Reciprocity/Cheating*: a desire for fairness and aversion to cheating is present across all cultures and occurs in children at a very young age, less than one year old in some studies (Hamlin, Wynn, & Bloom, 2007; LoBue, Chiong, Nishida,

Deloache, & Haidt, 2011). This is perhaps best understood as what Trivers (1971) termed reciprocal altruism. He explains that individuals care and provide for others in exchange for the same treatment, while those who cheat the system are identified and struggle to reproduce. Fairness reactions are pervasive in our lives, e.g. anger at hearing of a favourite sports player using performance enhancing drugs, or even at an ATM machine for confiscating your credit card. Fairness also presents a curious case for variance within the foundation. Higher levels of fairness concern are invoked in political liberals vs. conservatives depending on situation (Haidt, 2012).

3. *Ingroup/Loyalty/Betrayal*: defines the level of affiliation and loyalty felt for one's *group*, whatever that group may be. Ingroups and outgroups arose due to the constant competition for finite resources (Dawkins, 1989). Groups that could work together most efficiently survived, and the sense of loyalty within groups grew (Graham et al., 2013). It is astutely observable in the coalitions seen within chimpanzees as they compete for territory and rank within their area (de Waal, 1982). Human history paints a picture of tribes, then societies, then countries, fighting for resources and territory. The most cohesive and loyal forming lasting empires e.g. Greece, Rome, the U.S.A. These loyalty intuitions can be seen all around the modern world in various forms: strident sports team support, patriotism, willingness to join armed forces. It can also be the basis of racism and wider discrimination when outgroups are treated as the dangerous *other*.
4. *Authority/Respect/Subversion*: under this foundation we can observe how much an individual is willing to conform to authority and respect system rules. Hierarchies are present across all primates, usually defined by physical dominance, however more likely wealth and power in humans (Boehm, 1997; de Waal 1996). Groups with strong leadership and stable hierarchies have tended to succeed over history far better

than more anarchic or tyrannical social structures (Pfeiffer, 1998; Sherif, 1961). Those individuals who don't respect the hierarchy or seek to undermine it are punished. Again, this is observable in chimpanzee and bonobo populations. The primates more innately ready to form the kind of necessary relationships and navigate hierarchical structures are more likely to learn and survive than those less capable and relying solely on general intelligence (de Waal, 1982; Fisk, 1991). Authority systems are treated differently depending on culture (e.g. conservatives have higher respect for the police and military in the U.S than liberals) (Haidt & Graham, 2009).

5. *Purity/Sanctity/Degradation*: this final foundation addresses individual concerns for bodily and spiritual cleanliness. It is strongly associated with the universal emotion of disgust, proposed to evolve from the need to avoid pathogens and harmful contaminants to the body (Schnall, Haidt, Clore, & Jordan, 2008). Human evolution encountered many variations in diet due to shifts in territory and eating strategies. Naturally, those most adept at avoiding illness, or with better immune systems, were more likely to survive and reproduce (Schaller & Park, 2011). In much the same way as loyalty has generalised, disgust has been shown to manifest as a social protection, inducing fear and avoidance of unfamiliar and potentially *impure* others e.g. LGBTQIA individuals or different ethnicities (Schaller & Park, 2011; Inbar, Pizzaro, Knobe, & Bloom, 2009). Alternately, many cultures hold the sanctity of the body, i.e. *treating the body as a temple*, in very high moral regard (Graham et al., 2018).

Importantly, there are observable differences across people and cultures. Graham et al. (2011), utilising large international samples, observed that world region, after controlling for other demographic variables, was a reliable predictor of scores on concerns of moral foundations. The authors noted that Eastern cultures e.g. South, East and South-East Asia

consistently showed more concern for loyalty/ingroup and sanctity/purity than did Western cultures e.g. the U.S, Canada, and the U.K. Interestingly, these differences were smaller than that between conservatives and liberals within the U.S, which conforms to the literature supporting greater within-culture differences than between cultures (Vauclair & Fischer, 2011). Historic prevalence of pathogen levels has even been shown to predict not only levels of concern for purity, but also ingroup and authority (van Leeuwen, Koenig, Graham, & Park, 2014). van Leeuwen and Park (2009) have also replicated the difference in moral foundations of liberals and conservatives in a Dutch sample. Cultures and individuals tend to feel threatened by conflicting moral beliefs structures (Kesebir & Pyszczynksi, 2011; Pyszczynski, Motyl, & Abdollahi, 2009). It may be natural then that the partisan divide has become so pronounced (Andris et al., 2015; Abramowitz & Webster, 2018; Iyengar & Krupenkin, 2018) in the digital age as everyone has become aware of each other's views. People are often unable to even fathom that others could hold the opposing view to their own (Ditto & Koleva, 2011).

MFT factor structure in New Zealand

Some of the more recent research into the MFT factor structure has come out of New Zealand. Davis, Sibley, and Liu (2014) used a large New Zealand-based sample to test the factor structure of MFT using the Moral Foundations Questionnaire. They tested the five-factor model of MFT against multiple other options: single factor, two factor, three factor, and a hierarchical model consisting of the five foundations nestled within two second order factors (individualising and binding). The original five-factor model proved to be the best fit after a confirmatory factor analysis. While the overall model fit indices were weaker than desired, this is explained by the authors as due to the complexity of testing morality; the same

argument made by Graham et al. (2009). Interestingly, the authors tested whether the model fit held across genders, which it did. Contrary to Graham et al. (2009; 2011), Davis et al. (2014) did not find moderate-strong negative relationships between conservatism and the individualising foundations (Harm and Fairness). This indicates that the relationship between political ideology and moral foundation scores may be different to what the MFT authors claim. Davis et al. (2014) put this down to either a potential conceptual difference between liberal and conservative in NZ, or a national identity of equality and fairness.

Other potential foundations currently being studied and considered for induction into MFT include liberty/oppression, equity/undeservingness, and honesty/lying (Graham, et al., 2018). As these are not yet confirmed as foundations in the model, they will not be discussed further. MFT is not universally accepted, and the next section will discuss critiques and opposing theories and models of morality.

Opposing Monistic Theories

Dyadic Morality Theory (DMT) proposes that the pluralism presented in MFT can be explained solely by concerns of harm (Gray & Keeney, 2015; Shein & Gray, 2015). DMT suggests that all moral judgement accesses the same underlying process, viewing moral situations as a case of how an individual moral agent's unique cognitive template is causing harm to a moral patient (Gray and Keeney, 2015). In this context, a moral agent is performing an action, while the moral patient is an individual being acted upon. DMT seeks to portray MFT as a set of unrelated domain-specific foundations, however this is not the case as the foundations are developmentally constructed and edited by experience, therefore all related as part of the moral mind (Haidt & Joseph, 2007). The most effective argument for DMT came in a critique of MFT from Gray and Keeney (2015).

Critique from Gray and Keeney (2015)

Gray and Keeney (2015) claim that sampling bias, in the form of stimuli confounds, is the cause of differences observed in moral judgments across the foundations of MFT, rather than genuine moral differences. They contend that the context of moral scenarios commonly used in MFT studies are merely confounded by levels of *weirdness* and *severity*. MFT is a modular theory, stating that distinct modules or foundations exist based on moral content of actions/thoughts (Gray and Keene, 2015). Domain-general accounts alternatively, reject this idea and emphasise an overarching cognitive and affective function which guides moral judgement (Cameron, Lundquist, & Gray, 2015). In their critique of MFT, Gray and Keeney (2015) focus on the differences, or lack thereof, between the foundations of harm and impurity. They see impurity examples such as *eating a pet dog* as fundamentally weirder than harm violations like *direct violence*. Strange behaviours are also more likely to invoke judgements of an individual's character or disposition, rather than the act itself or extraneous situational influences (Pizzaro & Tannenbaum, 2011). Severity levels are also seen as critical to the argument. More severe acts are commonly seen as more immoral, so they are likely to be judged as representing more intention (Murphy, 2004). Moreover, harm violations often appear more severe (e.g. murder vs. eating out of the garbage), so are likely to be judged as such. Gray and Keeney (2015) ran three studies to assess whether weirdness and severity do indeed confound the differences between harm and purity. In study 1, participants judged previously used MFT scenarios: impurity scenarios were rated less severe and weirder, while harm scenarios were rated more harmful and even more impure (Gray, Young, & Waytz, 2012). Study 2 compared scenarios from MFT with ones generated by participants themselves. The authors note that the purity violations generated by participants didn’t

include anything like the *weird* examples used in MFT studies. However, this is precisely the point of many purity scenarios. They are rated as impure, but participants struggle to explain why. Participant-produced examples from this study like prostitution and child molestation (Gray and Keeney, 2015) are easily argued against. In the results of study 2, MFT scenarios were seen as less severe overall, most notably the impurity scenarios, and weirder overall, again mostly the impurity examples. Interestingly, ratings of harm and purity were also highly correlated in both studies 1 and 2 (Gray and Keeney, 2015). Finally, study 3 assessed the link between harm and acts, and purity and character. The authors found that manipulating weirdness and severity, rather than moral content, did indeed predict ratings of acts and character. They claim that the variations in liberal and conservative responses may be down to context-specific scenarios, as conservatives are more sensitive to purity concerns around sex and religion, whereas liberals respond more to nutritional and environmental concerns (Graham et al., 2009; Feinberg & Willer, 2013).

Graham's (2015) Response

Graham (2015), one of the most prominent theorists of MFT, began his response to Gray and Keeney (2015) by conceding that severity and typicality (weirdness) are indeed important factors in considering moral judgement, but refuted the claim that they explain the differences between harm and impurity. He notes that MFT does not claim that all foundations are equal in terms of severity, it goes so far as to expect this variation, particularly in the purity/degradation foundation. As a descriptive model, MFT does not make specific normative claims like equity of foundation severity. Addressing the very high correlation of harm and purity in studies 1 and 2 of Gray and Keeney (2015), Graham (2015) points out that self-report of how harmful or impure each violation is, is not an accurate

means to access intuitive concerns. He continues that there were also very high correlations between severity and harm (study 1, r=.93, study 2, r=.96) and severity and purity (study 1, r=.96, study 2, r=.97), making the comparisons with severity redundant. An interesting comparison would be measuring whether participants' scores on harm concerns predicted their purity scores. Correlations of this in the literature are generally much lower (r=.06 for the MFQ; r=.35 for the Moral Foundations Sacredness Scale (MFSS); and r=.29 for the scenarios generated in study 2 of Gray and Keeney) (Graham, 2015; Graham & Haidt, 2012; Gray & Keeney, 2015). Graham (2015) claims that it appears Gray and Keeney go out of their way to select the weirdest impurity examples from MFT research, rather than using a complete validated set such as the MFQ or MFSS. He further notes that, in study 3, the use of adultery in the weirdness manipulation does not effectively separate harm from impurity, it was even acknowledged in the article that adultery crosses multiple foundations. It is also used in an ambiguous situation, which conflates adultery with sexual assault. Finally, he accepts that harm and purity do differ by severity and typicality, but these are merely two of the many ways they vary and are not disconfirming confounds.

Evidence for Pluralism over Monism

Monistic theories claim that purity is merely a distorted version of harm, however the evidence leans to the contrary. Purity/degradation concerns have been demonstrated to predict cultural and social issue attitudes (e.g. same-sex marriage, abortion, euthanasia) above and beyond harm concerns, other foundations, and demographic variables (Koleva, Graham, Haidt, Iyer, & Ditto, 2012). Purity concerns also predict, at a unique level, opinions on the environment, and stem cell research (Rottman, Kelemen, & Young, 2015; Clifford & Jerit, 2013). One of the more notable examples of a need for a pluralistic view of morality comes

from a pair of studies by Rottman, Keleman, and Young (2014a; 2014b), in which judgement of suicide was predicted far more effectively by moral concerns around purity over harm. Purity appears in the literature to be the hallmark separator of pluralism from monism. Most of the argument for a pluralist view of morality stems from the vast amount of work done on the purity foundation. Exposure to similarities in purity concerns has even been shown to decrease social distancing (Deghani et al., 2016). The evidence for authority and ingroup concerns over harm, however, are not as obvious. Despite this, one strong example comes from Crone and Laham (2015), who observed a positive relationship between ingroup concerns and judgements of sacrifice, while also noting negative relationships between harm/purity and sacrifice judgements. This does tend to indicate a difference in the function of ingroup motivations versus harm and purity motivations. Graham et al (2018) themselves admit that limited work has been done to differentiate between authority and loyalty and separating all the wider foundations in judgement scenarios. This indicates some leeway in possibly changing the factor structure of MFT. The authors do, however, encourage this notion, supporting the *method-theory co-development* strategy (Graham et al., 2013). This means they are open to new measures and methods for testing current foundations and establishing new foundations. It is important to remember that MFT is a descriptive theory of morality, not a normative theory which claims how morality ought to be defined, so changing the structure is compatible. What is apparent from the literature on MFT is that while there is strong support for the five-foundation factor structure, there is space for refining the model.

Foundation differences can also have practical implications. For example, framing politically driven issues like the environment or health care in terms of purity concerns has been shown to reduce the partisan divide, with conservatives even endorsing liberal viewpoints (Feinberg & Willer, 2013; Feinberg & Willer, 2015). On a similar note, Haidt (2012) notes that republican politicians (who generally identify as being more conservative

than democrats) are far more adept than their democratic opponents at utilising moral arguments to sway votes. They are able to access not only the binding foundations but extend to harm and fairness, arguing against abortion in terms of killing innocent babies, or fairness with respect to paying less taxes, *getting your fair share.* Differences in reception of foundational concerns are also present in micro-facial expressions. Cannon, Schnall, & White (2011) observed distinct facial movements, representing affective responses, in participants listening to audio recordings of moral situations, an example being furrowing of the brows in anger in response to concerns for fairness versus wrinkling of the nose and upper lip in response to purity violations. There is certainly more evidence required for the other foundations, but the differences between harm and purity, and the individualising and binding foundations in general, indicates strong support for a pluralist conception of morality (Graham et al., 2018). One of the underlying ideals of pluralistic theories like MFT seems to be that parsimony is not worth falling short of complete understanding. This basically means that the simplest method is not always the best. The empirical advances in social and moral psychology begin to speak for themselves as to the value of MFT. Graham et al. (2013) see new data observed using validated MFT measurement tools as the path forward. The theory informs new measurements, followed by data informing the progression of the theory. The current study aims to add new evidence to this debate, providing large scale data for distinct groups (political liberals and conservatives) using the moral foundations questionnaire (MFQ). While MFT was not created for the purpose of assessing the differences between political conservatives and liberals, the foundational structure mapped on so effectively that this is where most of the empirical support for the theory has come from.

Chapter 3: Liberals and Conservatives

The Partisan Divide

The political divide between those identifying as more liberal and those as more conservative has become a prevalent part of wider public discourse, not only in the political arena, evidenced by many research teams (see Andris et al., 2015; Abramowitz & Webster, 2018; Iyengar & Krupenkin, 2018). Often, decisions or proposals from a government are met with furious debate and visceral disdain for the opposing side from all parties. This is likely most pronounced in Western democratic societies, particularly the U.S., which value individualist ideas of culture (Heinrich & Norenzayan, 2010). While liberalism and conservatism are obviously not the only political positions for individuals to take (e.g. moderate, libertarian), they are a useful dichotomy for classifying large portions of the population. The current study uses this framework as it builds upon the work of Haidt (2007; 2012) and Graham, Haidt, and Nosek (2009). Liberalism and conservatism, as concepts, have been a source of interest for psychological and philosophical literature for at least the last century. Classically speaking, individual liberty is the historical stalwart of liberal ideology, while conservatism stands as a positional ideology, protecting authority and institutions (Muller, 1997). While liberalism has generally taken a more optimistic view of the future of humanity, conservatism has been more pessimistic, concerned about the selfish and imperfectible qualities of humans (Graham et al. 2009). There are also notable personality differences: liberals are more open to new experience (McCrae, 1996), while conservatives favour familiarity and stability (Jost, Nosek, & Gosling, 2008).

Identity Politics

In the modern world of social media and fervent ideological debate, it is entirely possible that the link between morality and political beliefs could be changing. One of the most interesting recent occurrences in the field of morality and political belief is the rise of identity politics, particularly on the *left* or liberal side of the political spectrum. This is most apparent in the U.S, which conveniently aligns with the dataset used in the current research. Francis Fukuyama (2018) sums up the forces on either side as a threat to the national identity of the U.S, specifically with those on the far right associated with white nationalism creating a narrative of national identity based on race and religion, while simultaneously those on the far left arguing that racism, victimisation, and discrimination are inherent to the structure of the U.S culture. Identity politics is a heated subject, so it is important to define what is meant by the term. The framework revolves around individuals being defined by their group identity, usually in terms of race, ethnicity, gender, or sexual preference (Furse-Roberts, 2018). Many of the proponents seek to define politics, history, and sociological effects based on the conflicts between group identities throughout history. Individuals are distinguished, not by their similarities, a humanistic perspective, but more by their differences (Furse-Roberts, 2018). Ironically, this could be seen as the antithesis of equality, which identity politics advocates claim to want. The movement most likely originated through the Frankfurt School Critical Theory, extending the oppressor-oppressed narrative of economic classes espoused by Karl Marx to include race, gender and social classes (Fukuyama, 2018). Furse-Roberts (2018) sees the tribalism of identity politics as representing a group for many who do not have a clear marginalised identity of their own. This would be most obvious in the protest movements seen on University campuses in the U.S by white upper-middle class students (Haidt & Lukianoff, 2018). Despite its desire to support marginalised groups, identity politics can increase division and puts human dignity behind group identity. The increased

importance placed on human dignity, personal freedom, and a common humanity were a hallmark of enlightenment philosophers, and to an extent, Judaeo-Christian teachings (Furse-Roberts, 2018). It is possible that the visceral reaction to supposed discrimination seen on social media and particularly within the younger generation has given rise to a new side to the Purity foundation of Moral Foundations Theory. This would need to be studied directly of course, but many of the reactions e.g. large scale public condemnation of perceived individual discrimination using social media such as Twitter.com (Stewart et al., 2019), are reminiscent of the emotional reactions to homosexuality and spiritual impurity observed in self-described conservatives (Inbar, Pizzaro, Knobe, & Bloom, 2009). Social media itself has become a hotbed for political conflict and populist movements, which likely are shaping the wider landscape of politics and democracy.

Social Media and Politics

Social media has, in recent years, been used as a vessel for dissemination of targeted political views, most notably from Russian syndicates attempting to sow doubt in American democracy, often resulting in a high prevalence of misleading information within a news cycle, seeking to influence rather than inform (Crilley & Gillespie, 2019). Facebook's business model in particular allows for manipulation of user data to shape the views they are seeing, potentially shifting individual beliefs (Srnicek, 2016). 98 percent of Facebook revenue in 2018 came from targeted advertising alone (Crilley & Gillespie, 2018). The difficulty in distinguishing between advertising and real news is particularly concerning. Traditional journalism outlets have also become dependent on social media to spread their stories, leaving them vulnerable to manipulation. Print only newspapers have become an unsustainable business model and news organisations need to attract online viewers and

advertisers to sustain income. The speed required to release news over social media prevents proper editorial oversight and leads to a first-is-best mentality over facts-first (Hoskins & O'loughlin, 2015). Illegitimate news sources also undermine democratic politics in general, intentionally sowing doubt in democracy, and potentially distorting individuals understanding of their own political beliefs (Hoskins & O'loughlin, 2015). The result of this could be a misinterpretation of participant views on questionnaires attempting to measure political attitudes, and therefore warping predictive results on moral foundation scores on the MFQ. MFT and the MFH have presented a new way to frame the partisan divide and could be a very useful way to bring more reason and understanding to the debates around morality and politics.

The Moral Foundations Hypothesis

Many previous moral psychology researchers have painted conservative motivations as immoral. Their opposition to social welfare programmes, same-sex rights, and many other issues have been seen as irrationally opposing the moral concerns of harm, justice, and individual rights. MFT however, demonstrates that this is an unfair and incomplete representation of conservative views and morality. Through the framework of MFT, the moral divide between liberals and conservatives is known as the *Moral Foundations Hypothesis (MFH),* which states: when considering moral decisions, liberals emphasise most prominently the foundations of harm/care and fairness/reciprocity, while conservatives value all five equally, but emphasise the foundations of ingroup/loyalty, authority/respect, and purity/sanctity more than liberals (Graham, Haidt, & Nosek, 2009). The most important demarcation between liberal and conservative morality is that liberals emphasise

individualising foundations, while conservatives place equal concern in the collectivist binding and individualising foundations (Haidt & Graham, 2007). Unfortunately, based on the narrow version of individual-focused morality, social justice research became a search for what was *wrong* with conservatives, determining what social conventions and prejudices they were employing, rather than merely trying to understand and validate their thinking (Haidt & Graham, 2007). The divide is plain to see in Academia currently.

Bias in Academia

Liberal leaning researchers dominate journal article publications. Haidt and Graham (2007) observed over a three-year period that a far higher percentage of articles in the journal of social justice research (SJR) addressed fairness/reciprocity and harm/care (78%; 65%) than the binding foundations (<50% ingroup/loyalty; 33% authority/respect; 1 single article for purity/sanctity). The authors also note that the individualising foundations were far more actively endorsed. This is one explicit example, but the trend is pervasive throughout the psychological literature (Haidt, 2012). Perhaps the strongest piece of empirical evidence for the MFH comes from a set of studies from Graham, Haidt, and Nosek (2009) which will be detailed in the next section.

Graham, Haidt, and Nosek (2009)

Graham, Haidt, and Nosek (2009) conducted four separate studies to assess the MFH. Studies 1-3 included large samples with diverse demographics. Multiple methods were also included: rating the moral relevance of situations; giving moral judgements; committing moral trade-offs in the form of hypothetically completing acts for amounts of money; and

finally, real-world linguistic analysis of liberal and conservative church sermons (Graham et al., 2009). All four studies indicated the same pattern, liberals valued the individualising foundations of harm and fairness more than the binding foundations, and conservatives valued all five, while emphasising the binding foundations of ingroup, authority and purity more than liberals. Across all studies, latent variable models revealed that political identity was the best predictor of moral measure scores, beyond other demographic variables. Study four, which analysed speeches in different types of churches, is particularly crucial, as it is a real-world example, improving the external validity of the MFH. In study 2 specifically, 2,212 participants (62% female) were first asked to identify their political position on a 7-point scale anchored by strongly liberal and strongly conservative, with moderate at the midpoint. They were then given two measures to complete, the first assessing moral relevance responses, and the second moral judgement responses. These two measures were later shortened and now make up the Moral Foundations Questionnaire (MFQ), discussed in Chapter 4. Latent variable modelling demonstrated that political identity predicted both relevance scores, (parameters estimated = 114), $\chi^2(320) = 3{,}712.26$, $\varepsilon_a = .07$ (Harm ($\beta = -.27$), Fairness ($\beta = -.36$), Ingroup ($\beta = .11$), Authority ($\beta = .39$), and Purity ($\beta = .38$), all *ps* < .001), and judgement scores, (parameters estimated = 105), $\chi^2(245) = 2414.62$, $\varepsilon_a = .06$ (Harm ($\beta = -.32$), Fairness ($\beta = -.43$), Ingroup ($\beta = .67$), Authority ($\beta = .62$), and Purity ($\beta = .57$), all *ps* <.001), in the predicted direction. Negative indicates higher for liberals, positive higher for conservatives.

Further Empirical Support for the MFH

There is a strong ingroup affiliation to political orientation. Graham, Nosek, and Haidt (2012) sought to assess whether liberals and conservatives would stereotype each other's

moral concerns on the MFQ. Participants completed the questionnaire as themselves, a "typical" liberal, and a "typical" conservative. They were mostly accurate in their assessment of the divide between liberals and conservatives, scoring liberals higher on the individualising foundations, and conservatives higher on the binding foundations. Although, respondents underestimated how morally relevant harm was to conservatives. Partisan misperception was present in the form of liberals and conservatives both overestimating the differences in general. Both groups also overestimated scores of their own group, scoring them higher than the actual averages on the corresponding partisan foundations. Interestingly, liberals were the least accurate. In particular, in underestimating conservatives concern for harm and fairness, and overestimating liberals concern for the same two foundations. Conservatives, alternatively, were the most accurate at predicting the two individualising foundations. These results are indicative of a partisan motivation to the see the *other side* as opposing your values rather than being motivated by their own valid set of beliefs (Graham, Nosek, & Haidt, 2012). The MFH and MFT have been utilised by researchers who do not completely subscribe to the theoretical structure behind them but have still provided evidence to support the model.

Rempala, Okdie, and Garvey (2016) assessed the levels of moral motivations participants used to justify their political affiliations. In study 1, they observed, by coding open ended responses, significant thematic differences in justifications between liberals and conservatives that conformed to the MFH. In study 2, using the MFQ, further differences in moral foundation influence were observed, wider even than the participants stereotyped responses answering as a *typical* liberal or conservative would. These studies demonstrated that individuals were aware of their moral motivations, but to a lesser degree than was actually influencing them. Contrary to MFT, however, the authors put the differences between liberals and conservatives down to *threat sensitivity* and *resistance to change*, with

conservatives tending to be higher on both components. This is a common thread among researchers who claim conservatism is merely a response to hyperactivation of certain cognitive systems. Interestingly in this study, the two groups scored equally on the liberty/oppression foundation. Participants also seldom mentioned sanctity/degradation in their open-ended responses, despite it having a strong influence on their MFQ results (Rempala, Okdie, & Garvey, 2016). The different conceptual explanation from this research indicates a further need to assess the moral differences between liberals and conservatives, which the current study seeks to do.

Problems with the MFH

Davis et al. (2016) note that most evidence for the MFH uses predominantly white participants. They sought to assess whether the effect would hold up in a majority black sample, who are generally more religious and liberal than white people in the U.S. In two studies, they demonstrated that the MFH does not replicate well in this population. In the authority and purity foundations, which met assumptions of weak invariance, there was a much stronger relationship with conservatism for white people, than for black people. These results indicate that there may be a need for future consideration of ethnicity as a variable to reveal a more nuanced picture of the relationship between politics and morality. The authors also noted violations of scalar invariance across subscales of the MFQ, presenting problems for its between-groups, cross-cultural use. Davies, Sibley, and Liu (2014) ran confirmatory factor and correlational analyses testing the MFH in a large New Zealand sample (N = 3,994). They found strong positive relationships between the purity/sanctity, authority/ingroup foundations and conservatism, moderate positive relationship between ingroup/loyalty and conservatism, however, only weak negative relationships between harm/care,

fairness/reciprocity and conservatism. This evidence challenges findings from Graham et al. (2009; 2011) and could mean there is less of a relationship between the harm/care, fairness/reciprocity foundations, and political ideology. If the results had conformed to the MFH, then political conservatism should have also had at least a moderate relationship with the individualising foundations, as well as the binding foundations. It is also important to assess measurement tools themselves critically, which the following chapter will do for the MFQ.

Chapter 4: The Moral Foundations Questionnaire (MFQ)

The moral foundations questionnaire (MFQ) is the tool used in the current research to assess participants' scores on the five moral foundations of MFT. It is a 30-item self-report measure made up of two 15-item parts: moral relevance items and moral judgement items (Graham, Nosek, Haidt, Iyer, Koleva & Ditto, 2011). Graham et al. (2011) created the MFQ in an attempt to consolidate and move on from existing measures of morality e.g. the Moral Identity Scale (Aquino & Reed, 2002) or the Defining Issues Test-2 (Rest, Navarez, Thoma, & Bebeau, 1999), among others, and be inclusive of a more diverse conception of morality. The moral relevance and moral judgement measures used in study one and two of Graham et al. (2009) were the first versions of the MFQ, later combining to become the complete measure. Using both moral relevance and moral judgement items is critical to not only access explicit values held by individuals, but also potentially access further foundational concerns that they are not as acutely aware of (Graham et al., 2009). These first two were tested on large sample sizes, with diverse populations (total N=3,825), through projectimplicit.org. After running confirmatory factor analyses using the extensive theoretical background of MFT, a third version of the MFQ was created, correcting for weak factor loading and redundant correlations between items (Graham et al., 2011). This version was then tested on even larger samples through yourmorals.org (total N>28,000). Finally, to establish the final fourth 30-item version of the MFQ, an item selection analysis was performed to assess any loss or gains in correlations of internal and external validity criteria scales when subscales used one, two, three, or four items each. Three items each was ultimately determined the most accurate. The final version was again validated using yourmorals.org (N=34,476, 37% female, mean age= 36.2 years). Each item is answered on a six-point Likert-style response scale (0=*not at all relevant*, through to 5=*extremely relevant* for the moral relevance section;

0=*strongly disagree*, through to 5=*strongly agree* for the moral judgement section). Examples of items include: *Whether or not someone was cruel* for a harm relevance item; *Chastity is an important and valuable virtue* for a purity judgment item (Graham, Haidt, & Nosek, 2008).

Reliability

The subscale alphas are not ideal (ranging from α=.40-.84), however Graham et al. (2011) claim this is a reasonable range considering how wide the conceptual understanding of moral concerns is across a small number of items. By this, the authors mean that the five foundations cover a wide array of human moral concerns so it isn't surprising that the subscales' Cronbach's alphas aren't in the very high range, as more tightly defined variables would be. The MFQ is designed to segment the sample into subgroups with different patterns of responses, potentially contributing to these lower appearing alphas. Test-retest reliability has also been established using a much smaller sample than previous studies of 123 college students (mean age= 20.1 years, 69% female). Participants took the MFQ twice, with an average of over one month between administrations (Graham et al., 2011). Pearson correlations for each foundation were: Harm, r=.71; Fairness, r=.68; Ingroup, r=.69; Authority, r=.71; and Purity, r=.82 (all ps <.001). While these aren't particularly strong reliabilities, they are similar to the internal consistency rates.

Factorial Validity

Structural equation modelling was also used to compare different levels of factor structure. This confirmatory factor analysis revealed the best fit for the five-factor model, representing the five foundations of MFT and proving better than two-factor (individualising vs binding) and three-factor (Shweder's ethics of autonomy, community and divinity) models

(Graham et al., 2011). sample also add to the factorial validity of the measure (see chapter 2 for details).

Convergent, Criterion and Discriminant Validity

Each foundation was validated using existing scales as relational criteria with each foundation compared to three distinct scales (Graham et al., 2009). The authors demonstrated convergent and discriminant validity with correlations between external criterion scales and foundation scores: for each conceptually-related scale group, the corresponding foundation was the strongest predictor of scores (average r=.51) over the other four. They continued with support for predictive validity: scores on foundations were shown to be the best predictor of attitudes towards conceptually related social groups, above and beyond political attitudes. Finally, the theorists note that the MFQ also demonstrates incremental predictive validity in comparison to the Schwartz Value Scale (SVS) in predicting attitudes towards social groups and political issues. This is important as the SVS is a larger (58-item) measure covering more areas (10 value types), and is also well validated (Paez & De-Juanas, 2014).

External Validity

The large heterogeneous samples used in the creation and validation of the MFQ are a great step towards generalisability, far better than merely testing on university students as in the case of many psychology studies. University students represent a small, unique population, which have been demonstrated to be a poor representation of the wider population (Henrich, Heine, Norenzayan, 2010). These are still however predominantly white samples (87%). Fortunately, Graham et al. (2011) have broken their samples down by world

region-of-origin and performed model fit analyses which demonstrated reasonably good fit across 11 separate areas, including the U.S, U.K, South East Asia, East Asia, and Australia. (all CFI >.7, ε <.06). The previously mentioned study from Davies et al. (2014) also lends credence to the generalisability of the MFQ. New Zealand is a culturally and politically diverse nation; so, the replication of the five-factors in this sample is very positive evidence for its cross-cultural applicability. An insightful study comes from Yilmaz, Harm, Bahcekapili and Cesur (2016) in which MFT was tested, using the MFQ, in Turkey, a Muslim majority country. In line with the literature, the five-factor structure was shown to have the best fit through a confirmatory factor analysis. This is particularly useful for supporting the MFQ's cross-cultural use as Turkey varies considerably in religious and political beliefs, not fitting parsimoniously as an individualist or collectivist society (Yilmaz et al., 2016). Again, the difference in model fit between the five-factor and hierarchical (individualising and binding) models was very slim, indicating both have research utility.

Additional use of the MFQ

We have already covered political and cross-cultural differences revealed using the MFQ, but another is gender. This is relevant to address, as gender is one of the predicting demographic variables used in the current study as a comparison to political beliefs. Women have tended to score higher than men on Harm, Fairness, and Purity in the sample from yourmorals.org (n=49,428 women, 68,812 men). This holds after controlling for political affiliation and is wider than the gap between individualist and collectivist (Graham et al., 2011). These results conform to studies in the literature on gender differences in disgust sensitivity (Druschel & Sherman, 1999), egalitarianism (Arts & Gelissen, 2001), and empathy (Davis, 1983), however, more research is clearly needed in this area to explain the

variation. A second study was run by Yilmaz et al. (2016) which demonstrated that priming participants to view situations through an individualist or collectivist context resulted in a shift in concerns. The individualist manipulation led to more harm concern, while the collectivist led to more ingroup concern. This indicates potential for manipulation of moral arguments by successfully priming opponents to view the situations based on your desired framework.

Chapter 5: myPersonality.org and the use of Social Media in Research

Data collected through large-scale social media studies include a far more diverse population than a single lab study using individuals from one area. The data has also been shown to be as reliable as traditional pen and paper in-person tests (Stillwell & Kosinski, 2012). Anonymity is also easier to achieve because the participants have no need contact the researchers and identifying information might not be collected or can be removed automatically before the dataset is stored. The myPersonality project was released in June 2007, and it provided volunteer Facebook users with a variety of personality and ability surveys that they could take and immediately review results. Users were not paid to complete measures and this potentially reduced the number of unreliable results as there is more intrinsic motivation to complete measures correctly to receive accurate feedback. The data from said measures had been freely available to researchers until early 2018. In terms of demographics, as of Stillwell and Kosinski (2012), 63% of respondents were female, as opposed to 71% on average in studies in the Journal of Personality and Social Psychology (JPSP). This more even gender split is also advantageous as it presents a fairer representation of the population. Despite this, average age was 23.5 years (47% between 18-24), compared to 23 years in the JPSP, so effectively the same. An additional benefit of this method of data collection is the ability to reach detached populations due to low cost and the widespread availability of Facebook (42% of respondents from outside the U.S) (Stillwell & Kosinski, 2012). There are of course concerns with the social media methodology.

Rife, Cate, Kosinski, and Stillwell (2016) questioned whether Facebook data represents a biased sample of personalities, not reflective of wider society and therefore lacking generalisability. In order to test this, they took a sample of myPersonality respondents and compared results on multiple sizes of the international personality item pool (IPIP-NEO)

(Goldberg, 1999). At the time of writing, Rife et al. (2016) note that over six million users have completed at least one of the measures on the Facebook myPersonality application. First, in study one, with results from respondents to a stand-alone website, and then, in study two, to two samples of U.S undergraduate students. Tests of reliability exhibited high scores across the personality measures (α>.90). Immediately however, there are issues with this methodology, in that undergraduate students are themselves a questionable population when considering external validity. They have been demonstrated to represent a unique portion of society, rather than a wider snapshot (Henrich, Heine, & Norenzayan, 2010). It is possible then that these two comparisons are just comparing internet users with internet users and undergraduate students. Results indicated that while statistically significant differences did exist between the Facebook data and comparative data sets, the effect sizes were so small so as to not equate to practical significance (Rife et al., 2016). The only notable difference between the groups in study one was for openness to experience (η^2=.04). In study two, again openness was the only characteristic greater than a trivial effect size (η^2=.11). It is clear that these statistically significant but very small effects were found due to the large sample sizes and therefore very high statistical power. The notable impact of openness was put down, by the researchers, to the novel experience of being on Facebook appealing to those higher in the trait. Rife et al. (2016) concluded that Facebook represented a promising setting for data gathering, at least as effective as undergraduate samples, with potentially far greater diversity. They did not discover any systematic bias with significant practical value. The use of Facebook data by researchers in the social sciences in general is rising, there had been 475 published studies using this method of data gathering as of April 2012 (Wilson, Gosling, & Graham, 2012).

Notable research using Facebook data have studied topics including attitude similarity and strategic interactions among social networks, political mobilisation, differences and

variations in mood between nations (Goel, Mason, & Watts, 2010; Kramer, 2010; Kohli, Bachrach, Stillwell, Kearns, Herbrich, & Grapel, 2012; Bond, Fariss, Jones, Kramer, Marlow, Settle, & Fowler, 2012). This trend is likely to continue as more people use Facebook and interact in more behaviourally complex ways online. According to Carpenter (2012), trait narcissism is related to how people present themselves on Facebook. This may act as a moderator in studies which have found accurate reflections of real-world personality on Facebook. Other research has demonstrated that Facebook profiles do reflect accurate representations of individual personality, rather than idealised caricatures (Back, Stopfer, Vazire, Gaddis, Schmukle, Egloff, & Gosling, 2010). This would need to be replicated as social media has increased exponentially in recent years so there is a possibility that people have also changed how they portray themselves online.

The myPersonality data should include respondents from both individualist and collectivist cultures so it will ideally be balanced across the moral foundations. Participants will also vary across what are termed *tight* and *loose* countries, those that conform tightly to social norms, and those that are more lenient, respectively (Gelfand, Mishi, & Raver, 2006). In a different vein to the MFT research, but still utilising Facebook, Feldman, Charo, Farh, and Bardi (2015) used a sample of the myPersonality Facebook data (N = 1024) to assess the relationship between personal values and their level of unethicality, both accessed through the linguistic patterns of participant statuses. Feldman et al. (2015) emphasise the point that this Facebook data is a representation of a *naturalistic* setting. One must question however just how naturalistic an online environment can be considered. While it is certainly an integral part of modern society, it is still a theoretical debate as to just how natural these interactions can be considered. This is perhaps out of the reach of the current research, however it is worth noting, and a position for future exploration.

A Note on Cambridge Analytica

The recent scandal surrounding the data collection company Cambridge Analytica and its unethical use of mined personal data has thrust social media research into public awareness (Isaak & Hanna, 2018). The most potent concerns voiced around the world are that of privacy and protecting one's data. Fortunately, the data the current study uses from myPersonality.org is not metadata taken without expressed permission, it is data that was collected from volunteer participants who had provided informed consent to allow their data to be used for research. The current study only uses responses from the MFQ and demographic data. The data is deidentified and therefore respondents were anonymous.

Chapter 6: The Current Study

Reproducibility Crisis

Recent years have seen growing concern about the reproducibility of findings in psychology. High profile cases of fraud, p-hacking, and inability to replicate previous effects have severely dented the reputation of psychological science, particularly within the social psychology field. Perhaps the ignition for the concerns of replication is most effectively observed in an Open Science Collaboration (2015), led by Brian Nosek and colleagues, which attempted to reproduce the effects of 100 separate studies from three psychological journals. Replications were performed as close as possible to the conditions of the original study, including both experimental and correlational designs. To evaluate the reproducibility, significance and *p* values, effect sizes, subjective assessments of replication teams, and meta-analyses of effect sizes were reported (Open Science Collaboration, 2015). The authors noted that the mean effect size of replications (M_r = 0.197, SD = 0.257) was less than half that of the original studies (M_r = 0.403, SD = 0.188). Considerably worse was the statistical significance, with only 36% of the replications achieving a p-value below the alpha level threshold of .05, compared to 97% of the original studies. Crucially, correlational assessments revealed that success of the replication was predicted more effectively by the original results, over properties of the replication and original teams (Open Science Collaboration, 2015). This means that the levels of expertise or experience within teams, which can be a factor in replication success, were not the determining factors in these studies.

The lack of replication in the literature has long been a concern and can be attributed to some degree to publication bias. There is more incentive for researchers to publish new and exciting effects, rather than replicate previous findings. These incentives include

enhanced ability to receive grants, greater change of employment and promotion, and to get research published because editors are more likely to accept these manuscripts (Open Science Collaboration, 2015). It is the field itself and the public however that lose in this scenario. Too often study results are treated as fact, for instance in popular psychology books, or in journalistic articles which present the effect of one study as a universal property of humans (cf. Rad, Matingano, &Ginges, 2018). Conversely, it is rare for those in the media to return to a story to mention if these effects are later shown to be unsubstantiated as it does not make for interesting reading outside academia. Science progresses through consistent empirical evidence. No effect in psychology should be considered outright fact, only that it has supporting or disconfirming evidence. Fortunately, this crisis has presented the field with an opportunity to move forward, practising sound, efficient, and reproducible scientific methodology. The current research, which performs a replication, employed various techniques to maintain transparency and avoid misusing data. These include pre-registration of methods and hypotheses and not looking at data until after pre-registration. With pre-registration, we can concretely present our hypotheses, which prevents later p-hacking, re-analysing data until a significant effect or model is found (fit-hacking), which the hypothesis can be adjusted to match. The MFH has considerable supporting evidence, but there are also studies which demonstrate weakness. The current study might lend support to either side, improving our certainty of the validity of the MFH or creating a new pathway of conflicting research that needs to be followed.

Structural Equation Modelling

Structural equation modelling (SEM) is not a single statistical technique, it encompasses a group of procedures and has multiple applications (e.g. confirmatory factor

analysis or the latent variable model used in the current study) (Kline, 2015). Perhaps the most significant departure of SEM from simpler statistical methods is its reliance on the researcher having a theoretical base for the model. A latent variable model, such as the one used in the current study, is meaningless if the items indicating the latent variables are only correlated by chance (Morgan, Bollen and & Pearl, 2013). Kline (2015) notes that SEM distinguishes between observed and latent variables. Being able to analyse observed and latent variables, and to model and account for the effects of measurement error, distinguishes SEM from multiple regression and analysis of variance (ANOVA) (standard statistical techniques). There are two main goals of SEM analyses: understand the covariance among observed variables and explain as much of the variance as possible using the researcher's model (Kline, 2015). However, while it is the basic datum of SEM, covariance is not the only function, means can also be analysed. Critically, as is the case with the current research, SEM models require very large data samples (generally should have at least a 20:1 ratio of cases: parameters requiring estimates) (Kline, 2015). This gives the analysis enough statistical power. Unfortunately, most published samples using SEM have inadequate sample sizes (Westland, 2010). Perhaps most important to remember when interpreting SEM analysis results is that the most that can be concluded is that the model is consistent with the data. We cannot conclusively infer causation or claim that the model is generally proven. This is another problem in the reporting of SEM statistics, as strong causal claims are too often made with a model that does not justify the claims.

Research Questions/Prediction

This study is a direct replication of study 2 from Graham et al.'s (2009) study *Liberals and conservatives rely on different sets of moral foundations,* using a very similar latent

variable model to the one used by those authors, applied to a large existing dataset of participant responses to the MFQ. The parameters of the model will assess whether political identity i.e. how liberal or conservative each participant is, predicts their scores on each of the five moral foundations of MFT i.e. provides supporting or disconfirming evidence to the MFH. Moral foundations scores will be made from the 30-item MFQ, six items per foundation. In addition to political identity, age and sex will also be used as predicting variables. Our prediction is that political identity will predict foundation scores better than other demographic variables, such that higher levels of liberal political identity will predict higher scores on the individualising foundations (harm/care and fairness/reciprocity), while higher levels of conservative political identity will predict more stable scores across all five foundations, and higher scores than liberals on the binding foundations (ingroup/loyalty, authority/respect, purity/sanctity). Whether this prediction is supported will be based on the results of a full structural equation model. The hypothesis will be supported if the model has good fit i.e. all fit index scores will reach the threshold of acceptable levels of fit (RMSEA $<.07$; CFI ≥ 0.95; TLI $\geq .95$). Additionally, for the prediction to be supported, regression estimates must be in the predicted direction, with positive relationships between liberalness and the foundations of Harm and Fairness and negative relationships between liberalness and the foundations of Ingroup, Authority, and Purity.

Method

Pre-registration

The current research was pre-registered with the Open Science Framework at osf.io (Review the following link https://osf.io/4g5y7/). It was entered through the Social Psychology template (van't Veer & Giner-Sorolla, 2016). Included in the pre-registration was a detailed account of the study's theoretical context, predictions, data collection process, and data analysis plan. As the plan is made public, this process maintains the transparency of the research and leaves the researchers accountable to their original plans. Review appendix a for a document version of the pre-registration.

Participants and Procedure

Participants were drawn from an existing dataset, collected through the myPersonality Facebook application (review Chapter 5 of the literature review for information on the app) (Kosinski, Matz, Gosling, Popov, & Stillwell, 2015). This application recruited over 7 million Facebook users, with each individual having participated in at least one of the psychometric tests offered from 2007-2012 (Rohrer, Egloff, Kosinski, Stillwell, and Schmukle, 2018). A total of 1261 participants (55% female) who identified the U.S as their home country, with a mean age of 25.8 years (SD = 8.4; Range = 15-78) and who completed the MFQ were included in the current analyses. 757 participants identified as politically liberal, 147 as conservative, and 357 as moderate. The sample size is a very small proportion of total users of myPersonality.org due to the very specific parameters of the study (from the U.S, answered the MFQ, additional data exclusion criteria etc.). The sample was restricted to the

U.S to match the sample used by Graham et al. (2009). Additionally, the empirical evidence to support the moral foundations hypothesis mainly comes from this population so it is important to establish whether the trend continues using a sample from a different source (Facebook) (Haidt, 2012; Graham et al., 2018). This sample, after applying the exclusion criteria detailed below, came from a total dataset of N = 14,905. Participants were originally recruited through the myPersonality application on Facebook and were not paid for their time. Participation was based on voluntary interest as each participant was given a summary of their results and a brief interpretation of their questionnaire scores following their completion of each measure. The data was then de-identified and shared in an anonymous format for research use through mypersonality.org.

Data Exclusion

Several criteria were used to exclude unusable data. Review the following link for the studies complete coding procedure https://osf.io/ab3tj/. Code was created for the following exclusions: participant's home country outside the U.S.A; participants with outlying demographic variables (age <=15 & >=99); participants who failed the MFQ catch items; participants who missed 14 or more of the MFQ items. This last cut off was used to only include participants with enough responses to form a valid entry in the dataset. Missing half or more of the items on the measure would indicate that the participant has not taken the questionnaire seriously enough and could bias results (Kung, Kwok, and Brown, 2017). Fortunately, no participants missed this many items so this rule was redundant. Additionally, the MFQ has two built in catch items. In part 1: MATH - "Whether or not someone was good at math." This item is not scored; it is included both to force people to use the bottom end of the scale, and to catch and exclude participants who respond with the last 3 response options

(somewhat relevant, very relevant, extremely relevant) (Haidt, 2009). Participants were excluded in line with this. In part 2: GOOD - “It is better to do good than to do bad.” This is also not scored and included to force use of the top of the scale, and to catch and cut people who respond with the first 3 response options (strongly disagree, moderately disagree, slightly disagree) (Haidt, 2009). Participants were excluded in line with this. Answering the Math or Good items in these ranges was deemed by the authors as demonstrating an irrational response and indicative of a lack of attention or skipping through the measure without fully reading the items. The function of catch items in psychometric measures is to test attentiveness and identify participants who are not answering in good faith i.e. just selecting any response to get to the end (Graham et al., 2009). There is a potential concern that attention checks such as these can influence results by directing respondents to think in a certain manner and therefore change the way they respond to future items in the measure, distorting the validity of the scale. Kung, Kwok and Brown (2017) tested this hypothesis across two studies, using two common attention check techniques: structured-response items and an instructional manipulation check. They found no empirical support that scale validity was impacted by attention checks.

Measures

Before completing the moral foundations questionnaire (MFQ), participants were asked about their political identity. They were asked to indicate where they identify politically on a 7-point Likert-style scale, anchored by strongly conservative (1) and strongly liberal (7), with moderate in the centre (4). Participants were then required to complete two parts to the 30-item validated MFQ (Review Chapter 4 of the literature review for analysis of the MFQ measure; see appendix b for a full version of the scale). In part 1, *moral relevance*

items, they were asked "When you decide whether something is right or wrong, to what extent are the following considerations relevant to your thinking?" They were then required to rate 15 moral relevance items and one catch item on a six-point Likert-style scale (anchored by 0=not at all relevant, and 5=extremely relevant). An item example from part 1 is: "Whether or not someone showed a lack of loyalty", corresponding to the authority foundation of moral foundations theory (MFT). In part 2, *moral judgement items,* they were told to "Please read the following sentences and indicate your agreement or disagreement." Again, they were required to rate all 15 moral judgement items and one catch item on a six-point scale (anchored by 0=strongly disagree, and 5=strongly agree). An item example from part 2 is: "Justice is the most important requirement for a society", corresponding to the fairness foundation of MFT. Reliability estimates were calculated from the new dataset and the following are the Cronbach's alpha for each of the moral foundations of the MFQ: Harm (.51), Fairness (.42), Ingroup (.62), Authority (.60), Purity (.73).

Ethics

After being deemed low risk, the study was peer reviewed by both supervising researchers (Dr. Matt Williams and Dr. Peter Cannon) and another lecturer from the school of psychology at Massey University, not affiliated with the study. A low risk notification (44000020141) was then lodged with Massey University Human Ethics Committee.

Data Processing and Analysis

This study used an existing data set, so limited equipment was required. All analyses were run through R studio, in the R programming language (RStudio Team, 2015; Merkle &

Rosseel, 2018; Rosseel, 2012). The data-set was stored on an external HDD before being used. The data was held by supervising researcher Dr. Peter Cannon and not looked at by the lead researcher until after the study had been pre-registered. Initially, the dataset was cleaned and prepared for analysis by Dr. Cannon. This included removing any I.D's with multiple participations and removing I.D's with single value responses for all items. These exclusions were completed using specific code in R-studio. Once pre-registration was formally confirmed, the data was transferred from Dr. Peter Cannon to Alexander Bidwell for the analysis to begin. It was important not to look at the data before pre-registration in order to maintain transparency for the analysis and to prevent changing analysis strategies to suit the data rather than the study predictions. All models and other statistical methods were created and run through R-studio, specifically using the lavaan package (version 0.6-3) for CFA and SEM (Rosseel, 2012).

There were multiple options for the dataset to be used in this study. Dr. Peter Cannon, supervising researcher, had access to the original dataset in its raw form, and a form with all missing data removed. It was eventually decided to use the raw dataset, so all missing data could be dealt with manually. This meant that the analyses were more transparent, and the researchers knew exactly what was happening with the original missing data. At each step of data processing, a new subset of data was created after applying exclusion coding rules. 1213 missing data points remained after applying these rules. Missing data needs to be carefully dealt with in large-scale analysis. There are various types of missing data, but for this dataset, it is considered Missing at Random (MAR). MAR data can be replaced with actual values using imputation (Little & Rubin, 1987). This is because it is assumed that the data points can be predicted based on the other data. An example from the current study would be using participant responses on five of the six Harm items, to predict the value that was missed on the sixth. This is not a perfect prediction however, it is merely a stronger probabilistic

relationship than it would be if the missing data remained missing (Little & Rubin, 1987). Missing data was imputed using expectation maximisation, a form of single imputation. This form of imputation was most appropriate to use because it maintains inter-variable relationships through first using the other variables available to impute the missing values (expectation), and then performs checks on whether the imputed value is the most likely (maximisation) (Zhang, 2016). Imputation has multiple methods but is separated into the categories of single and multiple. The basic goal is to find the most likely value for each datapoint, rather than using missing data, to improve the accuracy of the analysis (Zhang, 2016). As there is not a large amount of missing data in this dataset, single imputation is the simplest and most efficient way to predict the missing values. Alternatively, for more serious cases of missing data, multiple imputation is required to simulate multiple models which use possible responses and compute a variance/confidence interval to attempt to understand the differences between multiple imputed datasets (Zhang, 2016). The process is much more complex and unnecessary for this analysis.

Model building:

The structural equation model (SEM) was formed from multiple parts, beginning with the measurement and definition of latent variables, wherein each response item on the MFQ was assigned as an indicating variable of the corresponding moral foundation latent variable (e.g. “Whether or not someone suffered emotionally,” represented by the item code Harm1 was a manifest/measured item for the Harm latent variable). This is called the *measurement model* and also serves the function of a confirmatory factor analysis on the factor structure of MFT in the dataset. View the following *Figure 1* path diagram for the confirmatory factor

model, in which the latent variables in the SEM are now factors representing each foundation of MFT:

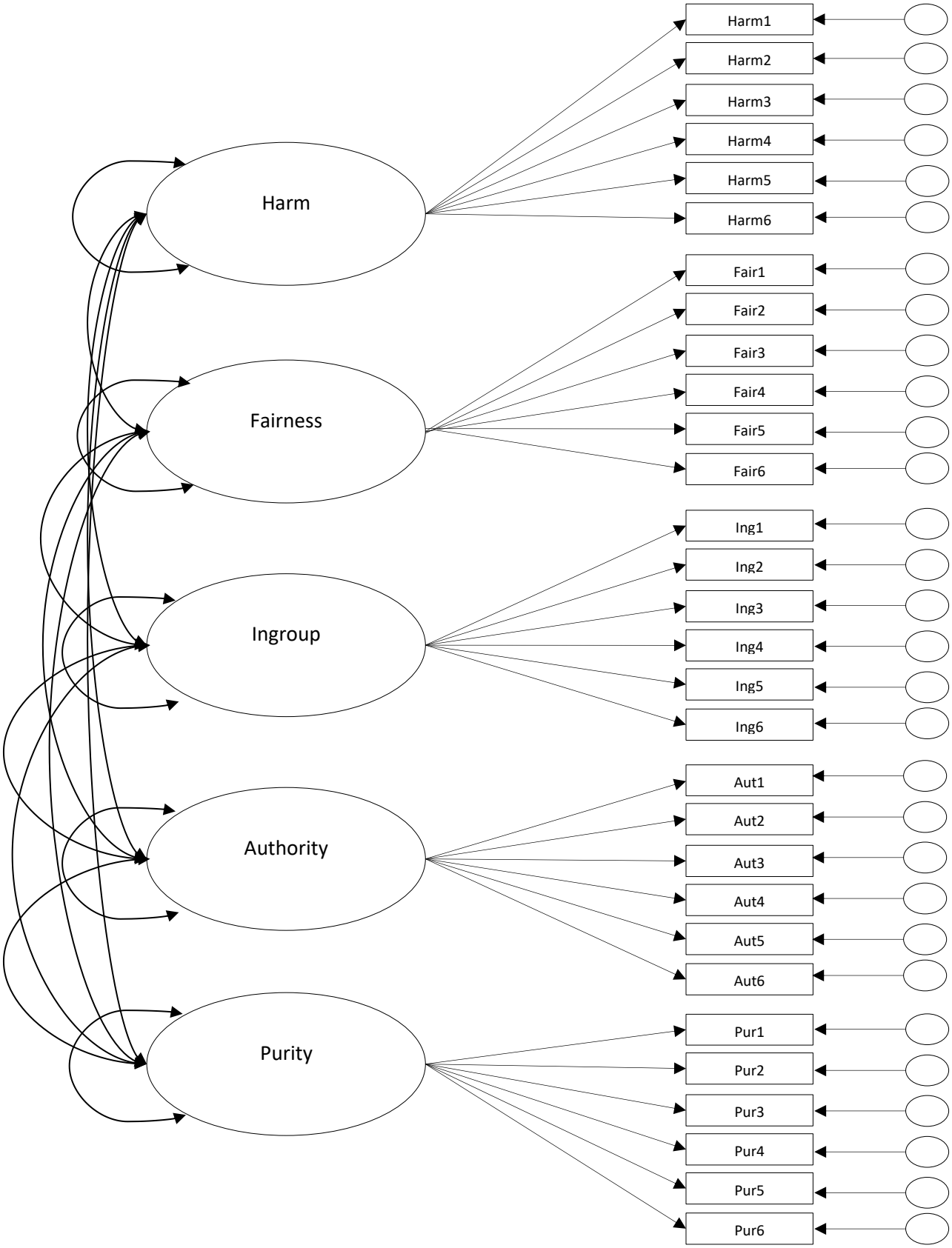


Figure 1. Path Diagram of CFA.

Note: ovals contain each factor/foundation; rectangles contain each MFQ item; circles to the right of the items indicate standard error; two-sided arrows indicate correlations; one sided arrows indicate predicting regression.

Here, each factor was measured by the six corresponding items on the moral foundations questionnaire (Graham et al., 2009). This CFA was then used as the measurement model section of the eventual SEM. Next, the regression section assigns each of the foundation latent variables as regressed on, i.e. predicted by, each of the demographic variables (age, gender) and the main independent variable of political identity. Age and gender were used as control variables to isolate political identity as the prominent predictive variable. While the original model from Graham et al. (2009) used age, gender, household income, and education as demographic variables, the current dataset did not have sufficient data for these. On that note, state, which was included as a variable in the pre-registration, could also not be used due to a lack of data (only home and current country were identified, not specific states). Finally, there was no reason to exclude the presence of covariances between the independent variables. See the following *figure 2* for the path-diagram representation of the final model:

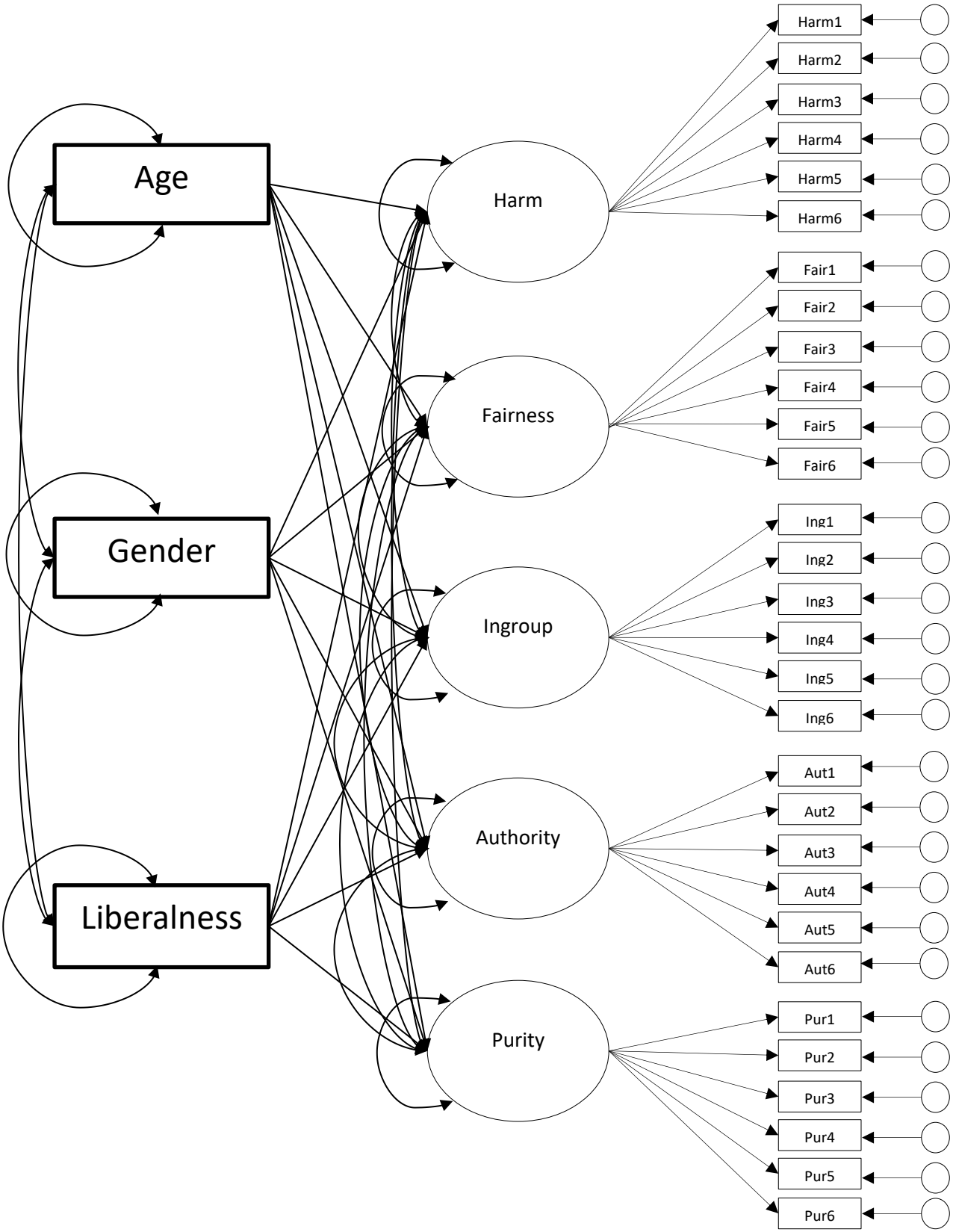
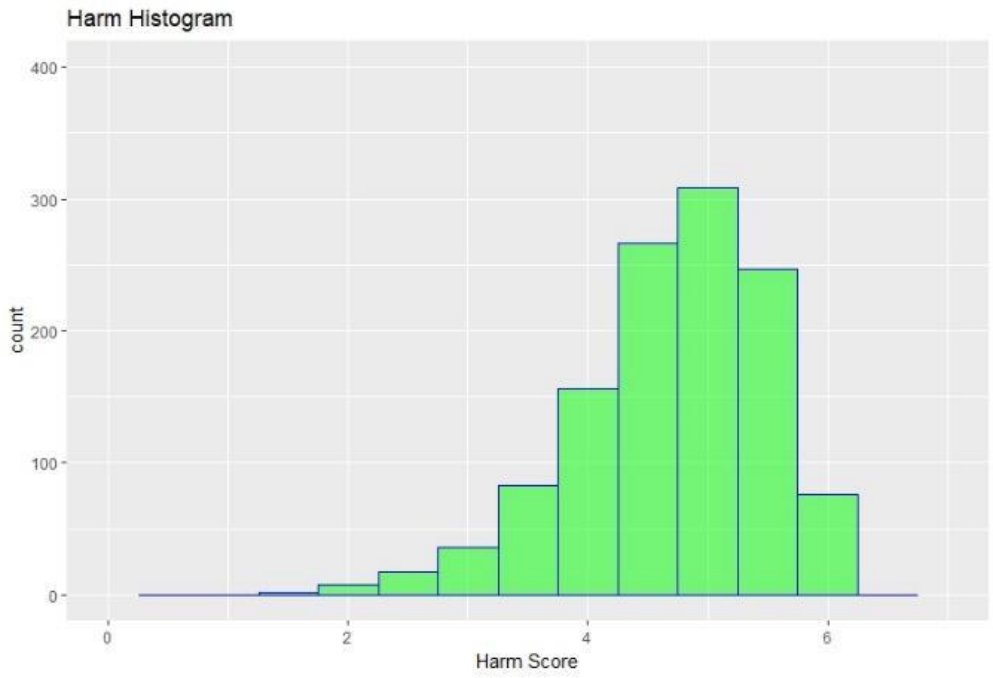


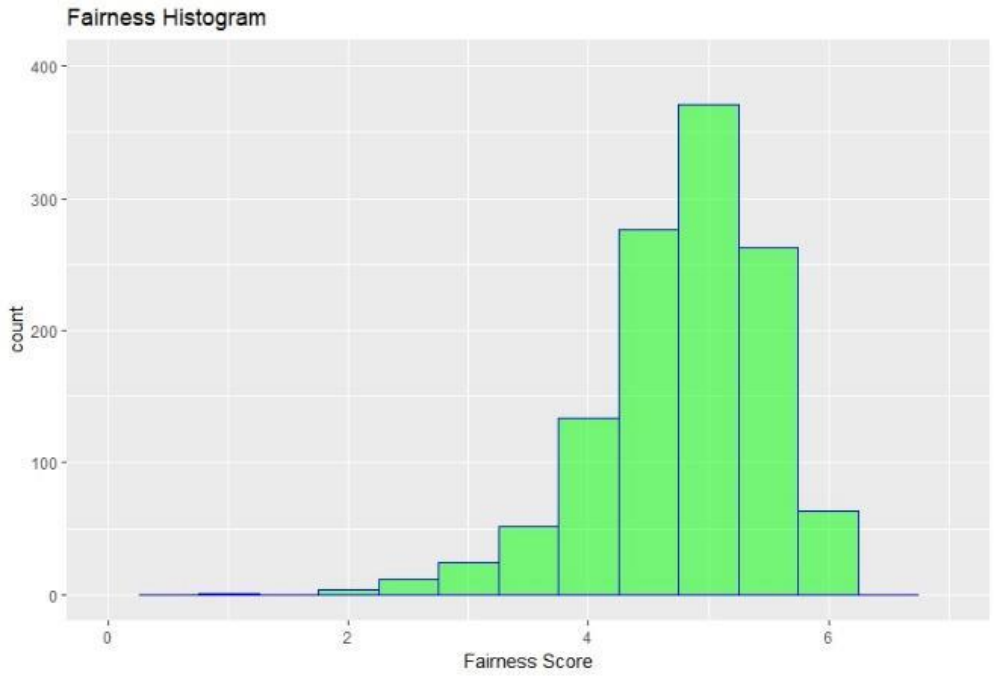
Figure 2. Path diagram of SEM

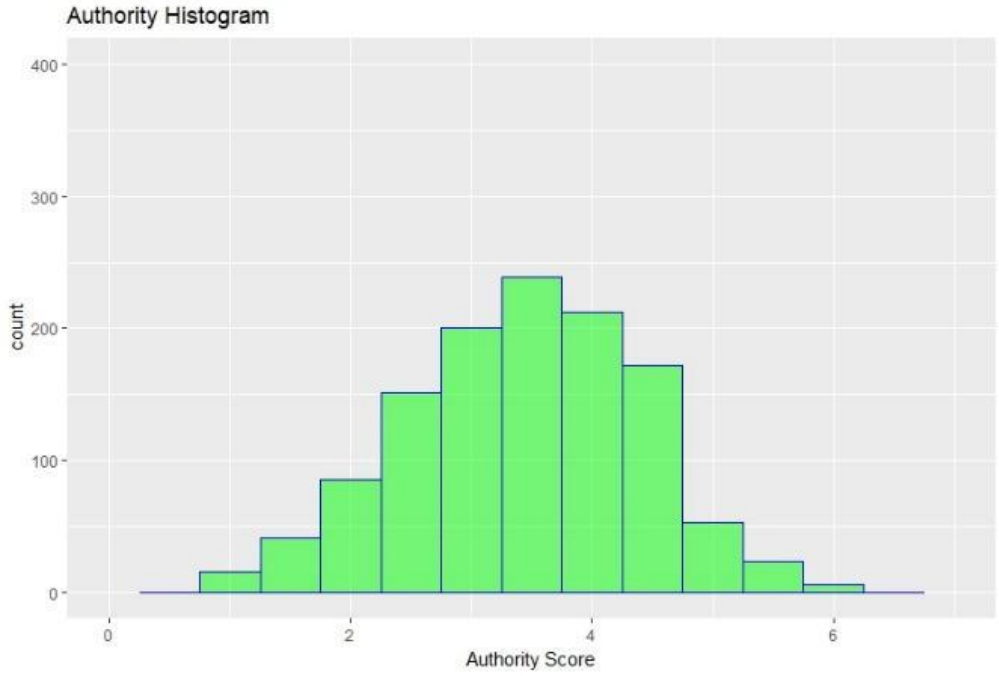
Results

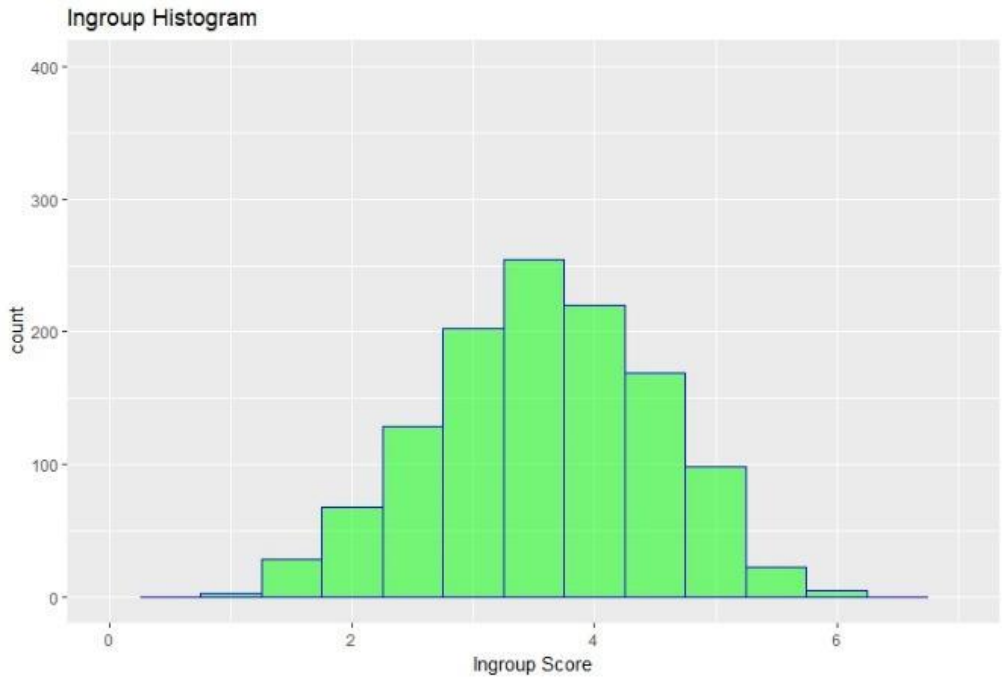
Univariate Descriptive Statistics

Figure 3 displays histogram plots of scoring across each of the five foundation variables. Visual inspection reveals a difference in mean score between foundations. Harm/Care and Fairness/Cheating are both negative skewed, with most participants scoring at the upper end of the scale, as opposed to Authority/Subversion, Loyalty/Betrayal, and Sanctity/Degradation which are approximately symmetrically distributed and show higher density in the middle range of the scale. This distribution of scores would be predicted by Graham et al. (2009) and MFT as, regardless of political identification, all participants should value preventing harm and maintaining fairness, hence scoring in the higher ranges of these two foundations.




Fairness Histogram
count
400
300
200
100
0
0
2
4
6
Fairness Score


Authority Histogram
count
400
300
200
100
0
0
2
4
6
Authority Score



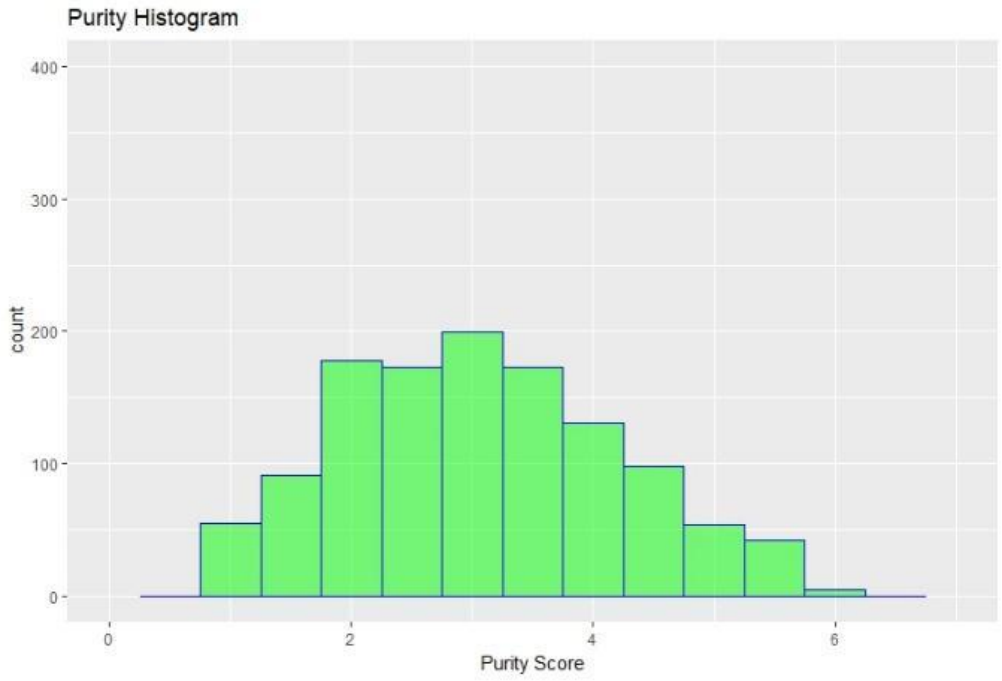


Figure 3. Histogram plots of participants scores on each of the five foundations of Moral Foundations Theory: Harm, Fairness, Ingroup, Authority, and Purity.

Non-preregistered Exploratory Correlational Analysis

The linear relationship between all demographic variables and the moral foundations was checked using zero order correlations in order to assess any relationships between variables in the wider model. These were run as exploratory analyses, not as pre-registered confirmatory analyses. First, composite scores on each foundation were created for each participant (e.g. an individual's mean score for Harm items 1 through 6). Once these were created, the correlation between each demographic variable with each foundation composite score was calculated. See Table 1 for correlation results.

Table 1

Correlations Between Demographic Variables and Moral Foundations

	Foundation				
Demographic Variable	Harm	Fairness	Ingroup	Authority	Purity
Age	.06	.01	.03	.04	.05
Gender	.17	.08	-.01	.04	.08
Liberalness	.08	.12	-.19	-.26	-.31

Note: All p values <0.01

The exploratory correlational analysis revealed tentative support for the predictions of the study, in that liberalness predicted scores on the five foundations of MFT in the expected direction. The strongest support came from the binding foundations, with a weak-moderate negative relationship between liberalness and Ingroup (r = -.19), and moderate negative relationships between liberalness and Authority (r = -.26) and Purity (r = -.31). These indicate that participants whom scored in the conservative range on the liberalness scale, were more likely to also score higher on the binding foundations of Ingroup, Authority, and Purity. The relationships between liberalness and the individualising foundations were not as strong with both weak positive relationships between liberalness and Harm (r= .08) and Fairness (r= .12). These indicate that participants whom scored in the liberal range of the political identity

scale, were more likely to score higher on the individualising foundations of Harm and Fairness. It is important to stress that these predictions are tentative. Interestingly, there was a weak-moderate positive relationship between gender and the Harm (r= .17) foundation, and weak positive relationships between gender and Fairness (r= .08) and Purity (r= .08), indicating that when a participant was female, they tended to endorse these foundations as having more relevance to morality. It is important to note that these correlations are all statistically significant ($\alpha = .01$) because correlation tests are highly sensitive with large sample sizes, such as the one used in the current study.

Confirmatory Factor Analysis

Confirmatory factor analyses were the first planned pre-registered analyses. The estimation method used in both the CFA and SEM was maximum likelihood (ML). ML uses probability distributions to estimate parameters of the model (e.g. predictions, covariances, correlations) that maximise the likelihood of the data observed, given the assumed model (Eliason, 1993). There were three model fit statistics specified in the pre-registration document: Root mean square error of approximation (RMSEA), Comparative fit index (CFI), and the Tucker-Lewis index (TLI), sometimes called the Non-Normed-fit index (NNFI). As mentioned in the Pre-registration, the acceptable fit threshold for each fit index are: RMSEA < 0.070, CFI and TLI ≥ 0.95. The RMSEA is an absolute fit index which determines how well the model, based on the theoretical framework of the study (i.e. a priori, rather than a baseline model), fits the data sample by informing us about the degree of model misfit relative to the degrees of freedom (Hopper, Coughlin, & Mullen, 2008). Specifically, the RMSEA is a good choice of fit statistic due to its ability to select the model with fewer parameters (i.e. choosing the most parsimonious option) (Diamantopoulos & Siguaw, 2000).

This is different to the CFI and TLI which are incremental fit indices. The function of these indices is to compare a baseline model to the calculated chi-square value, hence the other names for the indices: comparative or relative (Hopper et al., 2008). The baseline model in this study would be the default which assumes no true relationships between any of the observed variables. How well the hypothesised model explains the covariance matrix above and beyond the baseline model is proportionally described by these indices (Lai & Green, 2016). Acceptable in this context means a value above/below or equal to the cut-offs, depending on whether scoring above or below the threshold is desirable. The acceptable thresholds mentioned here come from progression in the consensus of the field. The CFI, for example, had an initial acceptable threshold of ≥ 0.9 until a study from Hu and Bentler (1991) indicated that this was too low to prevent acceptance of mis-specified models, advising that ≥ 0.95 was more appropriate. The current CFA model converged successfully but did not have acceptable fit based on all three fit indices: RMSEA (.0701) CFI (0.77) and TLI (0.75). As the model did not reach acceptable levels of fit on any of the fit indices, and had very poor fit on two out of the three, we can conclude that the model does not fit this dataset. Review the below Table 2 for the full output of the CFA parameter estimates.

Table 2

Pre-registered Confirmatory Factor Analysis Parameter Estimates

Item & Latent Variable	Estimate	Standard Error	*Z-score*	*p-value*	95 % CI Lower	95% CI Upper
Factor Loadings						
Harm1 <- Harm	1.000	0.000	NA	NA	1.000	1.000

Harm2 <- Harm	1.135	0.050	22.910	<0.001	1.039	1.233
Harm3 <- Harm	0.872	0.042	20.524	<0.001	0.788	0.955
Harm4 <- Harm	1.095	0.047	23.062	<0.001	1.004	1.190
Harm5 <- Harm	0.777	0.050	15.386	<0.001	0.677	0.875
Harm6 <- Harm	0.872	0.057	15.225	<0.001	0.760	0.984
Fair1 <- Fairness	1.000	0.000	NA	NA	1.000	1.000
Fair2 <- Fairness	0.869	0.039	22.237	<0.001	0.792	0.945
Fair3 <- Fairness	0.754	0.042	17.919	<0.001	0.668	0.833
Fair4 <- Fairness	0.704	0.046	15.346	<0.001	0.612	0.791
Fair5 <- Fairness	0.366	0.044	8.297	<0.001	0.276	0.449
Fair6 <- Fairness	0.507	0.051	9.859	<0.001	0.403	0.604
Aut1 <- Authority	1.000	0.000	NA	NA	1.000	1.000
Aut2 <- Authority	0.549	0.030	18.505	<0.001	0.491	0.607
Aut3 <- Authority	0.611	0.027	22.502	<0.001	0.558	0.644
Aut4 <- Authority	0.960	0.024	40.480	<0.001	0.912	1.005
Aut5 <- Authority	0.682	0.039	17.696	<0.001	0.605	0.756
Aut6 <- Authority	0.738	0.033	22.312	<0.001	0.672	0.802
Ing1 <- Ingroup	1.000	0.000	NA	NA	1.000	1.000
Ing2 <- Ingroup	0.767	0.047	16.390	<0.001	0.669	0.852
Ing3 <- Ingroup	0.822	0.047	17.423	<0.001	0.725	0.910
Ing4 <- Ingroup	0.816	0.033	14.397	<0.001	0.751	0.882

Ing5 <- Ingroup	0.680	0.038	17.878	<0.001	0.603	0.752
Ing6 <- Ingroup	0.561	0.035	16.060	<0.001	0.491	0.628
Pur1 <- Purity	1.000	0.000	NA	NA	1.000	1.000
Pur2 <- Purity	0.653	0.030	22.047	<0.001	0.596	0.712
Pur3 <-Purity	1.239	0.036	34.708	<0.001	1.168	1.307
Pur4 <- Purity	0.919	0.027	33.511	<0.001	0.865	0.973
Pur5 <- Purity	0.929	0.030	30.945	<0.001	0.869	0.987
Pur6 <- Purity	1.077	0.030	35.877	<0.001	1.017	1.135
Factor Variances						
Harm	0.495	0.036	13.649	<0.001	0.422	0.564
Fairness	0.609	0.042	14.538	<0.001	0.528	0.692
Ingroup	1.165	0.052	22.602	<0.001	1.066	1.268
Authority	0.941	0.054	17.420	<0.001	0.838	1.049
Purity	1.236	0.052	23.802	<0.001	1.135	1.339
Covariances						
Harm <- Fairness	0.411	0.030	13.520	<0.001	0.351	0.470
Harm <- Authority	0.108	0.024	4.553	<0.001	0.061	0.154
Harm <- Ingroup	0.153	0.022	7.053	<0.001	0.109	0.194
Harm <- Purity	0.226	0.022	10.083	<0.001	0.181	0.269
Fairness <- Authority	0.047	0.027	1.741	0.082	-0.006	0.099
Fairness <- Ingroup	0.122	0.025	4.977	<0.001	0.073	0.170

Fairness <- Purity	0.035	0.026	1.344	0.179	-0.016	0.086
Authority <- Ingroup	0.840	0.040	20.967	<0.001	0.765	0.922
Ingroup <- Purity	0.911	0.036	24.444	<0.001	0.842	0.982
Authority <- Purity	0.711	0.035	40.479	<0.001	0.645	0.782

Looking first at the item-foundation estimates, we can see that the strongest relationships between items and their corresponding foundation (latent variable) came from the Harm and Purity foundations. Harm had a mean unstandardized factor loading of 0.96, while Purity had a mean of 0.83. The higher the estimated value, the stronger the relationship between each item and its corresponding foundation. In comparison, the Fairness foundation had the weakest relationship with its corresponding items with a mean estimate of 0.70. In addition to the parameter estimates, the distance between confidence intervals of each foundation item are consistently short, indicating appropriateness of the factor loadings.

Structural Equation Model

After the CFA, a full structural equation model (SEM) was run to test the hypotheses of the study. Like the CFA, the SEM converged successfully, but this time the model reached acceptable fit based on the RMSEA fit index (0.068). Again however, the model fit did not reach the acceptable threshold for either of the other model fit indices (CFI = 0.767, TLI = 0.738). While the RMSEA indicated acceptable fit, based on the three index results, we cannot conclude that the model fits the data. As the SEM contained the same foundation latent variable to manifest item structure as the CFA, the per-item parameter estimates, and confidence intervals were very similar. Most important to review in the results table are the regression estimates which test the distinct predictions made in the study hypotheses. There

are positive relationships present between both the individualising foundations of Harm (*b* = .07, 95% CI [.05; .10], *p* < .001) and Fairness (*b* = .12, 95% CI [.09; .16], *p* <.001), and liberalness. This indicates that participants whom scored higher on the Harm and Fairness foundations also tended to score higher on the liberalness scale (i.e. self-identified as being more politically liberal). While these associations are on the weak side, they still support the hypothesis. In contrast, there were moderate negative associations between each of the binding foundations i.e. Ingroup (*b* = -.29, 95% CI [-.33; -.25], *p* <.001), Authority (*b* = -.37, 95% CI [-.40; -.34], *p* < .001), and Purity (*b* =-.39, 95% CI [-.42; -.36], *p* < .001), and liberalness. These indicate that participants whom scored higher on the binding foundations tended to score lower on the liberalness scale (i.e. self-identified as more politically conservative). To summarise, the predictions made about the direction of the regression estimates were supported, however the predictions about model fit were not, so based on the combined inferential criteria set out in the preregistration, the MFH was not supported with this analysis.

Table 3

Pre-registered confirmatory SEM Parameter Estimates

Item & Latent Variable	Estimate	Standard Error	*Z-score*	*p-value*	CI Lower	CI Upper
Harm1 <- Harm	1.000	0.000	NA	<0.001	1.000	1.000
Harm2 <- Harm	1.122	0.061	18.477	<0.001	0.997	1.239
Harm3 <- Harm	0.866	0.050	17.298	<0.001	0.765	0.960
Harm4 <- Harm	1.102	0.059	18.533	<0.001	0.984	1.213
Harm5 <- Harm	0.878	0.066	13.375	<0.001	0.749	1.001

Harm6 <- Harm	0.919	0.070	13.060	<0.001	0.780	1.059
Fair1 <- Fairness	1.000	0.000	NA	<0.001	1.000	1.000
Fair2 <- Fairness	0.844	0.042	20.118	<0.001	0.762	0.922
Fair3 <- Fairness	0.731	0.047	15.696	<0.001	0.639	0.818
Fair4 <- Fairness	0.703	0.049	14.216	<0.001	0.607	0.802
Fair5 <- Fairness	0.346	0.049	7.118	<0.001	0.251	0.442
Fair6 <- Fairness	0.518	0.060	8.700	<0.001	0.400	0.645
Ing1 <- Ingroup	1.000	0.000	NA	<0.001	1.000	1.000
Ing2 <- Ingroup	0.727	0.048	15.061	<0.001	0.630	0.817
Ing3 <- Ingroup	0.792	0.049	16.049	<0.001	0.693	0.883
Ing4 <- Ingroup	0.828	0.038	21.6000	<0.001	0.753	0.903
Ing5 <- Ingroup	0.663	0.046	14.408	<0.001	0.572	0.750
Ing6 <- Ingroup	0.541	0.039	13.931	<0.001	0.465	0.615
Aut1 <- Authority	1.000	0.000	NA	<0.001	1.000	1.000
Aut2 <- Authority	0.539	0.034	15.792	<0.001	0.472	0.605
Aut3 <- Authority	0.603	0.030	19.879	<0.001	0.544	0.667
Aut4 <- Authority	0.968	0.028	34.920	<0.001	0.913	1.022
Aut5 <- Authority	0.630	0.046	13.549	<0.001	0.537	0.715
Aut6 <- Authority	0.731	0.037	19.640	<0.001	0.657	0.802
Pur1 <- Purity	1.000	0.000	NA	<0.001	1.000	1.000
Pur2 <- Purity	0.539	0.034	19.608	<0.001	0.596	0.728

Pur3 <- Purity	0.603	0.042	30.041	<0.001	1.180	1.345
Pur4 <- Purity	1.263	0.035	26.572	<0.001	0.857	0.992
Pur5 <- Purity	0.926	0.036	26.199	<0.001	0.882	1.022
Pur6 <- Purity	1.115	0.036	31.285	<0.001	1.045	1.184
Factor Variances						
Harm	0.424	0.036	11.698	<0.001	0.354	0.496
Fairness	0.563	0.045	13.384	<0.001	0.478	0.651
Ingroup	0.764	0.047	16.171	<0.001	0.679	0.856
Authority	0.826	0.054	15.167	<0.001	0.727	0.931
Purity	0.818	0.048	17.013	<0.001	0.726	0.916
Age	104.683	8.949	11.698	<0.001	86.673	121.752
Gender	0.241	0.002	123.700	<0.001	0.237	0.245
Liberalness	2.362	0.063	37.295	<0.001	2.242	2.491
Covariances						
Age <- Gender	0.309	0.112	2.760	<0.001	0.088	0.516
Age <- Liberalness	-0.443	0.373	-1.188	0.235	-1.187	0.319
Gender <- Liberalness	0.059	0.017	3.435	0.0001	0.026	0.092
Harm <- Fairness	0.363	0.031	11.872	<0.001	0.304	0.423
Harm <- Ingroup	0.203	0.023	8.775	<0.001	0.160	0.249
Harm <- Authority	0.138	0.023	5.874	<0.001	0.092	0.184
Harm <- Purity	0.255	0.023	11.076	<0.001	0.211	0.301

Fairness <- Ingroup	0.201	0.026	7.848	<0.001	0.152	0.254
Fairness <- Authority	0.147	0.029	5.038	<0.001	0.091	0.203
Fairness <- Purity	0.127	0.026	4.950	<0.001	0.078	0.177
Ingroup <- Authority	0.596	0.036	16.459	<0.001	0.532	0.665
Ingroup <- Purity	0.265	0.030	15.439	<0.001	0.409	0.526
Authority <- Purity	0.531	0.035	15.098	<0.001	0.463	0.603
Regressions						
Harm <- Age	0.009	0.002	5.392	<0.001	0.005	0.012
Fairness <- Age	0.005	0.002	2.758	0.006	0.001	0.009
Ingroup <- Age	0.009	0.002	3.737	<0.001	0.004	0.014
Authority <- Age	0.011	0.002	4.834	<0.001	0.007	0.016
Purity <- Age	0.005	0.002	2.462	0.014	0.001	0.009
Harm <- Gender	0.358	0.041	8.728	<0.001	0.279	0.437
Fairness <- Gender	0.256	0.043	6.002	<0.001	0.174	0.338
Ingroup <- Gender	-0.078	0.050	-1.561	0.118	-0.178	0.022
Authority <- Gender	0.313	0.052	6.004	<0.001	0.211	0.416
Purity <- Gender	0.270	0.050	5.442	<0.001	0.179	0.363
Harm <- Liberalness	0.073	0.013	5.494	<0.001	0.046	0.099
Fairness <- Liberalness	0.125	0.016	8.005	<0.001	0.093	0.157
Ingroup <- Liberalness	-0.294	0.020	-14.348	<0.001	-0.334	-0.254
Authority <- Liberalness	-0.373	0.026	-22.788	<0.001	-0.405	-0.341

Purity <- Liberalness	-0.391	0.017	-22.702	<0.001	-0.423	-0.357

Non-Preregistered Exploratory Factor Analysis

Although the CFA was found to have acceptable model fit using the RMSEA index, the estimates for two other fit indices were sub-optimal. To investigate this further and to assess for alternative factor structures an exploratory factor analysis was run to assess whether the loading of each moral foundations questionnaire (MFQ) item aligns with what is predicted by moral foundations theory (MFT). An EFA is a form of analysis which is used to identify underlying latent variables within a dataset which can explain relationships between observed variables. EFA is commonly used to identify individual traits e.g. personality traits, social attitudes etc. (Haig, 2010). It is an abductive inference method, in that latent variables are identified which can then be further explored and potentially explained. When multiple variables are highly correlated, it could be hypothesised that there is an underlying cause to this relationship, which would be identified as a common factor in EFA (Haig, 2010). This relationship is then able to be further analysed. In the current study context, the EFA was an R-type factor analysis as the factors were calculated from a correlation matrix, as opposed to a Q-type factor analysis, which calculates factors from the individual respondent (Haig, 2010). The analysis was completed using the psych package in r-studio (Revelle, 2018). The initial parallel analysis, one of the newer forms of EFA, which is performed prior to extraction of factors, recognised eight factors, much higher than the five of MFT, contradicting previous research that the MFQ is accessing five factors. Parallel analysis allows for greater confidence in the factors identified than earlier forms of EFA (Wood, Akloubou Gnonhosou, & Bowling, 2015). It does this by generating random data based on the sample size and number of variables in a dataset, extracting factors based on this and calculating the average eigenvalues. These eigenvalues are then compared to the ones from

the actual data sample and only the eigenvalues bigger than those found in the random data are retained (Wood et al., 2015). This allows researchers to be more confident in their interpretation of the complete EFA results. In Figure 4 below, a scree plot shows a visual representation of the parallel analysis. The ideal factor number is identified by measuring the point where the *actual data* line intersects with the *simulated data* line, which in this case was two or three, again contradicting the idea that the MFQ scale is measuring five factors.

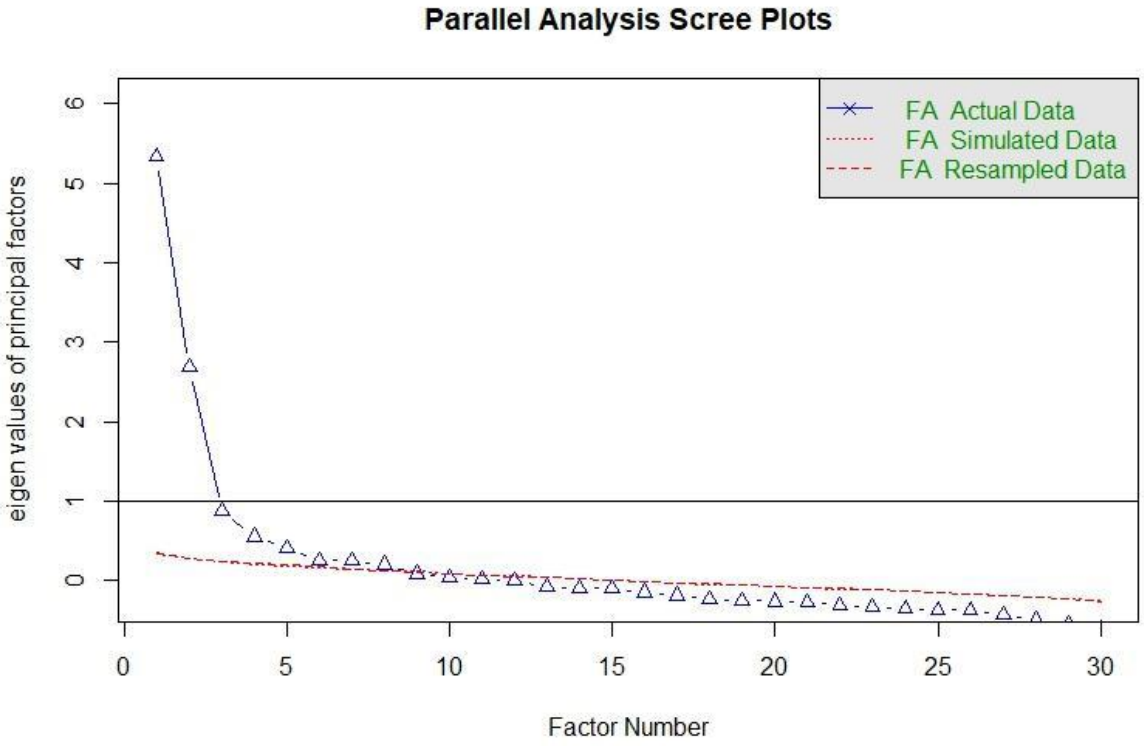


Figure 4. Plot of factor parallel analysis

Principal axis factoring was then combined with an oblique rotation method to extract the factors. This was executed on eight factors. Principal axis factoring is the crux of the EFA process and seeks to identify the least number of factors capable of accounting for the variance of the variables involved. An oblique rotation method was chosen because it does not assume factor correlations of zero, which an orthogonal rotation does (Brown, 2009). As can be seen in the below Table 4, the relationships predicted by MFT are visible. For

example, the Harm and Fairness foundations are more often grouped or alone than grouped with the binding foundations. Harm, Fairness and Authority were the most consistent, with five out of six Harm items loading onto Factor2, five out of six Fairness items loading onto Factor5, and five out of six Authority items loading onto Factor1. The most concerning aspect of this EFA is the number of items loading onto multiple factors e.g. pur1 loading onto Factors 6, 1, and 4 at above >.20. Loading >0.3 is generally considered as substantial cross-loading in the literature (Yong & Pearce, 2013). This could indicate that some of the MFQ items are not accessing a single foundation, or they are not being interpreted by participants the way MFQ researchers theorise. Alternatively, the cross loading may suggest that there is a higher order structure to the data, potentially explained by the individualising-binding higher order factor grouping. Below, in Table 4, is the output from the first EFA. For ease of reading, factor loadings above 0.2 have been highlighted.

Table 4

EFA Factor Loadings for all MFQ Items

Item	Factor							
	Factor1	Factor2	Factor3	Factor4	Factor5	Factor6	Factor7	Factor8
Harm1	0.07	0.69	0.02	0.00	-0.03	-0.12	0.03	-0.03
Harm2	-0.06	0.62	0.06	-0.04	0.09	0.09	0.11	0.02
Harm3	-0.04	0.38	0.07	0.32	0.03	-0.10	-0.33	-0.07
Harm4	-0.01	0.71	-0.07	0.00	0.07	0.13	0.08	0.03
Harm5	-0.01	0.26	-0.07	0.27	0.07	0.13	0.01	0.18
Harm6	0.06	0.13	-0.08	0.03	0.32	0.12	0.31	-0.12
Fair1	0.10	0.25	-0.01	-0.05	0.48	-0.10	-0.07	-0.07
Fair2	0.04	0.14	0.14	-0.02	0.36	0.06	-0.45	-0.15
Fair3	0.02	0.01	0.16	0.00	0.51	0.01	-0.13	-0.13
Fair4	-0.08	0.00	-0.02	0.03	0.69	0.04	0.07	0.09
Fair5	0.07	-0.04	-0.10	0.14	0.36	0.09	-0.13	0.31

Fair6	-0.11	0.20	0.08	0.08	0.13	-0.05	0.36	-0.25
Ing1	0.31	0.10	0.24	-0.09	0.02	0.03	0.08	0.32
Ing2	0.01	-0.05	0.70	0.02	0.01	0.03	-0.06	-0.04
Ing3	0.06	0.02	0.68	0.06	0.00	-0.02	0.02	0.05
Ing4	0.18	0.02	0.15	0.01	0.03	-0.03	0.02	0.47
Ing5	0.01	0.09	0.40	-0.06	0.02	0.17	0.26	0.13
Ing6	0.17	0.00	0.08	0.05	0.05	0.14	0.19	0.09
Aut1	0.74	0.01	0.05	0.01	0.00	0.01	-0.01	-0.01
Aut2	0.27	0.05	0.24	0.11	0.02	0.10	0.07	0.00
Aut3	0.42	-0.03	0.13	0.13	0.12	0.03	0.01	-0.04
Aut4	0.55	-0.01	-0.03	0.12	-0.06	0.08	-0.01	0.19
Aut5	-0.03	-0.03	0.15	0.03	0.15	0.40	-0.09	0.15
Aut6	0.32	-0.04	0.08	-0.01	-0.10	0.03	0.02	0.20
Pur1	0.37	0.08	0.04	0.20	-0.03	0.28	-0.09	-0.13
Pur2	0.06	0.00	0.07	0.78	0.00	-0.04	-0.04	-0.02
Pur3	0.02	0.04	0.03	0.02	0.04	0.68	-0.04	-0.01
Pur4	0.09	-0.03	-0.02	0.57	0.04	0.27	0.15	0.06
Pur5	-0.06	-0.03	0.16	0.23	-0.08	0.48	0.06	0.07
Pur6	0.14	0.04	-0.03	-0.03	0.01	0.65	0.03	-0.02

Below is the output when the EFA was constrained to five factors. This was done to discover whether the items would be clustered into the existing five foundation factors or whether the individualising items would be clustered separately from the binding items. The analysis revealed that this would indeed be sufficient, but again it did not nestle into the five factors predicted by MFT. What is clear here though, is that more grouping between the individualising and binding foundations is occurring. Ingroup and Authority items are particularly noticeable as they are all loading onto Factor3. Additionally, all the Harm and Fairness items are loading onto Factor2 and Factor5.

Table 5

EFA factor loadings constrained to five factors

	Factor				
Item	Factor1	Factor2	Factor3	Factor4	Factor5
Harm1	-.010	0.65	0.05	0.08	0.00
Harm2	-0.03	0.62	0.05	0.08	0.01
Harm3	0.13	0.34	-0.02	0.51	0.11
Harm4	0.l0	0.72	-0.05	-0.10	0.04
Harm5	0.14	0.22	-0.05	0.07	0.06
Harm6	0.22	0.17	-0.13	-0.26	0.28
Fair1	-0.10	0.21	0.02	0.53	0.03
Fair2	-0.05	0.13	0.11	0.34	0.43
Fair3	-0.10	-0.01	0.09	0.16	0.59
Fair4	0.08	0.00	-0.06	-0.19	0.67
Fair5	0.21	-0.08	0.11	-0.07	0.32
Fair6	0.06	0.24	-0.18	-0.08	0.11
Ing1	-0.02	0.06	0.62	-0.20	0.00
Ing2	-0.04	0.00	0.57	0.21	0.05
Ing3	-0.03	0.05	0.64	0.16	0.03
Ing4	0.01	-0.05	0.48	-0.15	-0.01
Ing5	0.06	0.14	0.42	-0.22	-0.04
Ing6	0.22	0.02	0.22	-0.19	0.01
Aut1	0.23	-0.04	0.52	0.01	0.05
Aut2	0.23	-0.04	0.40	0.01	0.03
Aut3	0.25	-0.05	0.36	0.07	0.16
Aut4	0.32	-0.06	0.43	-0.05	-0.18
Aut5	0.28	0.00	0.23	-0.06	-0.18
Aut6	0.09	-0.08	0.41	-0.09	-0.11
Pur1	0.48	0.08	0.22	0.12	0.01
Pur2	0.61	-0.02	0.01	0.38	0.05
Pur3	0.51	0.11	0.10	-0.18	0.00
Pur4	0.77	-0.01	0.00	0.02	0.02
Pur5	0.53	0.03	0.13	-0.08	-0.12
Pur6	0.51	0.10	0.11	-0.25	-0.04

Perhaps most interesting from the EFA results was that when the analysis was constrained to two factors, it maps almost perfectly onto what would be predicted by the individualising (Harm and Fairness) and binding (Ingroup, Authority, and Purity) foundation grouping.

Table

EFA factor loadings constrained to two factors

	Factor	
Item	Factor1	Factor2
Harm1	-0.01	0.57
Harm2	0.04	0.56
Harm3	0.05	0.58
Harm4	0.10	0.58
Harm5	0.08	0.27
Harm6	0.10	0.28
Fair1	-0.08	0.65
Fair2	0.01	0.62
Fair3	-0.05	0.55
Fair4	0.00	0.47
Fair5	0.27	0.18
Fair6	-0.09	0.27
Ing1	0.54	-0.04
Ing2	0.43	0.l13
Ing3	0.50	0.12
Ing4	0.44	-0.11
Ing5	0.44	-0.01
Ing6	0.40	-0.05
Aut1	0.65	0.01

Aut2	0.54	0.00
Aut3	0.52	0.13
Aut4	0.66	-0.11
Aut5	0.46	-0.18
Aut6	0.44	-0.21
Pur1	0.60	0.15
Pur2	0.48	0.21
Pur3	0.54	0.03
Pur4	0.64	0.04
Pur5	0.58	-0.09
Pur6	0.56	-0.03

Exploratory Case Based Analysis

As an additional exploratory analysis, a case-based method was used to directly assess how many participants conform to the moral foundations hypothesis. Case-based methods allow us to examine whether individuals conform to a specific pattern set in line with a hypothesis. In this sense, it is an idiographic approach i.e. a research perspective that emphasises the individual (De Luca Picione, 2015). Each participant entry is a case to be studied. Most associated with case-based analyses are single case studies in the clinical literature, which deeply investigate an individual and result in mainly subjective inferences (Blampied, 2000). The method used in the current study differs from this as it does not simply involve one individual, it is assessing a larger population individual by individual. Data are displayed graphically, and the methods rely on replication for claims of generalisability or causal inference (Blampied, 2000). One of the most valuable characteristics of case-based analysis is the ability to treat participants as individuals and how they relate to the research hypotheses, rather than merely viewing group level trends and relationships. It is appropriate to use this method as the moral foundations hypothesis makes claims on an individual level i.e. that a

person will score in a specific pattern on the MFQ depending on what their political attitudes are.

Separate analyses were run on liberal participants (those scoring five or higher on the liberalness scale) and on conservatives (those scoring three or lower on the liberalness scale). A specific way of running the case-based analysis was not pre-registered, but this was deemed the most appropriate as it allows for an easy comparison of both political groups. The following rule was used to indicate what pattern of foundation scores the MFH would predict for liberal participants: any participant who scores higher on both Harm and Fairness than the other three foundations of Ingroup, Authority and Purity. This was then tested on both liberal and conservative participants to see how many of each group displayed the predicted pattern. If a participant conformed to this rule, we could say that they fit the expected scoring pattern for someone with liberal political attitudes. The results of the analysis revealed 511 out of 672 (76.1%) liberal participants conformed to the rule, while 46 out of 141 conservatives conformed to the rule (32.6%). This result lends tentative support to the predictions of the study and the MFH. Those scoring in the liberal range of political identity were more likely to score higher on the individualising foundations than on the binding foundations. See Figure 5 below for a visual representation of the case-based analysis results.

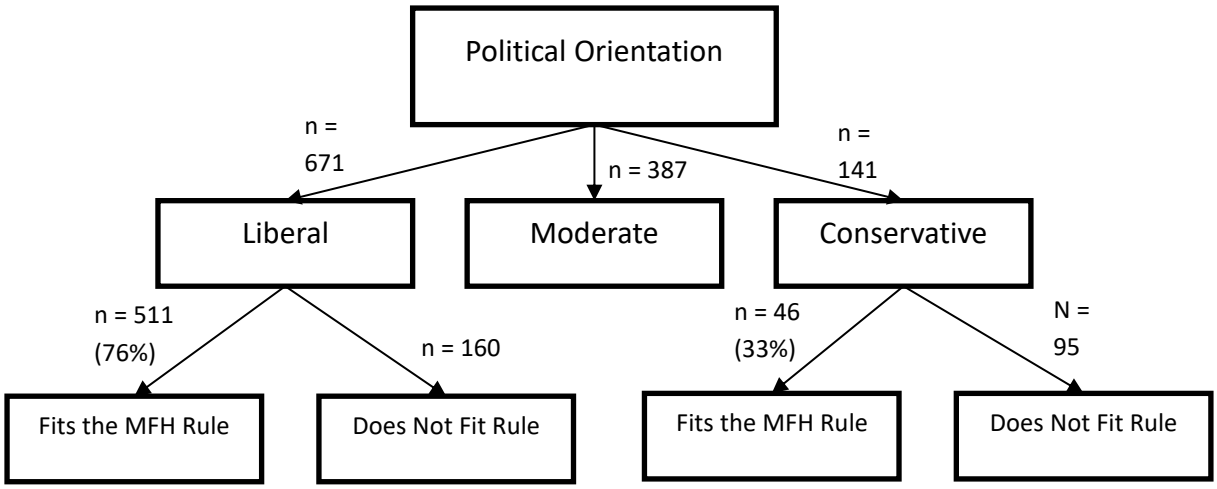


Figure 5. Visual representation of Case-based Analysis.

Discussion

Interpretation of Results

The following section will dissect the results of each section of the analysis. For context, the study hypotheses specified that those participants who scored higher on the scale of liberalness (identifying as more politically liberal) should score higher on the MFQ items associated with the moral foundations of Harm/Care and Fairness/Reciprocity than those items associated with the foundations of Ingroup/Loyalty, Authority/Subversion, and Purity/Sanctity. Harm/Care and Fairness/Reciprocity represent the individualising foundations, while the latter three represent the binding foundations. This pattern of results would be in line with the predictions of the moral foundations hypothesis. The predictions also stated that those scoring lower on the scale of liberalness (identifying as more politically conservative) will score higher than liberals on the MFQ items associated with the moral foundations of Ingroup, Authority, and Purity, the binding foundations. These predictions were to be assessed based on whether the confirmatory models reached acceptable levels of fit, and if the regression estimates in the structural equation model were in the hypothesised direction. Addressing the first condition, only one of the fit index thresholds were met, so in this case the study prediction was not supported. Despite this, the regression estimates in the SEM were in the hypothesised direction, such that liberalness had a positive relationship with the Harm/Care and Fairness/Reciprocity latent variables, while simultaneously had a negative relationship with Ingroup/Loyalty, Authority/Subversion, and Purity/Sanctity. Specifically, those scoring higher in liberalness were more likely to score higher on the individualising foundations, while those scoring lower on liberalness were more likely to score higher on the

binding foundations. Below, each of the results will be discussed to better inform these conclusions.

Important to note first are the univariate descriptive statistics, in the form of histogram plots of scoring on each of the five moral foundations. As was noted in the results section, the plots were in line with previous studies involving liberal and conservative participants. Most interesting are the normal distribution of the binding foundations. Previous research would predict that these distributions should be weighted more towards the lower scoring end, due to the large number of liberals in the sample (Graham et al., 2018). There were also far fewer participants scoring in the high ranges of the binding foundations (e.g. 5 or 6) which could indicate that very few participants were overtly concerned with the content of the items corresponding to these foundations, as opposed to the larger number in the high ranges of the individualising foundations. This higher scoring in the individualising foundations is predicted by previous research, as most liberals and conservatives are concerned with issues of Harm/Care and Fairness/Reciprocity (Graham et al., 2018). Notable is the much higher number of participants identifying as political liberal compared to previous studies, which could also be a reason for this pattern of scores. Despite not being ideal, since the dataset was drawn from a very large population, this demographic imbalance is not as much of a concern as it would be with a smaller sample e.g. <50, as there are ample data points to draw on for each group.

The exploratory correlational analysis revealed tentative support for both predictions, in that, those scoring higher on liberalness tended to score higher on the individualising foundation, while those scoring lower on liberalness scored higher on the binding foundations. Notable, were the weak positive correlations between liberalness and the individualising foundations. The weak level of these relationships does actually conform to previous research discussed in the literature review (Graham et al., 2018). Both conservatives

and liberals care about issues of Harm/Care and Fairness/Cheating, liberals however care about them the most. However, there is a much larger portion of liberals than conservatives in this dataset so it could be looked at another way, as perhaps an indication that the liberal-individualising association is not as strong as previously thought. Importantly, the association is still statistically significant with a large sample size. The associations predicted for conservative participants were supported in much stronger fashion. Moderate negative relationships were present between liberalness and the three binding foundations. The strongest association came between liberalness and purity (-.31), indicating that more conservative participants were much more likely to score higher on the purity foundation. This conforms to much of the research in moral psychology, with the association between conservatism and concerns about purity and spiritual sanctity having a solid base of empirical support (Graham, Haidt, & Nosek, 2009; Graham et al., 2018). A specific example comes from Inbar, Pizzaro, Knobe and Bloom (2009), in which participants with higher disgust sensitivity, associated strongly with high scores on the Purity/Sanctity foundation, were much more likely to identity as politically conservative. Additionally, the higher the disgust sensitivity, the more likely participants were to be opposed to homosexuality. Finally, there were weak-moderate associations between gender and the foundations of Harm, Fairness, and Purity. The higher scoring of females on these three foundations was a completely unexpected result. Most intriguing was the strength of the regression estimates found in the SEM in the current study. Female gender was moderately positively associated with Harm, Fairness, Authority and Purity, while weakly negatively associated with Ingroup. This could indicate that females are either more concerned than males with issues involving these moral foundations or simply that they have a more pronounced reaction to the items in the MFQ.

The confirmatory models were the main analysis strategy used in the current study to test the researcher's predictions. When undertaking analysis using structural equation

modelling, a hypothesised model is created and in turn evaluated based on the assessment of its fit to a set of data. This study has committed to the use of fit thresholds defined in the preregistration, so to maintain consistency they have all been reported and used to assess the results.

Now we can turn to the results of the CFA and SEM themselves, beginning with the CFA. As mentioned in the results section, the CFA did not reach acceptable levels of fit on any of the reported fit indices. Part of the study predictions included the confirmatory models reaching acceptable fit thresholds, so in this case, the prediction was not supported. Each moral foundation from moral foundations theory (MFT) is represented by a latent variable in the CFA and SEM. In turn, each latent variable has six items from the moral foundations questionnaire (MFQ) that are predicted to be associated with each particular latent variable more than the others. Looking directly at the parameter estimate, each of the latent variables had consistently strong association with the corresponding items. Only one item, Fair5, "justice is the most important requirement for a society," had an estimate below 0.4. The high estimates, coupled with narrow confidence intervals, means we can increase our level of certainty that each of the items are loading onto the predicted factor. Perhaps the most interesting results from the CFA were the covariances between foundations. Predicted relationships occurred based on past MFT research, such that the individualising foundations were most strongly associated with each other, as were the binding foundations. Additionally, the variables that were predicted to not be strongly associated with each other were not. Demonstrating this, Harm/Care and Ingroup/Loyalty had weak positive covariance and this suggests that these two foundations were less closely related than other foundation pairs. Despite these parameter estimates, as the model did not reach all of the fit index thresholds, the dataset cannot be said to fit this model and therefore the study predictions were not supported. It is important to note that this CFA only addressed the factor loading stage of the

model, so for more conclusive assessment of the study prediction, we need to next look at the full structural equation model (SEM).

Inconsistency in fit indices occurred in the SEM analysis, in that the model converged successfully, but only reached the acceptable threshold on the RMSEA index, and not on the CFI or TLI. Consistent with the CFA results, high beta estimates with narrow confidence intervals indicated strong support for the association between the foundation items and their corresponding foundation/latent variable. Confidence interval width is a function of the sample size and variance i.e. narrow confidence intervals are the result of a large sample size and low variance. As would be expected based on previous research (Graham et al., 2018), the strongest regression estimate came from the negative relationship between liberalness and Purity/Sanctity. The Purity/Sanctity foundation has consistently elicited the most reaction, in the form of higher scores, from participants in similar studies using moral scenarios (Inbar, Pizzaro, Knobe, & Bloom, 2009; Cannon, Schnall, & White, 2010). However, contrary to some previous studies (Graham et al., 2009; 2018), the regression estimates of liberalness and Harm/Care and Fairness/Reciprocity were much weaker. The implication of this is most likely that all participants care about Harm/Care and Fairness/Reciprocity, regardless of political identity, but also certain participants care about the other three foundations. Most surprising from the SEM results are the moderate positive regressions estimates of gender and the latent variables of Harm/Care, Fairness/Reciprocity, Authority/Subversion, and Purity/Sanctity, and the weak negative regression estimate of gender and Ingroup/Loyalty. These indicate that females were more likely to score higher on the first four mentioned foundations, and lower on the fifth.

While not being part of the pre-registered confirmatory analyses, the exploratory factor analysis (EFA) presents some of the most informative results of this study. It must be stressed that these results are tentative due to this exploratory status. The most important

finding from the EFA is that the items do not load onto the predicted five factors of moral foundations theory. The parallel analysis itself suggested eight factors, while the scree plot suggested either two or three. This means that the five factors that would be anticipated based on the five foundations of MFT did not immediately reveal themselves. As eight factors were produced, it is important to unpack this further and attempt to understand why this loading pattern may have occurred. Three of the eight factors were simple to interpret, with Factor 1 clearly representing the Authority/Subversion foundations, Factor 2 representing Harm/Care, and Factor 5 representing Fairness/Reciprocity. The others are less clear. Factor 3 had four out of six Ingroup/Loyalty items loading onto it, while Factor 6 had four out of six Purity/Sanctity items loading onto it, so these two are the most likely candidate for the other two foundations. Factor 7 and 8 both had an inconsistent mixture of loadings. Most intriguing was Factor 4 which had multiple Purity/Sanctity and Harm/Care items loading onto it. This could indicate some crossover between the items associated with these foundations.

When the analysis was constrained to force the extraction of only five factors, the items did generally load onto the hypothesised foundation structure. As noted in the results, this was still not a perfect match for the five foundations. However, as the foundations are associated in the individualising and binding groups, cross-loading is not entirely unexpected. The most revealing results came when the analysis was constrained to two factors, such that the individualising and binding foundation grouping nested within two factors. In simple terms, when we look at Table 6, if we consider factor one as the binding foundations, and factor two as the individualising foundations, almost all 30 items loaded onto the predicted factor. This then potentially means that this dataset is more suited to a two-factor model, individualising and binding, reminiscent of the early stages of moral foundations theory (Haidt & Joseph, 2007; Haidt & Graham, 2007). This indicates that a future SEM could use individualising and binding as two higher order latent variables with the five foundations as

separate lower order latent variables. Perhaps the most important takeaway from the EFA is that, with the participants in this dataset, there is some evidence for distinct foundations within the individualising and binding groupings, while also evidence for similarities within these groups. The cross-loading seen demonstrates this potential underlying similarity. As the EFA initially identified eight factors within the dataset, this is further evidence of the similarity between the foundations. Future research is required to assess whether there is potential for expanding the number of foundations into an eight-factor model. This could be assessed with a factor analysis on a different dataset. As mentioned in the chapter 2 of the literature review, there are multiple other foundations being considered for inclusion in the MFT (liberty/oppression, equity/undeservingness, and honesty/lying Graham, et al., 2018), so there is potential that the participants in the current study were concerned with these foundations.

Finally, the last statistical technique used in the current study was a case-based analysis. The results of this analysis did reveal tentative support to the predictions of the study. To recap on the method used, a specific rule was set out by the researchers and applied to each participant involved, to determine exactly how many individual participants answered the MFQ in line with what would be predicted by the MFH for liberal participants. The rule identified any participant that scored higher on the individualising foundations of Harm/Care and Fairness/Reciprocity than the other three binding foundations. The results indicated that over twice the percentage of liberals in the study conformed to the rule than did conservatives, such that those scoring in the liberal range of political identity were much more likely to score higher on the individualising foundations than the binding foundations. This is tentative empirical evidence in support of the study prediction.

Practical Implications

There are several practical implications we can draw from these results. First, in terms of the wider theoretical base of moral foundations theory (MFT) and the moral foundations hypothesis (MFH), this study presents empirical evidence against the predictions made by the MFH, albeit tentative due to the inconsistent fit of the confirmatory models. There is evidence for inferring that when looking at online datasets of U.S participants specifically, the moral foundations questionnaire (MFQ) and the MFT descriptive model of morality, in the form used in the current study, may be insufficient for making predictions about individual participants moral beliefs. It certainly does demonstrate a difference between those identifying as liberal and those identifying as conservative, however, when looking at the regression estimates. In a more real-world context, the demarcation between political sides demonstrates how the disconnect can occur between each sides inability to understand the others point of view/reasons for their moral positions (Graham et al., 2009). Often liberals justify their decisions more on the consequences for individuals and maximising social utility (Graham et al., 2009), while conservatives are more inclined to support rules set by previous generations, authority systems, or in a religious context by god (Muller, 1997). Both sides have a complex and nuanced morality and the results of this study further indicate the need to acknowledge this in order to gain a better understanding of the different political sides of the population. Important to remember is that the five foundations of MFT are merely a taxonomy to aid in the description of an individual's morality, not an absolute definition.

A second practical implication of the current study comes from the exploratory factor analysis. The items of the MFQ nestled much more effectively in a two-factor model, than that of the five predicted by MFT. These two factors in turn mapped almost perfectly onto the individualising and binding foundation groups. This indicates that perhaps, for certain

populations, in this case an online dataset, a two factor model is more appropriate and may yield more insightful predictions about moral profiles of individuals favouring the individualising foundations vs binding, rather than unnecessarily increasing model complexity such as with a five factor model. It also indicates that, rather than being specific to this population, the MFQ is not accessing five different factors, but only two. This would have more deeper implication for the wider research area and could warrant further investigation. Important to note is that the factor structure of the MFT has been tested by multiple other research teams (Davis et al., 2014; Yilmaz et al., 2016) and validated at five factors, so further research is required.

Finally, the study of political attitudes and moral beliefs could have potential in influencing public policy decisions, changing the way public political debate is engaged in, or even merely increasing compassion among populations. While a replication, such as the current study, does not introduce any revolutionary ideas to the public discourse, it aids in the progression of understanding morality and the different perspective individuals bring to public debate.

Limitations of the Current Study

The current study has several limitations that will now be addressed. First, the dataset from this study was gathered in 2009/2010 so it is questionable whether this is still representative of the wider public, and therefore limits generalisability of the results. There is a considerable amount of research in personality psychology indicating both the stability of traits over time and the potential for malleability, so there is no concrete answer to assuage this concern (Elkins, Kassenboehmer, & Schurer, 2017; Harris, Brett, Johnson, & Deary, 2016).

While limiting the dataset to participants from the U.S was intentional to be consistent with the original study by Graham et al. (2009), this presents a problem for the generalisability of the research. The U.S has a very distinct political landscape; marked by a dichotomy between the left and the right of the political spectrum. While this is common in Western democracies, it is not representative of the rest of the world; however, no explicit generalisability claims have been made by the current study. Fortunately, the original myPersonality.org data does include datasets from many other countries so future research can overcome this limitation.

Another limitation with the dataset specifically comes in the form of self-selection bias. Participants chose to be involved in the gathering of this data, volunteering through myPersonality.org to take the MFQ. This again could limit the external validity/generalisability of the results as it is not a representative sample of the wider population, many of whom may have no interest in volunteering for scientific inquiry. A possible solution to this would be to incorporate a five-factor model of personality measuring participants on the Big-5 traits of openness, conscientiousness, extraversion, agreeableness, and neuroticism (Costa and McCrae, 1988), in order to compare the traits of study participants with a control group from the wider population. This would improve the ability to make generalised predictions.

This study used a previously gathered dataset from other researchers across the globe. This disconnection from the data-gathering process presents problems with culpability for the use of the data and limits feasibility of checking any problems with the dataset itself. In terms of the culpability, as the data was not gathered by the researchers of the current study directly, it allows for distancing themselves from the data if the results don't go to plan. All aspects of the dataset are predetermined when using an existing dataset; this means the researchers don't have control over the quality of the data, how variables were measured and

recorded, confounding variables may not have been recorded, or even which population was being studied (Cheng & Phillips, 2014). With the current study, the original researchers, including supervisor of the current study Dr. Peter R. Cannon, were diligent in their collection, making the dataset easy to access and use. However, a labelling error in the final dataset meant that the current analysis had to be rerun once corrected, delaying the results by multiple months. Fortunately, as this was fixed, it had no impact on the results.

There is a potential argument to be made that these results could be exclusive to a sample gathered through the social networking site facebook.com. Facebook has great potential, due to its ability to reach billions of diverse users, however there are drawbacks to its use. There is a lack of ethical guidelines for the use of Facebook, and indeed other social media platforms, as a research tool (Kosinski, Matz, Gosliong, Popov, & Stillwell, 2015). Participants may be unaware that their data is being used much more widely than they anticipated. Deidentification takes a large step to assuaging these concerns, however it should still be made explicit to participants what exactly will be done with their data in the future. Recently, Facebook themselves have made changes to their data privacy strategies, which will make it more difficult for researchers to harvest data within the application (Facebook, 2018). Time will tell whether this impacts future research projects.

In terms of the results themselves, there were multiple analyses used that were not preregistered: the exploratory correlational analysis and the exploratory factor analysis. Additionally, the inferential criteria for the case-based analysis were not preregistered in much detail so they were decided post-hoc. This presents concern as it allows for leeway in deciding which results to report and analyse. For this reason, the results from these analyses must always be considered tentative. This has been made clear multiple times throughout the results and discussion.

A final note is the limitations of using fit index thresholds. Due to the inconsistency in the fit scores, there is a window for post-hoc rationalising of these scores in order for the researcher to present their most ideal results instead of the objective results. Many theorists consider cut-offs as aids to interpretation, rather than stringent thresholds that must govern whether a model fits (Fan & Sivo, 2005; Marsh, Hau, & Grayson, 2005; Yuan, 2005). They see researchers as too often overinterpreting cut-off values, as opposed to considering the entire model/data relationship. Labelling fit as *good* or *bad* is a qualitative interpretation, not a mathematical absolute (Lai & Green, 2016). Mueller and Hancock (2010) note that inconsistent fit indices are not uncommon and do not automatically mean the model does not fit. Unfortunately, this can create misunderstanding in the literature. Some researchers have intentionally reported only the indices reaching the appropriate threshold despite having calculated others that don't (Lai & Green, 2016). Lai and Green (2016) demonstrated, through multiple simulated models, and replications of empirical models, that two of the common reasons given for inconsistent fit values, weak correlations between observed variables and weak correlations concealing miss-fit, are incorrect conclusions. They argue the real reasons are much more nuanced. They go on to claim that the difference occurs due to the different methods employed by the separate fit indices to evaluate fit and interaction of the degrees of freedom of the hypothesised model and the baseline models fit. Conveniently, the indices used in this research were the RMSEA and CFI, two of the indices used in the current study. The details of their argument are beyond the scope of this discussion, but in simple terms, they would claim that it cannot be concluded that the current model is mis-specified as the alternate indices are acting as they should. Additionally, we could conclude that there is not a problem with specification of the model or the data itself. There is no absolute standard in SEM to compare fit index scores against (Lai & Green, 2016). Also important to note from this explanation, is that even if we had used multiple other fit indices

instead of the RMSEA, CFI and TLI, this would not have removed the variation in results. This explanation for model misfit, however, can become a post-hoc justification for not achieving the desired results in a study. Hence, the use of pre-registering exact fit thresholds removes the option for this kind of excuse.

Future Research Directions

The results of the current study have presented multiple paths for future research. Most surprising comes from the association revealed in the correlational and SEM analyses between gender and scores on the moral foundations. Gender differences in studies using the MFQ have been found before (Davis et al., 2014) but the direct relationship between gender and the moral foundations has not yet been thoroughly explored and should be the focus of a future confirmatory study. The second path for future research comes from the weak relationships between Harm/Care and Fairness/Reciprocity with liberalness. This is a similar finding to the lack of negative association found between conservatism and the individualising foundations by Sibley et al. (2014), discussed in *Chapter 2*. It is possible that this association has been overstated in previous research and future studies narrowing the focus to this relationship specifically could prove insightful for the research area. Conversely, it is also possible that conservatives in this study were lower on measures of conservatism than previous studies. If conservative were scoring higher in these foundations, that would offset the relationship between liberals and these foundations. This is another potential avenue to research further.

As previously mentioned, the dataset was limited to U.S participants; however, the wider dataset this sample was taken from contains an extremely diverse population from many different nations. Running the same analysis from the current study on all countries or

separating by region could produce some interesting insights into global region differences and similarities. Graham et al. (2009) found consistent support for the Moral Foundations Hypothesis (MFH) across three regional groups: the U.S (n=695); the U.K (n= 477) and what they termed *other nations* (n= 417), which consisted of participants from multiple other countries (the most being from Argentina, n=61, and Canada, n = 44). It would then be advantageous for the empirical base of MFT and MFH research to conduct the analysis from the current study on the wider sample population, including multiple world regions.

Finally, there remains the question of causality in studies like the current one. As MFT is a descriptive model it does not make a claim as to whether moral beliefs cause an individual to have specific political attitudes or vice versa. Any attempt to analyse this is beyond the scope of the current study, however it would be a useful avenue to pursue. Social Identity Theory could provide insight into this, proposed originally by Tajfel (1978). One of the major ideas from social identity theory is that individuals are motivated to divide the world into *them* and *us,* increasing bonds within their group and viewing out-group members negatively. This has been expanded in recent times to the realm of information sharing in the digital world. Social media and internet news sources allow individuals to constantly reaffirm their groups social and political attitudes, preventing cross-group discussion and understanding (Bergstrom and Bak-Coleman, 2019). These views could then become more solidified and part of an individual's core beliefs, potentially pushing them to the extremes of either side of an issue. As these political and social views become more entrenched, it may impact moral attitudes also, as individuals seek to reinforce their group views. Again, the causality direction is difficult to interpret. It also possible that a third confounding variable e.g. personality traits, could be the real driver of moral and political concerns. This would need further research to explore.

Conclusion

As we have seen from the above paper, the current study produced inconsistent results. To recap, the study predictions stated that the results found by Graham, Haidt, and Nosek (2009) would be replicated, in that the predictions made by the moral foundations hypothesis would be supported. The predictions were to be considered supported if the following conditions were met: both the confirmatory factor analysis and structural equation model reach acceptable levels of model fit; the regression estimates for political identity predicting foundation scores would be in the hypothesised direction, such that higher scores on the scale of liberalness would be associated with higher scores on the individualising moral foundations of Harm/Care and Fairness/Reciprocity, while lower scores on the liberalness scale would be associated with higher scores on the binding moral foundations of Ingroup/Loyalty, Authority/Subversion and Purity/Sanctity. To summarise each of the analyses used: the exploratory correlational analysis and case-based analysis provided tentative support to the study predictions; the confirmatory factor analysis and structural equation model did not provide support to the study predictions due to the inconsistency in model fit; and finally the exploratory factor analysis provided a more nuanced look at the factor structure that the moral foundations theory descriptive model is based on. As both the models did not conclusively fit the data, we can conclude that the inferential criteria for supporting the study predictions were not met, and as such the MFH was not supported with this dataset.

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Appendix a.

A. Hypotheses - Essential elements

Description of essential elements
Describe the (numbered) hypotheses in terms of directional relationships between your (manipulated or measured) variables.

In this study, a very similar model to the one used by Graham, Haidt, and Nosek (2009) in study 2 of their article 'Liberals and conservatives rely on different sets of moral foundations,' will be used on a large data set gathered online from the myPersonality project using the moral foundations questionnaire (MFQ) to see whether the effect reproduces and conforms to the MFH. *An appendix will include a direct replication of the original data from study 2 of Graham et al. (2009) to check the accuracy of their model. Prediction The same pattern of results from Graham et al. (2009) will be observed in the new MFQ data i.e. the MFH will be supported. Such that, more liberal identity will predict higher scores on the individualising foundations i.e. political identity will be negatively correlated with harm and fairness; while more conservative identity will predict higher scores on binding foundations i.e. political identity will be positively correlated with ingroup, authority and purity. The structural equation model used for the analysis will also reach the threshold of good fit for all reported fit statistics.
For interaction effects, describe the expected shape of the interactions.

N/A
If you are manipulating a variable, make predictions for successful check variables or explain why no manipulation check is included.

N/A

Recommended elements

Recommended elements
A figure or table may be helpful to describe complex interactions; this facilitates correct specification of the ordering of all group means.

-

For original research, add rationales or theoretical frameworks for why a certain hypothesis is tested.

Jonathan Haidt, Jesse Graham, and Brian Nosek (2007; 2009; 2012) have produced a considerable amount of evidence for what they term the Moral Foundations Hypothesis (MFH). This states that individuals identifying as politically liberal hold a distinct moral profile to those identifying as politically conservative; conceptualised using the five foundations of Moral Foundation Theory. Liberals place higher value (defined by larger scores on specific items of the Moral Foundations Questionnaire) on the individualising foundations of harm/care and fairness/reciprocity, while conservatives score relatively evenly across all five foundations; scoring higher than liberals on the three binding foundations of ingroup/loyalty, authority/respect, and purity/sanctity.
If multiple predictions can be made for the same IV-DV combination, describe what outcome would be predicted by which theory.

N/A

B. Methods - Essential elements

Description of essential elements

Design
List, based on your hypotheses from section A: Independent variables with all their levels a. whether they are within- or between-participant b. the relationship between them (e.g., orthogonal, nested).

Demographic Variables: Age, State, Sex, Political identity All are between-participant. Political identity is the main independent variable, predicting scores on the dependent measure (the Moral Foundations Questionnaire).
List dependent variables, or variables in a correlational design

Measured variables: Scores on the five foundations of the MFQ (30-item total, 6 items per foundation). Responses to items were scored individually as observed variables then each item corresponding to a specific foundation of MFT were added to get scores for each foundation. Political Identity was assessed on 7-point likert scale anchored by strongly liberal and strongly conservative. Coded as: strongly liberal = -3; moderately liberal = -2; slightly liberal = -1; neutral/moderate = 0; slightly conservative = 1; moderately conservative = 2; strongly conservative = 3. Responses on the MFQ were coded as: Part 1: not at all relevant = 0; not very relevant = 1; slightly relevant = 2; somewhat relevant = 3; very relevant = 4; extremely relevant = 5. Part 2: strongly disagree = 0; moderately disagree = 1; slightly disagree = 2; slightly agree = 3; moderately agree = 4; strongly agree = 5. Responses by participants on all demographics and on the observed measure have been coded already by the original researchers and will be used as they are.
Third variables acting as covariates or moderators.

N/A

Planned Sample
If applicable, describe pre-selection rules.

10,319 unique participants who have completed both the MFQ and Big-5 questionnaire.
Indicate where, from whom and how the data will be collected.

The sample has already been gathered in previous research through the myPersonality application (mypersonality.org). The data is in the possession of the main researcher, however has not yet been looked at.
Justify planned sample size

A very large sample size such as this will result in much stronger inferences. The analysis will be using structural equation modelling so a large sample size is necessary.
If applicable, you can upload a file related to your power analysis here (e.g., a protocol of power analyses from G*Power, a script, a screenshot, etc.).

No files selected
Describe data collection termination rule.

N/A

Exclusion Criteria
Describe anticipated specific data exclusion criteria. For example: a) missing, erroneous, or overly consistent responses; b) failing check-tests or suspicion probes; c) demographic exclusions; d) data-based outlier criteria; e) method-based outlier criteria (e.g. too short or long response times).

Participants outside the U.S Any I.D with more than one participation (in which case, all responses from this I.D are deleted) Response set cutting rule: if every item is answered the same the participant will be deleted There are also two catch items in the MFQ: Part 1: MATH - "Whether or not someone was good at math." - This item is not scored; it is included both to force people to use the bottom end of the scale, and to catch and cut participants who respond with the last 3 response options (Haidt, 2009). Participants will be cut in line with this. Part 2: GOOD - "It is better to do good than to do bad." - Not scored, included to force use of top of the scale, and to catch and cut people who respond with first 3 response options (Haidt, 2009). Participants will be cut in line with this.

Procedure
Describe all manipulations, measures, materials and procedures including the order of presentation and the method of randomization and blinding (e.g., single or double blind), as in a published Methods section.

This study uses an exisiting dataset so there will be no experiment run. The hypothesis will be tested using multiple statistical techniques (SEM, case-based analysis). The only required materials are the main researchers computer on which the analysis will be run and the published document.

Recommended elements

Recommended elements

Procedure
Set fail-safe levels of exclusion at which the whole study needs to be stopped, altered, and restarted. You may pre-determine what proportion of excluded participants will cause the study to be stopped and restarted.

N/A
If applicable, you can upload any files related to your methods and procedure here (e.g., a paper describing a scale you are using, experimenter instructions, etc.)

No files selected

C. Analysis plan - Essential elements

Confirmatory Analyses

Describe the analyses that will test the first main prediction from the hypotheses section. Include:
the relevant variables and how they are calculated;

Demographic Variables: Age, State, Sex, Political identity Measured variables: Scores on the five foundations of the MFQ (30-item total, 6 items per foundation) Responses to items were scored individually as observed variables then each item corresponding to a specific

foundation of MFT were added to get scores for each foundation. Political Identity was assessed on 7-point likert scale anchored by strongly liberal and strongly conservative. Coded as: strongly liberal = -3; moderately liberal = -2; slightly liberal = -1; neutral/moderate = 0; slightly conservative = 1; moderately conservative = 2; strongly conservative = 3. Responses on the MFQ were coded as: Part 1: not at all relevant = 0; not very relevant = 1; slightly relevant = 2; somewhat relevant = 3; very relevant = 4; extremely relevant = 5. Part 2: strongly disagree = 0; moderately disagree = 1; slightly disagree = 2; slightly agree = 3; moderately agree = 4; strongly agree = 5. Responses by participants on all demographics and on the observed measure have been coded already by the original researchers and will be used as they are.
the statistical technique;

A latent variable model and standardized regression estimation will be used to assess the prediction of the study. Estimation Method: Maximum Likelihood (items continuous) Method for dealing with missing data - Single imputation Multiple exploratory analysis strategies, with varying estimation methods, will be used to assess how well the findings are supported across estimators. The following will be used: Full Information Maximum Likelihood Weighted Least Squares: this will mean treating the items as ordinal The same plots used by Graham et al. (2009) will also be used in this study to improve comparative strength. Finally, a case-based analysis will be run to assess the MFH on an individual participant level. With this, an exact amount of liberals and conservatives who conform to the MFH prediction will be established
each variable's role in the technique (e.g., IV, DV, moderator, mediator, covariate);

DV: scores on the MFQ. IV: Political identity Covariate IV: Age, sex, state
rationale for each covariate used, if any;

Three covariates are used to asses whether the predictive strength of the IV exists beyond demographic variables.
if using techniques other than null hypothesis testing (for example, Bayesian statistics), describe your criteria and inputs toward making an evidential conclusion, including prior values or distributions.

The MFH will be considered to be supported if both of the following occur: 1. The regression estimates for political identity predicting foundation scores are in the hypothesised direction (negative for harm and fairness; positive for ingroup, authority, and purity) and of significant levels (p<.05). 2. The model reaches the threshold of good fit for all of the following fit statistics. Fit statistics to report: Root mean square error of approximation (RMSEA) - Threshold of good fit = < 0.07 Comparative fit index (CFI) - Threshold of good fit = ≥ 0.95 Non-normed fit index/ tucker-lewis index (NNFI/TLI) - Threshold of good fit = ≥ .95

Final questions
Has data collection begun for this project?

Yes, data collection is underway or complete
If data collection has begun, have you looked at the data?

No
The (estimated) start and end dates for this project are

No response
Any additional comments before I pre-register this project

No response

Appendix b.

Moral Foundations Questionnaire

Part 1. When you decide whether something is right or wrong, to what extent are the following considerations relevant to your thinking? Please rate each statement using this scale:

[0] = not at all relevant (This consideration has nothing to do with my judgments of right and wrong)
[1] = not very relevant
[2] = slightly relevant
[3] = somewhat relevant
[4] = very relevant
[5] = extremely relevant (This is one of the most important factors when I judge right and wrong)

_____Whether or not someone suffered emotionally

_____Whether or not some people were treated differently than others

_____Whether or not someone's action showed love for his or her country

_____Whether or not someone showed a lack of respect for authority

_____Whether or not someone violated standards of purity and decency

_____Whether or not someone was good at math

_____Whether or not someone cared for someone weak or vulnerable

_____Whether or not someone acted unfairly

_____Whether or not someone did something to betray his or her group

_____Whether or not someone conformed to the traditions of society

_____Whether or not someone did something disgusting

_____Whether or not someone was cruel

_____Whether or not someone was denied his or her rights

_____Whether or not someone showed a lack of loyalty

_____Whether or not an action caused chaos or disorder

_____Whether or not someone acted in a way that God would approve of

Part 2. Please read the following sentences and indicate your agreement or disagreement:

[0]	[1]	[2]	[3]	[4]	[5]
Strongly disagree	Moderately disagree	Slightly disagree		Slightly agree	Moderately agree	Strongly agree

_____Compassion for those who are suffering is the most crucial virtue.

_____When the government makes laws, the number one principle should be ensuring that everyone is treated fairly.

_____I am proud of my country's history.

_____Respect for authority is something all children need to learn.

_____People should not do things that are disgusting, even if no one is harmed.

_____It is better to do good than to do bad.

_____One of the worst things a person could do is hurt a defenseless animal.

_____Justice is the most important requirement for a society.

_____People should be loyal to their family members, even when they have done something wrong.

_____Men and women each have different roles to play in society.

_____I would call some acts wrong on the grounds that they are unnatural.

_____It can never be right to kill a human being.

_____ I think it's morally wrong that rich children inherit a lot of money while poor children inherit nothing.

_____ It is more important to be a team player than to express oneself.

_____ If I were a soldier and disagreed with my commanding officer's orders, I would obey anyway because that is my duty.

_____ Chastity is an important and valuable virtue.

The Moral Foundations Questionnaire (full version, July 2008) by Jesse Graham, Jonathan Haidt, and Brian Nosek.

For more information about Moral Foundations Theory and scoring this form, see:
www.MoralFoundations.org