

Intuitive Ethics and Political Orientations: Testing Moral Foundations as a Theory of Political Ideology

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Abstract: Originally developed to explain cultural variation in moral judgments, moral foundations theory (MFT) has become widely adopted as a theory of political ideology. MFT posits that political attitudes are rooted in instinctual evaluations generated by innate psychological modules evolved to solve social dilemmas. If this is correct, moral foundations must be relatively stable dispositional traits, changes in moral foundations should systematically predict consequent changes in political orientations, and, at least in part, moral foundations must be heritable. We test these hypotheses and find substantial variability in individual-level moral foundations across time, and little evidence that these changes account for changes in political attitudes. We also find little evidence that moral foundations are heritable. These findings raise questions about the future of MFT as a theory of ideology.

Replication Materials: The data, code, and any additional materials required to replicate all analyses in this article are available on the *American Journal of Political Science* Dataverse within the Harvard Dataverse Network, at: <http://dx.doi.org/10.7910/DVN/WTUGFZ>.

Moral foundations theory (MFT) posits that moral judgments are based in “intuitive ethics,” an “innate preparedness to feel flashes of approval or disapproval toward certain patterns of events involving other human beings” (Haidt and Joseph 2004, 56). Widely adapted as a trait theory, MFT’s most prominent empirical application is as an explanatory model of individual-level political ideology (Federico et al. 2013; Graham, Haidt, and Nosek 2009; Haidt, Graham, and Joseph 2009; Joseph, Graham, and Haidt 2009; Koleva et al. 2012).

MFT may also address an unresolved issue raised by research suggesting that ideology, broadly defined as interrelated sets of political attitudes, is a stable individual-level dispositional trait that is heritable and neuro-

biologically influenced (Ahn et al. 2014; Hatemi and McDermott 2012). It remains unclear how preferences on, say, gay marriage or immigration can be biologically influenced and, presumably, products of evolutionary selection pressures. As a theory of ideology, MFT offers a potential solution to this puzzle. Political attitudes are often rooted in judgments of right and wrong, and more instinctual and rationalized than informed and rational (Lakoff 2002; McDermott 2004). Succinctly, MFT suggests these instinctual judgments spring from individual-level variation in psychological modules evolved to deal with “long standing threats and opportunities in social life” (Haidt 2012, 144).

If true, these modules—moral foundations—must have certain properties. First, they must be stable and

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dispositional (at least to a similar extent as political orientations). Second, any within-individual change in these modules should predict within-individual change in political attitudes and ideologies. Third, as products of evolutionary processes, they should be genetically influenced. While central assumptions of MFT as a theory of ideology, these properties have been subjected to little empirical analysis.

We treat these properties as hypotheses, testing them using a unique panel study of twins and family members. While largely confirming previously reported psychometric properties of moral foundations questionnaires (MFQs) and their correlations with political attitudes, we find limited evidence for these hypotheses. In our data, within-individual variation in moral foundations across time is dynamic, not stable; changes in moral foundations do not consistently predict changes in ideology; and individual differences in moral foundations are far more a product of environmental than genetic factors. Rather than finding moral foundations are stable, heritable traits that predict ideology, we find ideology is a stable, heritable trait that predicts moral foundations to a greater degree than the reverse. These unexpected findings raise questions about MFT as a theory of ideology, and they challenge assumptions central to MFT as a theory of moral judgment.

Moral Foundations Theory

MFT is anchored in the broad research literatures of moral psychology and the evolution of psychological traits, and political scientists have made contributions to these literatures independent of MFT (DeScioli et al. 2014). Until relatively recently, the study of moral psychology was dominated by theoretical frameworks emphasizing deliberative reasoning (Kohlberg 1976; Piaget 1965; Turiel 1983). From this perspective, responses to moral dilemmas are based on a rational process informed by experience and universal human values (especially avoiding harm to individuals or, more broadly, social justice). Paxton and Greene (2010) give an example of one individual persuading a friend to become a vegetarian on moral grounds because the suffering and slaughter of sentient animals in inhumane conditions is unjust. These individuals are engaging in moral reasoning, that is, making a moral choice based on conscious deliberation.

Social intuitionist models challenge this approach. They suggest moral judgments are driven by reflexive, implicit emotional responses that are as likely to be anchored in localized group values tied to considerations of authority and tradition as any universal “golden rules”

regarding what is socially just. Conscious moral reasoning is certainly acknowledged in social intuitionist frameworks, but it is seen mostly as a post hoc process justifying the intuitive choice (Shweder and Haidt 2000). From this perspective, the moral choice of Paxton and Greene’s (2010) vegetarians is based in a reflexive flash of negative affect at the thought of defenseless animals being slaughtered. That automatic emotional response is the causal key; the articulated concerns about the unjust, inhumane treatment of animals are post hoc rationalizations for the intuitive, emotional response.

MFT offers a well-constructed model of the origins and implications of such intuitions. In evolutionary terms, MFT defines morality functionally; it assumes the purpose of moral systems is to “suppress or regulate selfishness and make social life possible” and that these systems consist of “interlocking sets of values, practices, institutions and evolved mechanisms” (Haidt 2008, 70). The essential logic of MFT is that humans have a set of psychological modules evolved to generate rapid, intuitive evaluative judgments. We experience these as flashes of affect that tip us toward moral approval or disapproval (Haidt and Joseph 2004). Five modules have been identified and extensively studied:¹

(1) Care/Harm: a moral receptor sensitive to individual suffering and need that evolved to deal with the adaptive challenge of caring for offspring

(2) Fairness/Cheating: a receptor sensitive to evaluating cooperative tendencies that evolved to deal with the adaptive challenge of benefiting from collective action without being exploited

(3) Loyalty/Betrayal: a receptor sensitive to evaluating individual group loyalty/trustworthiness that evolved to deal with the adaptive challenge of building and maintaining coalitions

(4) Authority/Subversion: a receptor to make us sensitive to social rank or position evolved to deal with the adaptive challenge of living in social hierarchies

(5) Disgust/Purity: a receptor originally sensitive to pathogens and parasites adapted to a wide variety of socially relevant objects and situations. It evolved to meet the adaptive challenge of promoting social unity by treating perceived social threats or taboos as equivalent to disease (for descriptive details on the five moral foundations, see Haidt 2012).

The first two foundations (Care/Harm and Fairness/Cheating) are collectively labeled individualizing foundations because they center on evaluative judgments

¹There is preliminary evidence for a sixth foundation, Liberty/Oppression (Iyer et al. 2012).

relative to individuals. The remaining three are labeled binding foundations because they center on maintenance and protection of the group (Graham et al. 2011). All five are argued to be universal to humans, yet there is considerable individual- and group-level variation in how these modules are developed and expressed. While clearly seen as evolved and innate traits (i.e., “organized in advance of experience”; Haidt and Joseph 2011), these modules are also extensively modified by socialization. The institutions and collective social values found in a given cultural context play an important role in encouraging or retarding the development of particular foundations in a given individual (Haidt 2012; Haidt and Joseph 2004). For example, individuals who grow up in a society characterized by deference to tradition and an expectation that group needs will take precedence over individual needs are more likely to develop a stronger reliance on the binding foundations in making moral choices. An individual raised in a society that prizes individual liberty more than group preferences is more likely to develop a stronger reliance on individualizing foundations.

The role of culture and the environment in developing these psychological modules is an important element of MFT, yet there is no question that at the individual level, MFT assumes moral foundations to be stable, dispositional, and genetically influenced (Haidt 2012, 325–28). As Graham, Haidt, and Nosek (2009, 1031) put it, MFT assumes that “human beings have the five foundations as part of their evolved first draft, but . . . there is heritable variation.” Haidt and Joseph (2011) describe moral foundations as likely to be polygenic traits with developmental characteristics similar to many other heritable social phenotypes, that is, the product of the incremental influences of many genes interacting in complex ways with their environments. The combination of differing genetic endowment and social reinforcement explains individual-level variation in moral intuition and thus moral judgments. Haidt, Graham, and Joseph (2009, 112) use the analogy of dials on an audio equalizer; each foundation represents a dial, and the combination of settings on the five dials varies across individuals. Genetics and developmental forces determine these settings, and those settings are stable; they constitute an individual-level trait that determines the basis for “intuitive ethics” (Haidt and Joseph 2004).

Moral Foundations Theory and Ideology

Identifying the origins of political attitudes is a long-running puzzle for political psychologists, who note that individuals often hold very strong political views on the

basis of remarkably little information. Like moral decisions, political preferences routinely appear to be more rationalized than rational. There is considerable disagreement about the proximate and distal causes of ideology and political attitudes, but there is no doubt that expressing a political preference involves making a subjective judgment of good versus bad, and such choices often have a moral dimension (Emler, Renwick, and Malone 1983; Lakoff 2002).

MFT offers an explanation of why people wear different ideological labels or express different political preferences. Succinctly, what underlies individual-level variation in political orientation is systematic variation in the settings on the “dials” of moral foundations. Liberals have the individualizing foundations (Care/Harm and Fairness/Cheating) turned to high and the binding foundations turned to low. Conservatives have their dials set more equally across all five foundations, though some research finds conservatives higher on the binding foundations (Graham, Haidt, and Nosek 2009; Graham et al. 2011).

In addition to providing an explanation of the causal origins of individual-level variation in ideology, MFT may also provide a coherent theoretical umbrella for a rapidly growing set of empirical studies that find political ideology and political attitudes are heritable and neurobiologically influenced (Alford, Funk, and Hibbing 2005). While the empirical evidence linking MFT to political values is considerable, less clear are the causal pathways connecting biology and selection pressures to concepts such as ideological self-identification as liberal/conservative and attitudes on specific issues such as gay marriage and abortion. MFT proposes a solution to this missing link. Those with their “dials” set high on the individualizing foundations (i.e., liberals) are instinctively more likely to support gay marriage, whereas those who rely equally or more on the binding foundations (i.e., conservatives) may raise objections to gay marriage because of its violation of traditional group or cultural norms. In this scenario, what is heritable and biologically influenced are the underlying dial settings—moral foundations—not the issues of the day.

The correlations between moral foundations and political orientations provide support to treat MFT as a platform capable of explaining the causes of ideology and political attitudes, and they offer a reasonable theoretical account of why these characteristics can be heritable and biologically influenced. For that theoretical account to be correct, at least three assumptions about MFT as a theory of ideology must be true. First, moral foundations must be stable and dispositional. In contrast to research suggesting that political attitudes are dynamic and do not

reflect a coherent political worldview (Converse 1964), the totality of empirical evidence presents a convincing case that political attitudes are stable and ideology is, in part, a dispositional trait (Ansolabehere, Rodden, and Snyder 2008; Krosnick and Alwin 1989). Individuals can and do change their opinions on given issues or even shift their ideological perspective, but for the most part, conservatives tend to hold coherent conservative issue preferences and tend to stay conservative, and liberals do the same. From an MFT perspective, then, ideology is a stable dispositional trait because the underlying moral foundations are stable dispositional traits. As the settings on the dials are calibrated by genetic predisposition and social reinforcement, they are “sticky,” which accounts for the consistency and coherency of political attitudes. If the dials were easily spun by time and circumstance, MFT’s signature explanation for differences between conservatives and liberals—consistent differences in reliance on individualizing versus binding foundations—logically could not be true because such reliance would be inconsistent. MFT scholars readily acknowledge that environmental forces can move moral foundation dials around (Haidt, Graham, and Joseph 2009). Yet for MFT to explain ideology, the dial settings need to be stable within individuals across time, at least to the extent that ideology is stable within individuals across time.

The second central assumption is that any changes in moral foundations should systematically predict changes in political attitudes. Indeed, a number of scholarly works explicitly use some variation of the phrase “moral foundations cause/explain/predict/shape political attitudes” (e.g., Haidt 2012; Inbar, Pizarro, and Bloom 2012; Inbar et al. 2009; Kertzer et al. 2014; Koleva et al. 2012). Others are more agnostic on the causal order; Graham, Haidt, and Nosek (2009, 1042), for example, raise the question, “Do people first identify with the political left or right and then take on the necessary moral concerns, or do the moral concerns come first, or is there reciprocal influence or even an unidentified third variable at the root of both?” This ambiguity is reflected in research that interchanges moral foundations and political orientations as independent and dependent variables (Federico et al. 2013; Kertzer et al. 2014). Nevertheless, it is important to note that our primary focus is assessing moral foundations as potential causes of political attitudes because if ideology is at least partially grounded in reflexive emotional responses to particular stimuli, it implies a clear causal order: The intuitive moral judgment triggered by that implicit response (i.e., moral foundations) must come first.

The third assumption is that moral foundations are heritable. If these psychological modules are evolved,

polygenic traits with a “heritable foundation,” they must, by definition, be heritable (Graham, Haidt, and Nosek 2009, 1031; Haidt 2012, 325–28; Haidt, Graham, and Joseph 2009). While it may not be possible (at least at the current time) to identify specific genes linked to moral foundations, there is a clear expectation that individuals raised in similar environments with similar genetic endowments should share similar moral intuitions.

As a theory of ideology, then, the critical test of MFT is not limited to predicting a correlation between moral foundations and political attitudes. The causal mechanism posited for this correlation requires (a) that moral foundations are stable and dispositional at least to the extent that the settings on moral foundation “dials” at one point in time are predictive of those settings at a future point in time, (b) that any substantive change in moral foundation “settings” will result in changes in political attitudes and (c) that moral foundations are heritable. Despite their importance to MFT as a theory of ideology, these hypotheses have received little empirical analysis. The exception to this is Graham and colleagues’ (2011) examination of test-retest correlations on moral foundations questionnaires taken 28–43 days apart on 123 undergraduate students. As far as we are aware, we present the first comprehensive empirical test of all three hypotheses, including the first heritability analysis and the first panel study exploring the covariance between MFT and political orientations over a significant time period.

Data and Measures

We test our hypotheses using original data from surveys of a sample of Australian twins and family members collected at two points in time, alongside four U.S. replication samples. In our primary sample, we collected data from 586 participants (70% response rate) in Wave 1 (2007–09), comprising 250 complete twin pairs and 86 singletons. Approximately 18–24 months later in Wave 2 (2009–11), we recontacted 402 twins from the original sample and 186 new twins, as well as 583 mothers, 365 fathers, and 124 non-twin siblings from both waves (total Wave 2 $N = 1,605$; 77% response rate). While not designed as a formal panel study, our data collection results in two separate but overlapping samples, which affords a number of advantages (for details on sampling procedures and data collection, see Hatemi et al. 2015). Our design allows us to capture longitudinal change in political attitudes and moral foundations; that is, it allows us to test our first two hypotheses. Because the bulk of this sample is made up of twin pairs, it also allows us to

decompose the variance in moral foundations into genetic and environmental components; that is, it allows us to test the hypothesis that moral foundations are heritable. In addition, we can test our hypotheses in two separate samples.

We measured political attitudes in both waves in a Wilson and Patterson (1968) format. This measures liberalism-conservatism using a summed score of salient political attitudes where respondents are asked to agree or disagree (1 = *agree*, 0 = *disagree*, 0.5 = *unsure*) with a one- or two-word encapsulation of an issue (e.g., “gay marriage,” “immigration”), and responses are coded to reflect conservative positions and then summed for an overall measure. We restrict our analyses to the 22 identical attitude questions between waves. We chose this measure deliberately because it is a widely used and validated measure of ideology (Bouchard et al. 2003; Everett 2013), includes specific attitudes previously found to be linked to MFT measures (Inbar et al. 2009), captures the multidimensionality of ideology (Treier and Hillygus 2009), and, finally, because it is the primary measure employed in heritability studies of political attitudes (Hatemi et al. 2014; Martin et al. 1986). Indeed, various subscales of the index and its individual items have also been found to be heritable (for a review, see Hatemi and McDermott 2012). We do not have a 5- or 7-point self-report scale of liberal-conservative ideology in our Australian data because such a measure does not translate well within an Australian context. We do, however, have such a scale (1 = *extremely liberal* and 7 = *extremely conservative*) in our U.S. replication samples used to explore the psychometric properties of the moral foundation questionnaires (see discussion below). Correlations between Wilson-Patterson scores and self-reported ideology items were reliably between 0.76 and 0.81, indicating that our results would not substantially differ from a 5- or 7-point self-report measure.

To measure moral foundations, subjects in both waves completed Graham, Haidt, and Nosek’s (2009) Moral Foundations Questionnaire (MFQ). The latest versions of the MFQ currently recommended by Graham et al. (2011) were not developed (or at least publicly available) when the survey instrument for Wave 1 was constructed and fielded. The Wave 1 MFQ consisted of 10 items, two for each foundation; these items are largely identical to items used in the first developed MFQ (see Graham, Haidt, and Nosek 2009, Study 1) and focus on moral relevancy. The currently recommended short-form MFQ (<http://www.moralfoundations.org/questionnaire>; Graham et al. 2011) was available for Wave 2, so second-wave subjects completed this instrument. The latter consists of 20 items, four for each foundation, with 10 focused

on moral relevancy and 10 on moral judgment. Our complete instruments are reported in the online supporting information (SI).

In both waves, measures of internal consistency (Cronbach’s α) for our MFQ items for each of the five foundations were comparable to those reported by Graham et al. (2011) using cross-national samples (sample sizes by country ranged from $n = 56$ to $n = 26,014$) and to those reported on undergraduate and convenience samples in the United States, Australia, and other Western democracies (Nilsson and Erlandsson 2015; Weber and Federico 2013). Table S1 in the SI reports all alphas by dimension and wave, as well as comparison alphas from Graham et al. (2011).

We conducted exploratory factor analysis of the moral foundations items in both waves. We identified and replicated the same overall two-factor structure reflecting the individualizing and binding dimensions reported by Graham et al. (2011) in both Wave 1 and Wave 2 (loadings for individual items in a two-factor solution are reported for both MFQs in Tables S2 and S4; see Table S3 for results on a similar analysis using just the Wave 2 moral relevancy items). These results are consistent with extant approaches identifying a two-dimensional structure of morality (Lakoff 2002; McAdams et al. 2008; Nucci and Turiel 2009; Turiel 2002). Similar to Graham et al. (2011), however, we could not find the five-factor solution that Graham, Haidt, and Nosek (2009) suggest captures the underlying structure of MFQ instruments. We ran exploratory factor analyses using both oblique and orthogonal rotations on the Wave 1 and Wave 2 MFQs as well as the 10 moral relevancy items from the Wave 2 MFQ (i.e., an instrument comparable to the Wave 1 MFQ). All produced consistent results—the Wave 1 MFQ and the Wave 2 moral relevancy items fell clearly and cleanly into two factors recognizable as individualizing and binding foundations (see the SI for additional information on the factor analyses).

We replicated our MFQ instruments (i.e., the recommended short-form MFQ20 and our Wave 1 MFQ) along with the currently recommended full 30-item MFQ (MFQ30) on four independent U.S. samples: a random sample of adults from a midwestern state ($N = 342$; Deppe et al. 2013), a small undergraduate student sample from a large midwestern university ($N = 52$), and two adult convenience samples administered on Amazon.com’s Mechanical Turk platform (both collected in October 2014; first sample $N = 531$, second sample $N = 521$). These data yielded findings remarkably similar to the Australian samples; a variety of factor-analytic approaches consistently yielded a two-dimension individualizing/binding structure, again consistent with the two-factor structure

reported by Graham et al. (2011), but little support for the theorized five dimensions corresponding with the five moral foundations. All versions of the MFQ were highly similar to each other; short-form MFQ moral foundation scores were highly correlated with the full MFQ30. For the MFQ20 (i.e., our Wave 2 instrument), correlations with the full MFQ30 scores ranged from a low of 0.92 to a high of 0.97. For our truncated Wave 1 MFQ, correlations with the full MFQ30 ranged from a low of 0.62 to a high of 0.92. We report correlations for moral foundation scores for all versions of the MFQ for different samples in Table S5 of the SI.

In total, we performed a wide variety of factor analyses on four different versions of the MFQ (MFQ30; MFQ20, our Wave 2 instrument; the Wave 1 MFQ10; and an instrument comparable to the Wave 1 MFQ consisting of 10 moral relevancy items) using six different samples in two countries (two Australian, one U.S. student, two U.S. national using MTurk, one country-level random sample), with a total $N = 3,637$. Regardless of sample and version of the instrument, all analyses produced similar results: Different versions of the MFQ were highly correlated, underlying individualizing and binding foundations were readily identified and replicated, whereas a five-factor solution divided along the five moral foundations was much more elusive. These analyses increase confidence that the MFQs used in our Australian data are valid and reliable, but they also suggest that our investigations should pay particular attention to the individualizing and binding dimensions, not just the five individual moral foundations. The two-dimension structure was easily the most consistent and easy-to-replicate feature of data from MFQs regardless of the specific instrument or sample.

Table 1 reports bivariate correlations between the five moral foundation dimensions, the individualizing and binding factor scores from the factor analyses, and our ideology measure for both Wave 1 and Wave 2 samples. We also report correlations from scores using just the 10 moral relevancy items that are similar between the MFQ20 in Wave 2 and the MFQ in Wave 1 to provide a more direct comparison. These correlations fall roughly between .10 and .40; all replicate relationships reported in the extant literature, all are consistent, and 20 of the 21 are statistically significant at $p < .05$ (two-tailed test). The individualizing measures are all negatively correlated with conservatism and significant, suggesting the Care/Harm and Fairness/Cheating moral foundations associate with liberalism. The binding measures are all positively correlated with conservatism, and all are statistically significant ($p < .05$), except for the Loyalty/Betrayal scores taken from Wave 1. These findings replicate the moral

TABLE 1 Correlation between Moral Foundations and Ideology

Moral Foundation Dimension	Ideology Wave 1	Ideology Wave 2
Care/Harm	-.17*	-.10*
Care/Harm MFQ20		-.08*
Fairness/Cheating	-.18*	-.10*
Fairness/Cheating MFQ20		-.07*
Loyalty/Betrayal	.03	.13*
Loyalty/Betrayal MFQ20		.24*
Authority/Subversion	.14*	.21*
Authority/Subversion MFQ20		.31*
Disgust/Purity	.12*	.17*
Disgust/Purity MFQ20		.29*
Individualizing Factor	-.25*	-.17*
Individualizing Factor MFQ20		-.10*
Binding Factor	.18*	.27*
Binding Factor MFQ20		.38*
N	577	1,573

Note: Pearson's r reported. High ideology values = more conservative.

* $p < .05$.

foundations/ideology relationship reported in other studies.

Overall, our MFQs perform well psychometrically—they certainly seem to be reliable, replicate the key empirical finding of MFT and ideology in all of our samples, and provide a robust platform to test the stability of moral foundations, their impact on political attitudes across time, and their heritability.

Hypothesis 1: Moral Foundations Are Stable Traits

If moral foundations are stable dispositional traits, test-retest correlations should be high. Graham et al. (2011, 371) report test-retest correlations of 0.7–0.8 on MFQ items given to undergraduates an average of 37.4 days apart. They conclude that “item responses are quite stable over time and that within-occasion variation is more a function of the broad diversity of measurement rather than instability.” In our larger adult samples, test-retest correlations taken approximately 18–24 months apart returned a mean test-retest correlation of 0.33 (the diagonals of Table 2). While positive and significant, these are modest compared to similar test-retest correlations on political attitudes (see discussion below). Correlation sizes do not appear to be an artifact of comparing scores taken from slightly different MFQ instruments.

TABLE 2 Relationships between Wave 1 and Wave 2 Moral Foundation Scores

	Wave 1 Care/Harm	Wave 1 Fairness/ Cheating	Wave 1 Loyalty/ Betrayal	Wave 1 Authority/ Subversion	Wave 1 Disgust/ Purity	Wave 1 Ind. Factor	Wave 1 Bind. Factor
Wave 2 Care/Harm	0.25*	0.29*	0.13*	0.02	0.21*	0.31*	.08
Wave 2 Fairness/Cheating	0.28*	0.33*	0.20*	0.10	0.20*	0.33*	.14
Wave 2 Loyalty/Betrayal	−0.03	0.03	0.32*	0.31*	0.25*	−0.09	.40*
Wave 2 Authority/ Subversion	−0.05	0.02	0.21*	0.29*	0.21*	−.10	.33*
Wave 2 Disgust/Purity	−0.04	0.07*	0.18*	0.18*	0.34*	.05	.30*
Wave 2 Individualizing Factor	0.32*	0.34*	.17*	.07	0.21*	0.36*	.10*
Wave 2 Binding Factor	−0.18*	−0.06	0.23*	0.29*	0.27*	−.24*	.40*

Note: N = 370. Pearson's *r* reported.

**p* < .05.

Replicating the analyses using only the 10 common moral relevancy items from the MFQ20 used in Wave 2 and the MFQ10 used in Wave 1 returned an average test-retest correlation of 0.28 (see Table S6 of the SI). Four of the 10 moral relevancy items in the Wave 1 and Wave 2 MFQs were identically worded, and these returned an identical mean 0.28 test-retest correlation (see Table S7 in the SI). Moral foundation scores, then, account for 8–10% of the variance of moral foundation scores for the same people less than 2 years later.

Our data clearly reflect considerable dynamic variability in within-individual moral foundation scores, especially when compared to the test-retest correlation of political ideology (0.72, *p* < .001, *N* = 270). The mean difference between Wave 1 and Wave 2 Wilson-Patterson scores was not statistically significant (*t* = 1.24, *p* = .21, two-tailed, paired samples test). In order to make a more direct comparison between the MFQ and ideology instruments, we created a single factor score for the Wilson-Patterson ideology measure to extract the common variance across all items. The Wave 1 and Wave 2 ideology factors correlated at 0.77 (*p* < .001). Test-retest correlations for individual items on the attitude items varied, but they were generally between 0.4 and 0.5 and statistically significant. Political attitudes certainly moved around a little over the course of a year or two, but considerably less than moral foundations.

The central inference is that moral foundations are not particularly stable within individuals across time, at least compared to ideology. Rather than a trait, the results are more consistent with the notion of moral foundations as a state that consistently and meaningfully connects with ideology within a given time point,

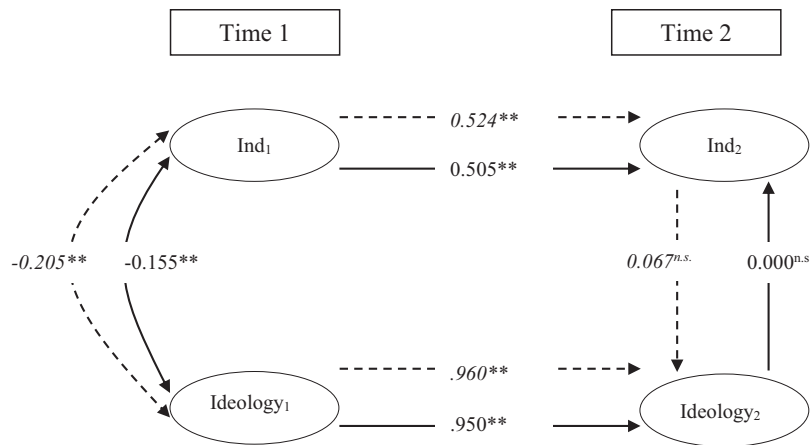
but are subject to considerable individual-level dynamic variability.

Hypothesis 2: Changes in Moral Foundations Will Predict Changes in Political Attitudes

If moral foundations causally influence political ideology, logically not only should moral foundations at time *t*₁ predict moral foundations at *t*₂, and political ideology at *t*₁ should predict ideology at *t*₂, but more crucially, changes in ideology at *t*₂ should also be mediated through changes in moral foundations. More simply, *if moral foundations cause political ideology, changes in moral foundations should correspond with changes in political ideology*. The direction of the causal relationship between ideology and moral reasoning has long been debated (Emler, Renwick, and Malone 1983). Weber and Federico (2013, 125), for example, argue in favor of testing for reciprocal causality specifically between moral foundations and ideology. Though our primary focus is on moral foundations as the cause of political attitudes, given that we found political attitudes to be considerably more stable than foundations, we test both causal pathways.

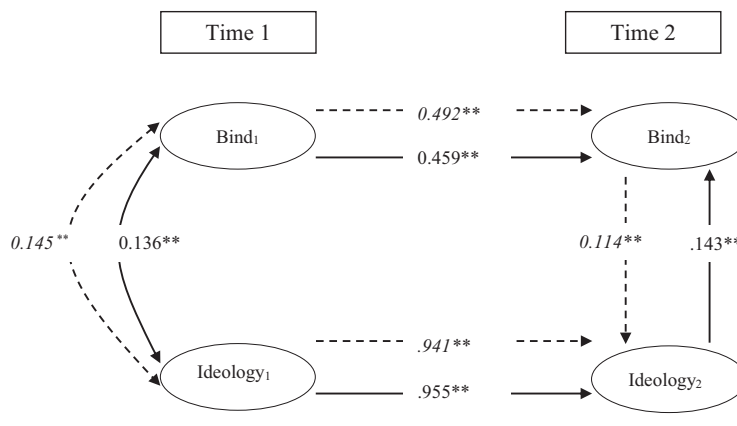
We tested these causal pathways by first estimating structural equation models of the longitudinal relationships between all of the individual moral foundations and political ideology dimensions in Mplus 6.12 (Muthén and Muthén 1998–2011). We only use those items where similar measures were present in both waves. We report results for the individualizing and binding factors in Figures 1 and 2, which use dashed lines to represent the

FIGURE 1 Longitudinal Relationships between Individualizing Foundations and Political Ideology



Note: Dashes and italic font represent a model where MFQs predict ideology (RMSEA = 0.047, CFI = 0.55, TLI = 0.53). Solid lines represent a model where ideology predicts MFQs (RMSEA = 0.047, CFI = 0.55, TLI = 0.53). Path coefficients are standardized estimates between the latent factors, and disturbances were clustered by family to account for the non-independence of the observations. $^{**}p < .01$, $^{*}p < .05$; coefficients with superscript $^{n.s.}$ are insignificant.

FIGURE 2 Longitudinal Relationships between Binding Foundations and Political Ideology



Note: Dashes and italic font represent a model where MFQs predict ideology (RMSEA = 0.045, CFI = 0.58, TLI = 0.56). Solid lines represent a model where ideology predicts MFQs (RMSEA = 0.047, CFI = 0.58, TLI = 0.56). Path coefficients are standardized estimates between the latent factors, and disturbances were clustered by family to account for the non-independence of the observations. $^{**}p < .01$, $^{*}p < .05$.

causal paths from moral foundations to ideology and solid lines for ideology to moral foundations (analyses for the five individual foundations are reported in Figures S1–S5 of the SI). As expected, ideology at t1 strongly predicts ideology at t2, and moral foundations at t1 predict moral foundations at t2. The crux of our hypothesis test is the path from moral foundations at t2 to ideology at t2, and vice versa; this represents a key causal link if

changes in moral foundations lead to changes in political attitudes.

For the individualizing factor, estimates for the causal path from moral foundations to ideology and for ideology to moral foundations are near zero and not statistically significant. The same is true for the Individualizing dimensions of Care/Harm and Fairness/Cheating. For the binding factor, the causal pathways are significant, but

TABLE 3 Cross-Lagged Differential for Individualizing, Binding, and Political Ideology

$r_{(x,y)}$	ρ_{x1y2}	ρ_{x2y1}	Δ	p-value
$r(\text{Binding, Ideology})$	0.150	0.160	-0.010	0.31
$r(\text{Individualizing, Ideology})$	-0.166	-0.263	0.097	0.09

Note: The values for ρ_{x1y2} and ρ_{x2y1} are the two cross-lagged correlations. The test of spuriousness is derived from the cross-lagged differential in the simple formula: $\rho_{x1y2} - \rho_{x2y1}$.

modest, and changes in ideology significantly predicted changes in binding to a greater degree (0.14) than changes in binding predicted changes in ideology (0.11). The paths from Disgust/Purity (0.10), Authority/Subversion (0.13), and Loyalty/Betrayal (0.11) to ideology were also significant, but again in most cases the paths from ideology to moral foundations were significant and larger (0.16, 0.17, and 0.10, respectively; see the SI). We then conducted cross-lagged correlation analyses (Kenny 1975) to identify whether these differences in predictive magnitude were spurious (see the SI and Tables S12–S14 for supporting analyses).

The cross-lagged differentials are presented in Table 3. For binding and ideology, the sign of the differential is negative, whereas the correlation is positive (see Table 1), suggesting ideology causally influences binding. However, the cross-lagged differential is not statistically distinct from equality; thus, we cannot rule out that the relationship is spurious. For individualizing and ideology, the sign of the differential is positive, whereas the correlation is negative (see Table 1), also hinting that ideology causally influences individualizing, but again the cross-lagged differential is not significant.

Our analyses point toward ideology having a slightly greater causal influence on moral foundations than vice versa, but the cross-lagged results mean we cannot reject the hypothesis that the relationships are spurious. Overall, then, we find no consistent support for the hypothesis that changes in moral foundations will lead to meaningful changes in ideology, at least not to a greater degree than changes in ideology lead to changes in moral foundations.

Hypothesis 3: Moral Foundations Are Heritable

The final hypothesis we test is not just important to MFT as a theory of ideology, but cuts to the central origins of the MFT conceptual framework, the assumption of evolved (i.e., genetically influenced) psychological modules.

To test the hypothesis of heritability, we use a twins-reared-together design that provides estimates of genetic and environmental influences on a given phenotype. Monozygotic (MZ) twins are the result of a single fertilized egg and share 100% of their chromosomal sequence. Dizygotic (DZ) twins are the result of separately fertilized eggs and, on average, are genetically as similar as any other pair of siblings. MZ and DZ twin pairs raised in the same household share similar familial environments—same ethnicity, socioeconomic class, neighborhood, and so on. This “common” environment combined with the genetic variance between the two types of twins allows the classic twin design to partition observed variance into the latent factors of additive genetic influence (A), common environmental influences (C) and unique environmental influences (E).

To achieve this variance partitioning, we used a maximum likelihood, structural equation modeling approach tailored for genetically informative data that is designed to minimize the discrepancies between observed and predicted covariance/variance matrices, generate estimates of model fit for a range of parameter values, and converge at the solution when it locates parameter values for A, C, and E that produce the lowest log-likelihood.

Table 4 reports univariate heritability analyses, corrected for sex, for the individualizing and binding factors, for each of the five moral foundations in Wave 1 and Wave 2, relying on the 10-item measures and the full MFQ20 in Wave 2 (see Table S11 of the SI for twin analyses without a sex correction). Analyses were conducted in classic Mx (Neale et al. 2002). Due to large and significant sex differences in the co-twin correlations, we report only the full models by sex (co-twin correlations by zygosity and sex are presented in Table S10 of the SI). Parameter values are standardized and reported as proportions of total variance (e.g., 0.35 indicates 35% of phenotypic variance is attributable to the relevant latent factor). For our purposes, most important are the estimates of phenotypic variance attributable to additive genetic influence (A or a^2). Our larger-N Wave 1 estimates find no consistent evidence of heritability in any of the MFT measures. None of the estimates significantly differ from zero, and all of the Wave 1 additive genetic estimates are $\leq .15$. Wave 2 estimates suggest modest levels of genetic influences on Fairness/Cheating for both sexes (.22–.31), Authority/Subversion for males only (.31), and Loyalty/Betrayal and Disgust/Purity for females only (.28 and .22, respectively). Again, however, these estimates are not statistically significant. Analysis of the MFQ20 from Wave 2 results in slightly larger estimates in Disgust/Purity and Care/Harm, and smaller estimates in Loyalty/Betrayal and Authority/Subversion, but none are significant.

TABLE 4 Genetic and Environmental Source of Variation on MFT and Political Ideology

Univariate Twin Models	Females			Males			-2LL	df	AIC
	a ²	c ²	e ²	a ²	c ²	e ²			
Individualizing Foundations									
Wave 1 Individualizing Factor	.04(.00-.32)	.05(.00-.27)	.91(.68-1.00)	.15(.00-.50)	.11(.00-.44)	.74(.50-.99)	1434.10	509	416.10
Wave 2 Individualizing Factor	.31(.00-.51)	.00(.00-.36)	.69(.49-.94)	.19(.00-.45)	.01(.00-.43)	.80(.54-1.00)	1215.41	423	369.41
Wave 2 MFQ20 Individualizing Factor	.27(.00-.49)	.03(.00-.32)	.70(.49-.96)	.09(.00-.44)	.15(.00-.45)	.76(.55-.98)	1207.22	423	361.22
Wave 1 Care/Harm	.00(.00-.22)	.01(.00-.19)	.99(.78-1.00)	.05(.00-.48)	.17(.00-.43)	.77(.52-1.00)	1951.36	509	933.36
Wave 2 Care/Harm	.13(.00-.36)	.02(.00-.27)	.85(.63-1.00)	.06(.00-.40)	.09(.00-.38)	.85(.60-1.00)	1854.48	423	1008.48
Wave 2 MFQ20 Care/Harm	.21(.00-.39)	.00(.00-.30)	.79(.60-1.00)	.25(.00-.49)	.00(.00-.42)	.75(.50-1.00)	2181.96	423	1335.96
Wave 1 Fairness/Cheating	.00(.00-.24)	.01(.00-.20)	.99(.76-1.00)	.00(.00-.35)	.04(.00-.28)	.96(.65-1.00)	1977.65	509	959.65
Wave 2 Fairness/Cheating	.31(.00-.52)	.00(.00-.34)	.69(.48-.95)	.22(.00-.49)	.02(.00-.48)	.76(.50-1.00)	1761.86	423	915.86
Wave 2 MFQ20 Fairness/Cheating	.35(.00-.55)	.00(.00-.30)	.65(.45-.90)	.16(.00-.52)	.14(.00-.49)	.70(.47-.95)	2088.04	423	1242.04
Binding Foundations									
Wave 1 Binding Factor	.12(.00-.34)	.00(.00-.24)	.88(.66-1.00)	.11(.00-.41)	.00(.00-.28)	.89(.59-1.00)	1463.12	509	445.12
Wave 2 Binding Factor	.22(.00-.47)	.06(.00-.40)	.72(.53-.94)	.06(.00-.40)	.09(.00-.36)	.85(.60-1.00)	1102.76	423	256.76
Wave 2 MFQ20 Binding Factor	.00(.00-.38)	.46(.11-.60)	.54(.40-.70)	.00(.00-.45)	.40(.06-.57)	.60(.39-.80)	1054.88	423	208.88
Wave 1 Authority/Subversion	.02(.00-.24)	.00(.00-.19)	.98(.76-1.00)	.00(.00-.26)	.00(.00-.19)	1.00(.74-1.00)	2092.63	509	1074.63
Wave 2 Authority/Subversion	.02(.00-.39)	.18(.00-.38)	.80(.60-1.00)	.31(.00-.53)	.00(.00-.46)	.69(.44-.97)	1829.41	423	983.41
Wave 2 MFQ20 Authority/Subversion	.08(.00-.52)	.26(.00-.50)	.65(.47-.86)	.19(.00-.46)	.00(.00-.38)	.81(.54-1.00)	2167.71	423	1321.71
Wave 1 Loyalty/Betrayal	.00(.00-.34)	.14(.00-.30)	.86(.63-1.00)	.00(.00-.28)	.07(.00-.26)	.93(.72-1.00)	2055.82	509	1037.82
Wave 2 Loyalty/Betrayal	.28(.00-.50)	.03(.00-.34)	.69(.50-.93)	.06(.00-.41)	.12(.00-.38)	.82(.59-1.00)	1828.96	423	982.96
Wave 2 MFQ20 Loyalty/Betrayal	.07(.00-.37)	.09(.00-.32)	.83(.62-1.00)	.01(.00-.39)	.21(.00-.43)	.79(.57-1.00)	2187.33	423	1341.33
Wave 1 Disgust/Purity	.12(.00-.40)	.05(.00-.29)	.83(.60-1.00)	.15(.00-.48)	.03(.00-.31)	.82(.52-1.00)	2170.73	509	1152.73
Wave 2 Disgust/Purity	.22(.00-.45)	.00(.00-.30)	.78(.55-1.00)	.00(.00-.26)	.02(.00-.30)	.97(.70-1.00)	1856.36	423	1010.36
Wave 2 MFQ20 Disgust/Purity	.33(.00-.54)	.01(.00-.36)	.65(.46-.90)	.17(.00-.49)	.06(.00-.42)	.78(.51-1.00)	2311.10	423	1465.10
Political Ideology									
Wave 1 Ideology	.51(.07-.66)	.00(.00-.42)	.49(.34-.70)	.59(.10-.72)	.00(.00-.36)	.41(.25-.66)	3231.03	510	2211.03
Wave 2 Ideology	.46(.09-.67)	.06(.00-.51)	.48(.33-.69)	.52(.08-.73)	.03(.00-.51)	.45(.27-.73)	2681.51	422	1837.51

Note: All models estimate the full ACE model, with means corrected for sex; a², c², and e² represent additive genetic, common environmental, and unique environmental influence, respectively. All measures are sum scores unless identified as a factor score.

Essentially the results are the same: sporadic, not significant, and little to no heritability in moral foundations.

Heritability analyses on the individualizing and binding factors lead to similar inferences. In Wave 1, there is little evidence for heritability, with an estimated 4 to 15% of the variance attributable to genetic influences. Estimates of heritability are both higher and lower in the smaller second-wave sample, depending on the measure and sex, ranging from 9 to 31% for individualizing and 0 to 22% for binding.

In summary, regardless of sample or MFQ measure, we cannot find consistent evidence for genetic influences on moral foundations, regardless of whether we treat moral foundations as five separate dimensions or as two latent individualizing/binding factors.

For comparison, Table 4 reports a heritability analysis of ideology measured by the Wilson-Patterson sum score. The Wave 1 and Wave 2 ideology scores provide similar estimates of genetic influence on ideology (0.54 and 0.44, for both sexes), and the estimates are significant. In other words, we have no problem replicating the well-established heritability of ideology in two samples (for a review, see Hatemi and McDermott 2012), and, unlike moral foundations, genetic influences account for a substantial portion of why individuals differ.

Discussion and Conclusion

MFT suggests political attitudes are driven by instinctual evaluations rooted in psychological modules shaped by Darwinian processes to solve repeated social dilemmas. This causal chain requires a set of assumptions about those psychological modules (moral foundations) that prior to this study had yet to be fully tested. In contrast to MFT's hypotheses, we find considerable within-individual dynamic variability in MFT measures, little evidence that change in MFT accounts for change in ideology, and minimal and sporadic evidence of heritability in the MFT measures. In contrast, political orientations demonstrated considerably more within-individual stability, they are heritable, and there was even some evidence (admittedly inconsistent) that changes in political orientations lead to changes in moral foundations to a greater degree rather than vice versa.

What might explain these findings? One obvious possibility is Type II error; the causal relationships suggested by MFT are real, but our analyses fail to identify them, most likely because of measurement error. We view this as unlikely for several reasons. First, Graham et al. (2011) find that reduced-item MFQ instruments are ro-

bust. Second, all the items in our instruments are widely used in MFQs, and the large majority are included in the most up-to-date recommended MFQ (<http://www.moralfoundations.org/questionnaires>). Third, our MFQs perform psychometrically similar to other moral foundation instruments, and they capture the predicted correlations with political attitudes. Fourth, we compared various versions of the MFQ instruments and found them to be highly correlated. At a minimum, if our results are unduly influenced by measurement error, this raises an issue not just for our analyses, but with the measurement of moral foundations generally.

Another potential cause of Type II error is that there may be something unique about the sample or population preventing accurate measurement. We view this as even less likely. First, our sample replicates the central empirical finding of the moral foundations literature: Moral foundations correlate with ideology. Second, other personality traits measured on the same population our sample is taken from remain consistent with the extant literature across populations (e.g., Heath, Cloninger, and Martin 1994). Third, we have little problem replicating the same basic psychometric properties of MFQ instruments in separate samples of American adults.

We also note that regardless of the version of the MFQ instrument and which of the six samples we applied it to, our analyses consistently point toward a two- rather than a five-dimensional structure. The individualizing/binding dimensions are certainly compatible with MFT, but the general lack of a clear five-dimensional structure seems inconsistent with the functional explanations of moral foundations (i.e., as psychological modules evolved to deal with specific adaptive problems related to social living; Schaller, Park, and Kenrick 2007). This warrants future investigation.

If the probability of Type II error is low, our findings—neither expected nor anticipated—suggest the need to refine or revise MFT as a theory of ideology. Put simply, our findings run contrary to assumptions underpinning MFT as a theory of ideology. The obvious inference from our analysis is either that moral value systems are not innate or that MFQ items and instruments are not validly and reliably tapping into such innate systems. It is also possible that these systems are so malleable by the social environment that the underlying genetic influences cannot be readily detected. If we accept that MFQ instruments capture general tendencies in moral decision making, our findings are consistent with the notion of moral foundations being highly responsive to context: more of a state than a trait. It may be through this mechanism—cognitive and emotional states resulting from development and experience—that moral foundations are tied

to ideology, rather than through psychological modules heavily influenced by selection pressures. It may also be that individuals choose or evoke moral foundations as reasons to justify their predisposed ideological values, a relationship already suggested by many (Emler 2003, 259; Emler, Renwick, and Malone 1983; Jost and Amodio 2012; Lakoff 2002; Lodge and Taber 2005).

This possibility is also hinted at in the existing MFT literature, which sometimes comes very close to describing moral foundations (or whatever is measured by MFQs) as a state rather than a trait. As Haidt, Graham, and Joseph (2009, 112) put it, MFQs are really tapping into “the degree to which individuals endorse and value the culturally constructed virtues and concerns built on one or more foundations.” This qualification is potentially important because it suggests MFQs tap into a *contextualized* more than a dispositional dimension of personality.

This is not necessarily a fatal blow for MFT. Haidt, Graham, and Joseph (2009, 110) describe moral foundations as a “Level 2 psychological construct” within McAdams’s (1995) three-level model of personality. Level 2 traits adapt to time and space, unlike Level 1 traits, which are nonconditional and decontextualized. Level 2 traits, as McAdams candidly discusses, are relatively ill defined. For Haidt, Graham, and Joseph (2009, 111), Level 2 dimensions are viewed as “much more variable than Level 1 traits across life stages and contexts” and, unlike Level 1 dimensions, are more responsive to experiential manipulation. This suggests place and context “turn the dials” of moral foundations to a greater extent than is typical for ideology. This certainly seems to have happened in the 18–24-month span our data cover. Perhaps moral foundations should *not* be conceptualized as heritable, stable, and dispositional traits, but as malleable cognitive and emotional states connecting—or even reflecting—more stable traits like personality and ideology.

Our findings are more compatible with both developmental perspectives and an emerging literature seeking to refine the social intuitionist challenge to traditional moral reasoning theories of moral psychology (Garvey and Ford 2014; Paxton and Greene 2010; Suhler and Churchland 2011). This acknowledges that social intuitionism is broadly correct in its claim that emotion plays a role in moral judgment, but suggests it is overly dismissive of the role of conscious deliberation. This has potentially important implications for how moral psychology translates into political preferences. Whatever is tapped by MFQs may consistently relate to ideological preferences not because liberals and conservatives have different “intuitive ethics” but because they employ different reasoning approaches to moral dilemmas (Emler,

Renwick, and Malone 1983). This makes sense because MFQs are *not an implicit measure*. MFQ items pose questions that invite a cognitive rather than an intuitive response. That conscious deliberation of these probes may lead to systematically different responses by ideology is a reasonable hypothesis compatible with the consistent empirical record of moral foundations correlating with political attitudes. It is also compatible with research suggesting that the relationship between moral foundations and political preferences is more nuanced if the latter is treated as a multidimensional concept or extended to include traits such as authoritarianism.

This, of course, partially reverses the causal expectations of MFT. Specifically, it suggests that the stable, dispositional, and heritable trait of ideology, or other traits, is either leading individuals into specific experiences that guide the constant updating of moral values, and causing contextualized, conscious deliberation of moral choices, or that moral values and ideological values co-constitute and mutually influence one another, with slightly stronger causal arrows going from ideology to moral foundations. Our study provides evidence for taking these alternative causal hypotheses seriously. If any are true, MFT is not likely to be an explanation of the *causes* of ideology—especially in the sense of its biological antecedents—but it retains considerable interest for framing investigations of the *consequences* of ideology.

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Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's website:

Figure S1: The Longitudinal Relationship between Disgust/Purity and Political Ideology

Figure S2: The Longitudinal Relationship between Care/Harm and Political Ideology

Figure S3: The Longitudinal Relationship between Authority/Subversion and Political Ideology

Figure S4: The Longitudinal Relationship between Fairness/Cheating and Political Ideology

Figure S5: The Longitudinal Relationship between Loyalty/Betrayal and Political Ideology

Table S1: Internal Consistency of Moral Foundation Items

Table S2: Factor Analysis of MFQ Items—Wave 1

Table S3: Factor Analysis of MFQ Items (Moral Relevancy Only) – Wave 2

Table S4: Factor Analysis of MFQ Items (Full MFQ20) – Wave 2

Table S5: Correlations of Instruments Used in Study with Contemporary Recommended Long- (MFQ30) and Short- (MFQ20) Form Moral Foundations Questionnaires

Table S6: Relationships Between Wave 1 and Wave 2 Moral Foundation Scores Using Moral Relevancy Items Only

Table S7: Correlations of Identical Questions Asked in Wave 1 and Wave 2

Table S8: Factor Analysis of Wave 1 and Wave 2 Moral Relevancy Items

Table S9: Correlations Between Individualizing/Binding Factors and Ideology

Table S10: Familial Correlations for MFT

Table S11: No Sex Correction Twin Analyses for MFT and Political Ideology

Table S12: Correlations between the latent traits, Binding and Political Ideology

Table S13: Correlations between the latent traits, Individualizing and Political Ideology

Table S14: (Table 3 in the article): Cross-Lagged Differential for Individualizing, Binding and Political Ideology