Epistemic Motivation and the Structure of Moral Intuition: Dispositional Need for Closure as a Predictor of Individualizing and Binding Morality

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Abstract: Moral foundations theory argues that morality encompasses both group-preserving binding concerns about in-group loyalty, authority and purity and individualizing concerns about harm avoidance and fairness. Although studies have examined the relationship between sociopolitical attitudes and the moral foundations, the relationship between individual differences in epistemic motivation—as indexed by need for cognitive closure—and moral intuition remains unexplored. Given the role of groups in providing epistemic security, we hypothesized that the need for closure would be most strongly related to support for the foundations most central to the regulation of group ties, that is, the binding foundations as opposed to the individualizing ones. Data from three samples provided evidence for this. Unpacking this pattern, we also found that those high in need for closure endorsed all foundations, whereas those low in need for closure emphasized only the individualizing ones. Finally, we found that the relationship between need for closure and the binding foundations was mediated by right-wing authoritarianism, an orientation closely linked to a desire for the preservation of conventional in-group morality.

Key words: need for cognitive closure; moral foundations theory; authoritarianism; political psychology

Although we all suffer from the occasional lapse in conscience or self-control, it is fair to say that morality exerts a powerful and pervasive influence on our thoughts, feelings and behaviour. Nevertheless, there is substantial dispositional variability in the kinds of thoughts, feelings and actions that people judge to be right or wrong—and even in the kinds of concerns that are regarded as dealing with morality at all. Perhaps, the most visible context in which these differences of opinion manifest themselves is the sociopolitical domain (e.g. Graham, Haidt, & Nosek, 2009; Gray & Wegner, 2011; Janoff-Bulman, Sheikh, & Baldacci, 2008; Skitka & Morgan, 2014). Moral foundations theory has been especially generative in this realm (Graham et al., 2009; Haidt & Graham, 2007). Besides emphasizing the centrality of affect and intuition in moral judgement (Haidt, 2001, 2007), this approach argues that the moral domain encompasses individual differences in both binding concerns about loyalty to in-groups, respect for authority, and purity and sanctity and individualizing concerns about caring for others and treating them fairly (Haidt & Graham, 2009; Haidt & Joseph, 2007; Shweder, Much, Mahapatra, & Park, 1997).

Notably, ideology is a reliable predictor of individual differences in support for the various foundations, with liberals endorsing only the individualizing foundations and conservatives endorsing both the individualizing and binding foundations (Graham et al., 2009). Although studies have also delved into the relationship between other sociopolitical orientations and the moral foundations (Federico, Weber, Ergun, & Hunt, 2013), there has been less systematic, theory-driven research on how individual differences in personality predict patterns of support for the moral foundations. In particular, there has been scant attention to how dispositional differences in epistemic needs and motives focused on the desire for certainty—in particular, the need for cognitive closure (NFC; Webster & Kruglanski, 1994)—link up with the moral foundations. In this study, we aimed to fill this lacuna in the literature.

Why focus on individual differences in epistemic needs? By providing guidelines for navigating a complex social world, the intuitive moral concerns highlighted by moral foundations theory may offer epistemic security. However, not all moral foundations are equal in epistemic terms. Because NFC predisposes individuals toward greater reliance on and allegiance to groups (Kruglanski, Pierro, Mannetti, & De Grada, 2006), we predicted that it will be most closely associated with moral foundations that affirm group norms and structures, protect social consensus and discourage dissent—that is, in-group loyalty, authority and purity, rather than fairness and caring for others. We describe our theory in the succeeding discussion.

THE MORAL FOUNDATIONS AND THEIR CORRELATES

Moral foundations theory focuses on elucidating the intuitive foundations of moral functioning (Graham et al., 2013; Haidt & Graham, 2007). Drawing on both anthropological
evidence and evolutionary models of human behaviour, the theory identifies core moral motives—or moral foundations—that reflect ‘innate psychological mechanisms that co-evolved with cultural institutions and practices’ (Graham et al., 2009, p. 1030; see also Richerson & Boyd, 2005; Shweder et al., 1997). Two foundations, harm/care and fairness/reciprocity, focus on concern for the suffering of others and ensuring fairness and reciprocity in relationships. These foundations are individualizing foundations: they secure the well-being and rights of individuals via an ‘ethic of autonomy’ (Haidt & Joseph, 2004; Shweder et al., 1997). The other three foundations, in-group/loyalty, authority/respect and purity/sanctity, focus on cohesively integrating people into groups and social institutions. As such, they are grouped together as binding foundations. The in-group/loyalty and authority/respect foundations ensure group cohesion and deference to group leaders, whereas purity/sanctity promotes reverence for the things regarded as sacred within a group and a more general avoidance of biological and social forms of ‘contamination’. While the in-group and authority foundations reflect a group-reinforcing ‘ethic of community’, purity corresponds to the ‘ethic of divinity’ underlying religious morality (Haidt & Joseph, 2007; Shweder et al., 1997).

As noted previously, individuals differ in the degree to which they support the various foundations. But what predicts these differences? In the extant literature, ideology is one of the most important answers to this question: those who identify as liberal tend to prize the individualizing foundations far above the binding, whereas conservatives tend to value all five dimensions more equally (Graham et al., 2009, 2011, 2013; Haidt & Graham, 2007). These differences reflect long-standing thematic differences between the left and the right, such as the historical liberal emphasis on individual rights and the historical conservative emphasis on tradition and organic social unity as counterweights to individualism (Haidt & Graham, 2007). Other sociopolitical variables have been linked to the various moral foundations in predictable ways as well. For example, social dominance orientation predicts reduced support for the individualizing foundations, whereas right-wing authoritarianism (RWA) predicts increased support for the binding foundations (Federico et al., 2013; Graham et al., 2011; Kugler, Jost, & Noorbaloochi, 2014). Similarly, Koleva, Graham, Iyer, Ditto and Haidt (2012) found that the binding foundations are especially linked to conservatism in the domain of social issues (e.g. gay rights and abortion).

In contrast, there has been less systematic attention to how individual difference variables other than explicitly sociopolitical ones relate to support for the foundations. Nevertheless, existing evidence suggests that personality variables reflecting sensitivity to threat and attention to social duty are associated with greater support for the foundations most central to the maintenance of protective group ties, that is, the binding foundations. For example, individual differences in perceived susceptibility to social threats (Federico et al., 2013; van Leeuwen & Park, 2009) and biological threats in the form of pathogens (van Leeuwen, Park, Koenig, & Graham, 2012; see also Graham et al., 2011; Horberg, Oveis, Keltner, & Cohen, 2009) are associated with greater support for the binding foundations. Similarly, various dimensions of the Big Five model of personality have been linked to the foundations. In particular, greater conscientiousness, or concern for duty, responsibility and impulse control, is associated with greater support for the binding foundations (Hirsh, DeYoung, Xu, & Peterson, 2010; Lewis & Bates, 2011). Thus, the considerations that people bring to bear in judging right from wrong are a predictable function of dispositions that more generally incline them to cherish (or to disregard) individualizing and binding moral concerns.

**THE EPISTEMIC DYNAMICS OF MORAL INTUITION: THE ROLE OF THE NEED FOR CLOSURE**

One important cluster of individual differences that has not received attention as a predictor of support for the moral foundations is that focused on epistemic needs for certainty (Krulanski, 2004). Perhaps, the most important of these variables is the need for closure, a tendency to seek and preserve certainty and to avoid uncertainty and ambiguity (Webster & Kruglanski, 1994). One of the most significant findings in the literature on NFC is the robustness with which it predicts a wide variety of sociopolitical attitudes and orientations. Individuals high in NFC are more likely to classify themselves as political conservatives (Jost, Glaser, Kruglanski, & Sulloway, 2003), adopt right-wing positions on social and political issues (Jost, Federico, & Napier, 2009) and display higher levels of authoritarianism, religious conservatism and nationalism (Jost et al., 2003; see also Cunningham, Nezlek, & Banaji, 2004; Federico, Golec, & Dial, 2005; Federico & Goren, 2009; Jost et al., 2007). Indeed, dispositional NFC is regarded as one of the most important individual difference predictors of attitudes in the social and political realms (Jost et al., 2009).

Despite the centrality of NFC to this literature, no studies that we are aware of have offered theoretically grounded predictions about how NFC should relate to various patterns of moral intuition, or even explored the correlations between NFC and endorsement of the different foundations. In the present study, we attempted to fill this gap by developing a basic model of how epistemic concerns should relate to the individualizing and binding moral foundations. Broadly, we argue that morality provides certainty by giving individuals clear, consistent and broadly applicable guidelines for how to behave—and for how to evaluate others’ behaviour—in a complex social world. However, some moral values may offer a more direct route to certainty than others. In this vein, the binding foundations in particular give external guidelines furnished by social groups a moral character. In this way, the binding foundations do more than provide people with a handy set of rules—they reflect a more general belief that following rules associated with one’s place in social groups, social institutions and even a broader cosmic order is good in and of itself. This led us to a second, more specific prediction: given that NFC is associated with support for group-
linked restraints, it would be especially related to support for the binding foundations. In this regard, it is also worth noting that NFC varies along a bipolar continuum, with some individuals manifesting a need to avoid closure. Whereas individuals high in NFC may be drawn toward the clear guidelines that the binding foundations uphold, those low in NFC might be actively repelled by the constraints that these foundations impose.

Research on the implications of NFC in group contexts reinforces this primary prediction. Ample evidence suggests that NFC is associated with a general syndrome of ‘groupcentrism’ characterized by greater in-group favouritism and conformity to in-group norms (Kruglanski et al., 2006; see also de Grada, Kruglanski, Mannetti, & Pierro, 1999; Federico et al., 2005; Golec & Federico, 2004; Golec de Zavala, Federico, Cislak, & Sigger, 2008; Kruglanski, Shah, Pierro, & Mannetti, 2002; Shah, Kruglanski, & Thompson, 1998). Like specific moral guidelines, groups offer useful guideposts with which individuals can navigate the social world. Groups and social categories provide useful cues for understanding others, deciding how to behave in particular situations, and establishing one’s own identity (Allport, 1954; Fiske & Neuberg, 1990; Hogg, 2000). This is especially true of highly entitative groups whose members’ characteristics can be more clearly and consistently inferred from group membership alone (Hogg, 2007; Kruglanski et al., 2006). Given that individuals high in NFC tend to be more group centric, they may also favour the moral considerations that support group cohesion. Again, the most relevant foundations in this regard should be the binding ones, which ascribe a moral character to the ideas that tie groups together—unity, common authority and consensual norms. Indeed, in a wide-ranging review of the implications of NFC in intergroup contexts, Kruglanski et al. (2006) note that people high in NFC ‘endorse central authority that sets uniform norms and standards; […] they suppress dissent, shun diversity, and show in-group favoritism; […] they venerate their group’s norms and traditions and display fierce adherence to its views […]’ (p. 84)—a pattern of behaviours that bears a striking resemblance to those aspects of morality that the binding foundations attempt to shore up.

Based on these considerations, we predicted that individual differences in NFC would be more strongly related to support for the binding foundations than the individualizing ones. In turn, this asymmetry suggests distinct patterns of support for the two sets of foundations among individuals low and high in NFC. We expected the individualizing and binding foundations to contribute to these patterns in different ways. On one hand, as noted earlier, we expected little variance in support for the individualizing foundations as a function of NFC. More specifically, we expected support for the individualizing foundations to remain uniformly high. Consistent with this expectation, prior work suggests that individuals show relatively high support for the individualizing foundations regardless of ideology (e.g. Graham et al., 2009) and even in states of regulatory depletion and cognitive load that limit one’s ability to control moral responses (Wright & Baril, 2011). On the other hand, whether or not the binding foundations are endorsed as well should vary with NFC. Thus, our primary hypothesis implied that we should observe a particular pattern of support for the moral foundations as a function of NFC. Specifically, we expected individuals dispositionally high in NFC to show relatively high support for the binding foundations as well as the individualizing ones, producing a uniform pattern of support across the two clusters of moral foundations; in contrast, we expected individuals low in NFC to resist committing themselves to strict group-linked guidelines, de-emphasizing the concerns represented by the binding foundations without rejecting the individualizing foundations.

THE MEDIATING ROLE OF RIGHT-WING AUTHORITARIANISM

Broadly speaking, previous research and theory on the moral foundations assume that support for the foundations should be related to prior sociopolitical commitments (Federico et al., 2013; Graham et al., 2009, 2011; Kugler et al., 2014) and that the relationship between ‘pre-political’ traits and the moral foundations is mediated by these sociopolitical commitments (Federico et al., 2013; see also Perry & Sibley, 2012). Therefore, we also explore the possibility of a mediated relationship between NFC and binding morality. Specifically, while we focused primarily on the asymmetric relationship between NFC and the two foundation clusters in the present study, we also hypothesized that the relationship between NFC and the binding foundations would be especially mediated by RWA, which reflects one’s willingness to submit to established in-group authorities, adhere to conventional in-group norms and support aggression toward out-groups (Altemeyer, 1996).

Prior research strongly suggests the relevance of RWA in this context. In theoretical terms, RWA—and the construct of authoritarianism more broadly—is thought to reflect a sociopolitical emphasis on the enforcement of norms that ensure cohesion and uniformity of identity, values and belief (Duckitt, 2001; Duckitt & Sibley, 2010; Federico et al., 2013; Feldman, 2003; Stenner, 2005). As Duckitt and Sibley (2010) put it, RWA is the ‘social attitudinal expression of values of collective security and order (social cohesion, order, stability, and tradition) as opposed to values of personal freedom and self-expression’ (p. 1867). Of course, these values of ‘collective security and order’ are typically realized in the context of group life (Graham et al., 2013). Indeed, the core of RWA can also be seen as a sociopolitical manifestation of the group-centrism and desire for homogeneity associated with NFC (Kruglanski et al., 2006; Van Hiel et al. 2004). Moreover, the sociopolitical concerns at the heart of RWA—support for in-group authority, conventional in-group norms and distinctiveness from cultural out-groups—should promote a moralization of group-related concerns like in-group loyalty, respect for authority and the protection of what is regarded as sacred.

Thus, we expected NFC to predict a stronger attitudinal emphasis on the themes embodied in RWA and that RWA in turn would be associated with a stronger emphasis on the binding moral foundations—such that RWA should
account for the relationship between NFC and binding morality predicted by our primary hypothesis. Extant research provides evidence for parts of this hypothesized picture. First, NFC is a particularly strong predictor of RWA (Federico, Ergun, & Hunt, 2014; Van Hiel et al., 2004). Second, RWA is an especially strong and specific predictor of support for the binding foundations (Federico et al., 2013; Kugler et al., 2014). Moreover, given that RWA is also commonly thought of as an antecedent of left–right ideology (e.g. Duckitt & Sibley, 2010; Federico et al., 2014; Jost et al., 2003), it may also be the case that NFC has an additional (and more complex) indirect relationship with binding morality. That is, NFC may predict RWA, which would in turn predict ideology, which would finally predict endorsement of binding morality. Despite examining these individual pieces of the puzzle, no study that we are aware of has examined the integrated hypothesis that RWA should mediate the relationship between NFC and the binding foundations. Thus, we also tested this second hypothesis in a final set of analyses.

OVERVIEW AND HYPOTHESES

Based on the theoretical considerations outlined earlier, we examined two hypotheses:

Hypothesis 1: Dispositional NFC should be more strongly related to the binding foundations than the individualizing ones, such that individuals low in NFC show a pattern of depressed support for the binding foundations relative to the individualizing ones, whereas individuals high in NFC show relatively similar levels of support for the two clusters of foundations.

Hypothesis 2: Right-wing authoritarianism should mediate the relationship between NFC and binding morality.

We examined these hypotheses in three different samples. Given the robust role that political ideology plays in predicting various patterns of moral intuition in a wide range of cultural contexts (Graham et al., 2013) and the fact that left–right ideology is itself strongly predicted by NFC (e.g. Jost et al., 2003), we either controlled for or incorporated self-reported ideology in all analyses in order to demonstrate that the effects of the NFC hold even when considering those of the predictor most commonly cited in the moral foundations literature.

METHOD

Samples and participants

Data came from three separate samples of undergraduates enrolled in psychology courses at a major university in the midwestern USA. Participants volunteered for the study in exchange for extra credit in one or more of their psychology courses. Participants were recruited for mass-testing sessions by class announcements, online advertisements on the department website and flyers posted in university buildings. All participants completed surveys individually.

Sample 1 included N=199 participants (mean age = 20.58, SD = 3.97), collected during the winter and spring of 2011. There were 128 women and 65 men, with one participant not indicating gender. Broken down by race/ethnicity, 152 participants were White, 19 were Asian-American, 10 were African-American, 1 was Latino/Latina and 17 indicated another or no classification.

Sample 2 included N=309 participants (mean age = 19.62, SD = 4.51), collected between the summer of 2008 and the winter of 2009. There were 200 women and 107 men, with two not indicating gender. Moreover, 218 participants were White, 51 were Asian-American, 15 were African-American, 9 were Latino/Latina and 16 indicated another or no classification.

Sample 3 included N=306 participants (mean age = 19.79, SD = 2.45), collected between the spring and fall of 2009. Of these, 166 were female, and 123 were male, with 17 not indicating gender. By race/ethnicity, 203 participants were White, 52 were Asian-American, 14 were African-American, 3 were Latino/Latina, 4 were Native American and 30 indicated another or none.

Measures

Our three key measures are described earlier for each data set.1 For easier interpretation of effect sizes, all variables were recoded to run from 0 to 1.

Moral Foundations Questionnaire

The five original moral foundations identified by Haidt and Graham (2007)—harm, fairness, in-group/loyalty, authority/respect and purity—were measured using the 30-item version of the Moral Foundations Questionnaire (Graham et al., 2011). For each foundation, a composite scale was created by recoding all responses to run from 0 to 1 and then averaging both the ‘relevance’ and ‘judgments’ items for each foundation into a single scale (e.g. Federico et al., 2013). Because our primary interest was in whether epistemic motives differentially predict the individualizing and binding foundations, we also generated composite measures for each of the two general clusters: harm and fairness were averaged to form an individualizing foundations scale, and in-group/loyalty, authority/respect and purity were averaged to form a binding foundations scale. Summary statistics for the five foundation scales and the individualizing and binding composites are shown in Table 1.

Left–right ideology

In order to control for the variable most commonly highlighted as a predictor of differential patterns of moral foundation endorsement (e.g. Graham et al., 2009), we included a control for ideology in each sample. The variable was measured using standard self-placement items (e.g. Federico, Deason, & Fisher, 2012). In samples 1 and 3, a single item was used: ‘How would you describe your

1Participants in all three samples received wide-ranging omnibus surveys assembled by multiple investigators interested in different hypotheses. As such, the surveys contained a variety of measures besides the ones listed here.
political outlook? Responses were given on a scale ranging from 1 (very liberal) to 7 (very conservative); higher scores indicate greater conservatism (M=0.44, SD=0.24, in sample 1; M=0.44, SD=0.26, in sample 3). In sample 2, two items were used: ‘How would you describe your political outlook with respect to economic issues?’ and ‘How would you describe your political outlook with respect to social issues?’ Responses were given on scales ranging from 1 (very liberal) to 7 (very conservative). The two items were highly correlated (r=0.53, p<0.001), so they were averaged to form a scale (with higher scores indicating greater conservatism; M=0.24).

Need for closure
Individual differences in the key epistemic motive we focus on in this study were operationalized using the NFC scale (Webster & Kruglanski, 1994). Samples 1 and 3 used a short 14-item version of the scale. Data collected by Pierro and Kruglanski (2006) in the USA and Italy suggest that this short scale has excellent psychometric properties, showing relatively high reliability (α=0.81, in the USA; α=0.79, in Italy) and strong disattenuated correlations with the original 42-item scale (r=0.92, in the USA; r=0.93, in Italy). The scale has been successfully used in recent published work as well (Pierro & Kruglanski, 2008; see also Federico et al., 2012). The items in this scale can be found in the online Appendix. These items were averaged to form scales in each sample; higher scores indicate greater NFC (α=0.83, M=0.44, SD=0.14, in sample 1; α=0.83, M=0.46, SD=0.14, in sample 3). Sample 2 used the full 42-item version of the NFC scale (Webster & Kruglanski, 1994). These items were also averaged to form a scale, with higher scores indicating a greater NFC (α=0.85, M=0.53, SD=0.17).2

Right-wing authoritarianism
Because of length restrictions in our surveys, RWA was measured using the short ‘Continuing Twelve’ version of the RWA scale, comprising 12 items that have appeared consistently on successive versions of the instrument (Altemeyer, 1988, 1996). This short scale correlates with other variables in the same way as full versions of the scales, and it has been used in a number of previous studies (Altemeyer, 1988, 1996; Dollinger, 2007; Federico, Hunt, & Ergun, 2009; Federico et al., 2013, 2014). The items are listed in the online Appendix. All items were recoded so that higher numbers indicated higher RWA and then averaged to form a single composite (α=0.81, M=0.47, SD=0.15, in sample 1; α=0.74, M=0.58, SD=0.16, in sample 2; and α=0.76, M=0.54, SD=0.16, in sample 3).

RESULTS
Need for closure and support for individualizing and binding moral concerns
Our first and primary hypothesis suggested that dispositional NFC should be more strongly related to the binding foundations than the individualizing ones, net of ideology. A simple way of examining this hypothesis would be to regress the individualizing foundations on NFC and then do the same with the binding foundations in a second model. However, we wanted to statistically compare the coefficient for NFC when predicting each cluster of foundations, so we used multilevel modelling to predict both foundation clusters in the context of a single model. Thus, in each sample, we treated each individual’s score on each foundation as a separate observation, giving us five observations per participant (resulting in N=964 in sample 1; N=1465, in sample 2; and N=1440, in sample 3); all such observations from the same participant have the same score on NFC and ideology. We then created a dummy variable to indicate whether the outcome for a particular observation was an individualizing foundation score or a binding foundation score. Observations containing participants’ scores on harm and fairness were given a value of 0 on this indicator, and observations

2Research on the full need for closure (NFC) scale indicates that items from the decisiveness subscale of the measure are often poorly correlated with items from the other subscales and that the decisiveness items in the original 42-item NFC scale actually tap ability to decide rather than a ‘need’ to do so (as the theory behind NFC would suggest; Roets & Van Hiel, 2007). This was the case in our data: the average correlation between the decisiveness and the other four subscales (preference for order and structure, desire for predictability, discomfort with ambiguity and close-mindedness) was r=0.17, whereas the average correlation among the other four subscales was r=0.58. Moreover, when we ran our main analysis using only the decisiveness subscale, the latter was unrelated to either the individualizing foundations (b=−0.06, p>0.10) or the binding foundations (b=0.02, p>0.10), consistent with the idea that the original decisiveness items fail to adequately tap a need for decisiveness. As suggested by Roets and Van Hiel (2007), we therefore repeated all of the sample 2 analyses using a reduced NFC scale excluding all of the decisiveness items (α=0.87). The results of these analyses were substantively identical and are available on request from the authors.
containing their scores on in-group/loyalty, authority/respect and purity were given a score of 1. Foundation support was then regressed on ideology, NFC, the foundation-type indicator, and the cross-level ideology × individualizing/binding and NFC × individualizing/binding interactions.\(^3\) The NFC × individualizing/binding interaction thus tests our hypothesis by contrasting the coefficient for NFC when predicting the individualizing foundations with coefficient for NFC when predicting the binding foundations; the ideology × individualizing/binding interaction contrasts the relationship between ideology and individualizing with the relationship between ideology and binding. In all samples, both the intercept and the coefficient for the foundation-type indicator were allowed to vary randomly across participants.\(^4\) Finally, in all analyses, the 0–1 variable codings were used; no variables were centred.

We present full estimates for these models in the three samples in Tables 2–4. Several findings stand out. First, support for the binding foundations clearly differed more as a function of NFC than support for the individualizing foundations did. Consistent with this, the NFC × individualizing/binding interaction was significant in all samples: \(b = 0.31\) (95% confidence [CI]: 0.16, 0.47), in sample 1; \(b = 0.19\) (95% CI: 0.10, 0.28), in sample 2; and \(b = 0.28\) (95% CI: 0.18, 0.38), in sample 3. Moreover, the ideology × individualizing/binding interactions were significant in all three samples (ps < 0.001), suggesting that the relationship between ideology and foundation endorsement also differed across the individualizing/binding distinction.

To probe these interactions, we computed simple slopes for relationships between ideology and NFC and foundation types. In all samples, the level 1 specification was foundation support = \(\beta_0 + \beta_1(\text{ideology type}) + r_i\). The level 2 specifications were \(\beta_0 = \gamma_{00} + \gamma_{01}(\text{NFC}) + \gamma_{02}(\text{ideology}) + u_{0j}\), for the intercept, and \(\beta_1 = \gamma_{10} + \gamma_{11}(\text{NFC}) + \gamma_{12}(\text{ideology}) + u_{1j}\), for the foundation-type coefficient.

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Table 2. Moral foundation support as a function of ideology and NFC: full model estimates for sample 1

<table>
<thead>
<tr>
<th>Foundation support</th>
<th>b</th>
<th>SE</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideology</td>
<td>−0.13*** (0.03)</td>
<td>[−0.19, −0.06]</td>
<td></td>
</tr>
<tr>
<td>NFC</td>
<td>−0.04 (0.06)</td>
<td>[−0.15, 0.08]</td>
<td></td>
</tr>
<tr>
<td>Individualizing/binding</td>
<td>−0.48*** (0.04)</td>
<td>[−0.55, −0.41]</td>
<td></td>
</tr>
<tr>
<td>Ideology × individualizing/binding</td>
<td>0.40*** (0.04)</td>
<td>[0.31, 0.48]</td>
<td></td>
</tr>
<tr>
<td>NFC × Individualizing/binding</td>
<td>0.33*** (0.07)</td>
<td>[0.18, 0.47]</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.74*** (0.03)</td>
<td>[0.69, 0.80]</td>
<td></td>
</tr>
<tr>
<td>Variance components for random effects</td>
<td>Intercept</td>
<td>0.006 (0.001)</td>
<td>[0.004, 0.008]</td>
</tr>
<tr>
<td></td>
<td>Coefficient for individualizing/binding</td>
<td>0.007 (0.002)</td>
<td>[0.005, 0.011]</td>
</tr>
<tr>
<td></td>
<td>−2 × log-likelihood</td>
<td>−998.28</td>
<td></td>
</tr>
<tr>
<td>Wald (\chi^2) (degrees of freedom)</td>
<td>408.17 (5)***</td>
<td></td>
<td></td>
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</tbody>
</table>

Note: Entries are unstandardized estimates from a multilevel linear mixed model. Number of level 1 units = 1465; number of level 2 units = 288. NFC, need for closure.

\(*p < 0.05;\)
\(**p < 0.01;\)
\(***p < 0.001.\)

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Table 3. Moral foundation support as a function of ideology and NFC: full model estimates for sample 2

<table>
<thead>
<tr>
<th>Foundation support</th>
<th>b</th>
<th>SE</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideology</td>
<td>−0.14*** (0.03)</td>
<td>[−0.19, −0.08]</td>
<td></td>
</tr>
<tr>
<td>NFC</td>
<td>−0.01 (0.04)</td>
<td>[−0.09, 0.07]</td>
<td></td>
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<tr>
<td>Individualizing/binding</td>
<td>−0.41*** (0.03)</td>
<td>[−0.46, −0.36]</td>
<td></td>
</tr>
<tr>
<td>Ideology × individualizing/binding</td>
<td>0.35*** (0.03)</td>
<td>[0.29, 0.42]</td>
<td></td>
</tr>
<tr>
<td>NFC × Individualizing/binding</td>
<td>0.19*** (0.04)</td>
<td>[0.10, 0.28]</td>
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</tr>
<tr>
<td>Intercept</td>
<td>0.78*** (0.02)</td>
<td>[0.74, 0.82]</td>
<td></td>
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<tr>
<td>Variance components for random effects</td>
<td>Intercept</td>
<td>0.005 (0.001)</td>
<td>[0.004, 0.007]</td>
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<tr>
<td></td>
<td>Coefficient for individualizing/binding</td>
<td>0.005 (0.001)</td>
<td>[0.003, 0.007]</td>
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<tr>
<td></td>
<td>−2 × log-likelihood</td>
<td>−1726.82</td>
<td></td>
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<tr>
<td>Wald (\chi^2) (degrees of freedom)</td>
<td>586.73 (5)***</td>
<td></td>
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</table>

Note: Entries are unstandardized estimates from a multilevel linear mixed model. Number of level 1 units = 1465; number of level 2 units = 293. NFC, need for closure.

\(*p < 0.05;\)
\(**p < 0.01;\)
\(***p < 0.001.\)

---

Table 4. Moral foundation support as a function of ideology and NFC: full model estimates for sample 3

<table>
<thead>
<tr>
<th>Foundation support</th>
<th>b</th>
<th>SE</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideology</td>
<td>−0.12*** (0.03)</td>
<td>[−0.17, −0.06]</td>
<td></td>
</tr>
<tr>
<td>NFC</td>
<td>−0.08 (0.05)</td>
<td>[−0.19, 0.02]</td>
<td></td>
</tr>
<tr>
<td>Individualizing/binding</td>
<td>−0.40*** (0.02)</td>
<td>[−0.45, −0.35]</td>
<td></td>
</tr>
<tr>
<td>Ideology × individualizing/binding</td>
<td>0.33*** (0.03)</td>
<td>[0.28, 0.38]</td>
<td></td>
</tr>
<tr>
<td>NFC × Individualizing/binding</td>
<td>0.28*** (0.05)</td>
<td>[0.18, 0.38]</td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>0.76*** (0.03)</td>
<td>[0.71, 0.81]</td>
<td></td>
</tr>
<tr>
<td>Variance components for random effects</td>
<td>Intercept</td>
<td>0.010 (0.001)</td>
<td>[0.008, 0.013]</td>
</tr>
<tr>
<td></td>
<td>Coefficient for individualizing/binding</td>
<td>0.005 (0.001)</td>
<td>[0.003, 0.007]</td>
</tr>
<tr>
<td></td>
<td>−2 × log-likelihood</td>
<td>−1791.36</td>
<td></td>
</tr>
<tr>
<td>Wald (\chi^2) (degrees of freedom)</td>
<td>536.00 (5)***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Entries are unstandardized estimates from a multilevel linear mixed model. Number of level 1 units = 1465; number of level 2 units = 293. NFC, need for closure.

\(*p < 0.05;\)
\(**p < 0.01;\)
\(***p < 0.001.\)
endorsement in the individualizing and binding response categories. The resulting slopes represent the overall relationships between ideology and NFC and the individualizing and binding foundation clusters. We summarize these estimates in Table 5. Consistent with our primary hypothesis, the relationship between NFC and the binding foundations was significant in all samples ($b_{1} = 0.29$ [95% CI: 0.15, 0.42], in sample 1; $b_{2} = 0.18$ [95% CI: 0.10, 0.27], in sample 2; and $b_{3} = 0.20$ [95% CI: 0.08, 0.31], in sample 3), whereas the relationship between NFC and the individualizing ones was not ($b_{1} = -0.02$ [95% CI: -0.14, 0.00], in sample 1; $b_{2} = -0.01$ [95% CI: -0.09, 0.07], in sample 2; and $b_{3} = -0.08$ [95% CI: -0.19, 0.02], in sample 3). Because all variables were recoded to run from 0 to 1, these coefficients also provide estimates of effect size. Thus, in sample 1, moving from the minimum to maximum value of NFC non-significantly reduced support for the individualizing foundations by 4% of their full range but significantly increased support for the binding foundations by a full 29% of their range. Similar, in sample 2, moving from the minimum to maximum value of NFC decreased support for the individualizing foundations by 1% of their full range and increased support for the binding foundations by 18% of their range. Finally, in sample 3, going from the minimum to maximum value of NFC reduced support for the individualizing foundations by 8% of their full range and increased support for the binding foundations by 20% of their range.

In addition, the slopes for the relationships between ideology and the two foundation types paralleled what has been found in previous research (e.g., Federico et al., 2013; Graham et al., 2011). Specifically, ideology had a consistently negative relationship with endorsement of the individualizing foundations (all $p_{S} < 0.001$) and a consistently positive relationship with endorsement of the binding foundations (all $p_{S} < 0.001$). Moreover, consistent with the idea that left–right differences are more pronounced with respect to the binding foundations than the individualizing foundations (e.g., Graham et al., 2009), the effect sizes implied by the slope estimates suggested that the absolute magnitude of the relationships between ideology and binding foundation endorsement was somewhat stronger: that is, going from one end of the ideological spectrum to the other was associated with 27% change in binding endorsement versus 13% change in individualizing endorsement in sample 1, 22% change in binding versus 14% change in individualizing in sample 2 and 21% change in binding versus 12% change in individualizing in sample 3.

### Need for closure and differing patterns of moral intuition

Thus, our first hypothesis received strong support in all three samples. However, the logic of this hypothesis also implies that these relationships should be undergirded by distinct patterns of moral intuition among those low and high in NFC. Specifically, individuals low in NFC should show a pattern of depressed support for the binding foundations relative to the individualizing ones, whereas individuals high in NFC should show relatively similar levels of support for the two clusters of foundations. To explore this possibility, we used estimates from the models to plot predicted levels of support for the individualizing and binding foundations as a function of individual differences in NFC, controlling for ideology. These plots are shown in Figure 1; the lines plot support for each foundation cluster as a function of NFC. These plots reveal patterns that were uniformly consistent with the logic of our hypothesis. In all samples, individuals low in NFC showed a depressed pattern of support for the binding foundations relative to the individualizing ones, whereas

---

**Table 5. Support for binding and individualizing foundations as a function of ideology and need for closure**

<table>
<thead>
<tr>
<th>Sample 1</th>
<th>Individualizing morality</th>
<th>Binding morality</th>
<th>Sample 2</th>
<th>Individualizing morality</th>
<th>Binding morality</th>
<th>Sample 3</th>
<th>Individualizing morality</th>
<th>Binding morality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ideology</td>
<td>-0.12***</td>
<td>0.27***</td>
<td>-0.14***</td>
<td>0.22***</td>
<td>-0.12***</td>
<td>0.21***</td>
<td>-0.17</td>
<td>-0.06</td>
</tr>
<tr>
<td></td>
<td>[-0.19, -0.06]</td>
<td>[0.19, 0.35]</td>
<td>[-0.19, -0.08]</td>
<td>[0.16, 0.28]</td>
<td>[-0.17, -0.06]</td>
<td>[0.15, 0.27]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Need for closure</td>
<td>-0.04</td>
<td>0.29***</td>
<td>-0.01</td>
<td>0.18***</td>
<td>-0.08</td>
<td>0.20***</td>
<td>-0.09</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>[-0.15, 0.08]</td>
<td>[0.15, 0.42]</td>
<td>[-0.09, 0.07]</td>
<td>[0.10, 0.27]</td>
<td>[-0.19, 0.02]</td>
<td>[0.08, 0.31]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Entries are unstandardized simple slope estimates derived from multilevel linear mixed models; 95% confidence intervals are given in brackets.

$*p < 0.05$;

$**p < 0.01$;

$***p < 0.001$.

---

Although we present only the basic models in the text, we also conducted robustness checks to ensure that our results held up when other relevant controls were considered. We considered two sets of controls: (1) income, because socioeconomic status has been linked to support for the binding foundations (Cote, 2011), and (2) the openness and conscientiousness dimensions of the Big Five, given their strong links to sociopolitical and moral attitudes (Jost et al., 2009; Lewis & Bates, 2011). In samples 1 and 2, only income was available. When this variable and its interaction with the foundation-type dummy were included, the critical NFC x individualizing/binding interactions remained virtually unchanged: $b = 0.31$ (95% confidence interval [CI]: 0.17, 0.46), in sample 1, and $b = 0.19$ (95% CI: 0.11, 0.28), in sample 2, both $p < 0.001$. As before, the relationship between NFC and the binding foundations reached significance: $b = 0.29$ (95% CI: 0.16, 0.43), in sample 1, and $b = 0.18$ (95% CI: 0.10, 0.27), in sample 2; both $p < 0.001$. The relationships between NFC and the individualizing foundations were not significantly different from zero: $b = -0.02$ (95% CI: -0.14, 0.09), in sample 1, and $b = -0.01$ (95% CI: -0.09, 0.07), in sample 2; both $p > 0.05$. In sample 3, income, openness and conscientiousness were available. When these three controls and their interactions with the foundation-type dummy were included, the NFC x individualizing/binding interactions remained significant: $b = 0.13$ (95% CI: 0.02, 0.24), $p < 0.001$. Although NFC significantly predicted endorsement of both foundation types in this analysis, its relationship with the binding foundations was over twice as strong: that is, $b = 0.24$ (95% CI: 0.13, 0.36), $p < 0.001$, vs $b = 0.11$ (95% CI: 0.003, 0.22), $p < 0.05$. Thus, our results are robust to the inclusion of key controls.

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individuals high in NFC showed a relatively similar pattern of support for both sets of foundations. Furthermore, while individuals at all NFC levels supported the individualizing foundations at levels significantly above the rescaled midpoint of 0.5, only individuals at higher levels of NFC supported the binding foundations at levels that rose reliably above the midpoint. As a reminder, all of these patterns were taken from models that control for ideology; thus, they reflect the predictive power of NFC over and above the effects of the variable most commonly associated with different patterns of moral intuition in the literature (e.g. Graham et al., 2009).

As a further illustration of how differential support for the two sets of foundations varies as a function of NFC, we also estimated simple slopes for the foundation-type indicator (with 95% CIs) at values across the full range of the NFC variable. These estimates are plotted in Figure 2. In essence, the slope values represent estimated mean support for the binding foundations minus estimated mean support for the individualizing foundations at different NFC levels. These estimates indicated that support for the binding foundations was significantly and consistently lower than support for the individualizing foundations when NFC was at its minimum ($b = -0.31$ [95% CI: $-0.37$, $-0.24$], in sample 1; $b = -0.25$ [95% CI: $-0.30$, $-0.20$], in sample 2; and $b = -0.25$ [95% CI: $-0.30$, $-0.21$], in sample 3). In turn, this difference in favour of the individualizing foundations dropped continuously as NFC increased; indeed, when NFC was at its maximum, the difference in support for the two sets of foundations was small and not significantly different from zero in two of the three samples ($b = 0.01$ [95% CI: $-0.08$, $0.09$], in sample 1; $b = -0.06$ [95% CI: $-0.10$, $-0.01$], in sample 2; and $b = 0.03$ [95% CI: $-0.03$, $0.08$], in sample 3). Thus, data from all three samples provided evidence for the specific pattern of different support for the moral foundations implied by our first hypothesis.6

6This pattern of differential support for the moral foundations also implies that those high in NFC should endorse a greater number of moral foundations. This point is not central to our tests of the first hypothesis, but it does have interesting implications for the structure of moral judgments among those high versus low in NFC. As such, we test and provide evidence for this prediction in supplementary analyses reported in the online Appendix.

As a further illustration of how differential support for the two sets of foundations varies as a function of NFC, we also estimated simple slopes for the foundation-type indicator (with 95% CIs) at values across the full range of the NFC variable. These estimates are plotted in Figure 2. In essence, the slope values represent estimated mean support for the binding foundations minus estimated mean support for the individualizing foundations at different NFC levels. These estimates indicated that support for the binding foundations was significantly and consistently lower than support for the individualizing foundations when NFC was at its minimum ($b = -0.31$ [95% CI: $-0.37$, $-0.24$], in sample 1; $b = -0.25$ [95% CI: $-0.30$, $-0.20$], in sample 2; and $b = -0.25$ [95% CI: $-0.30$, $-0.21$], in sample 3). In turn, this difference in favour of the individualizing foundations dropped continuously as NFC increased; indeed, when NFC was at its maximum, the difference in support for the two sets of foundations was small and not significantly different from zero in two of the three samples ($b = 0.01$ [95% CI: $-0.08$, $0.09$], in sample 1; $b = -0.06$ [95% CI: $-0.10$, $-0.01$], in sample 2; and $b = 0.03$ [95% CI: $-0.03$, $0.08$], in sample 3). Thus, data from all three samples provided evidence for the specific pattern of different support for the moral foundations implied by our first hypothesis.6

Right-wing authoritarianism as a mediator of the relationship between need for closure and binding morality

Our second hypothesis was that RWA—as an indicator of a general preference for conformity to in-group morality—would mediate the relationship between NFC and binding morality. To examine this hypothesis, we estimated a path model summarizing relations among NFC, RWA, ideology and binding morality in each sample. To represent the key

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route connecting NFC to binding morality, direct paths from NFC to RWA and from RWA to binding morality were specified. To reflect the direct effect of NFC on binding morality and the relationship between ideology and support for the binding foundations highlighted in previous research (e.g. Graham et al., 2009), direct paths from NFC to binding morality and from ideology to binding morality were also specified. Moreover, given that RWA is commonly regarded as a key antecedent of left-right self-placement (e.g. Jost et al., 2003), a direct path from RWA to ideology was also included. Finally, because preliminary analyses indicated that the direct path from NFC to ideology was non-significant in all three samples (because of full mediation of the NFC/ideology relationship by RWA), we fixed this path to zero in all cases.7 Thus, this model allows for two indirect effect pathways from NFC to binding morality: one via RWA alone and one via both RWA and ideology in turn. These indirect effects were computed by multiplying all of the direct effect coefficients along each pathway, and the significance of each indirect effect (as well as the significance of the total indirect effect of NFC on binding morality via both pathways) was tested by computing unstandardized indirect effects in each of 1000 bootstrapped samples and finding the 95% CI in the resulting distribution (Shrout & Bolger, 2002).

The results are summarized in Figure 3, and the relevant indirect effect estimates and bootstrapped standard errors can be found in Table 6. In all three samples, NFC was significantly associated with higher levels of RWA (p < 0.001), and RWA was associated with greater binding endorsement (p < 0.001). Moreover, RWA was strongly associated with ideology in all three samples (p < 0.001), while the net direct relationship between ideology and binding foundation support was modest but significant in all cases (p < 0.05). Finally, NFC had a modest direct relationship with binding morality in two of the three samples (p < 0.05).9

Table 6. Indirect effects of the NFC on support for the binding foundations

<table>
<thead>
<tr>
<th>Sample 1</th>
<th>Estimate ± SE</th>
<th>Bootstrapped 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFC → RWA → binding</td>
<td>0.19 ± 0.05</td>
<td>[0.10, 0.29]</td>
</tr>
<tr>
<td>NFC → RWA → ideology → binding</td>
<td>0.03 ± 0.01</td>
<td>[0.0003, 0.05]</td>
</tr>
<tr>
<td>Total indirect effect of NFC</td>
<td>0.22 ± 0.05</td>
<td>[0.11, 0.33]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample 2</th>
<th>Estimate ± SE</th>
<th>Bootstrapped 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFC → RWA → binding</td>
<td>0.18 ± 0.04</td>
<td>[0.11, 0.25]</td>
</tr>
<tr>
<td>NFC → RWA → ideology → binding</td>
<td>0.02 ± 0.01</td>
<td>[0.002, 0.05]</td>
</tr>
<tr>
<td>Total indirect effect of NFC</td>
<td>0.20 ± 0.04</td>
<td>[0.14, 0.28]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sample 3</th>
<th>Estimate ± SE</th>
<th>Bootstrapped 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFC → RWA → binding</td>
<td>0.12 ± 0.03</td>
<td>[0.06, 0.18]</td>
</tr>
<tr>
<td>NFC → RWA → ideology → binding</td>
<td>0.02 ± 0.01</td>
<td>[0.001, 0.05]</td>
</tr>
<tr>
<td>Total indirect effect of NFC</td>
<td>0.14 ± 0.03</td>
<td>[0.08, 0.21]</td>
</tr>
</tbody>
</table>

Note: Estimates are from models presented in Figure 3; confidence intervals were estimated based on 1000 bootstrap samples. All indirect effects are significant at the p < 0.05 level.

NFC, need for closure; RWA, right-wing authoritarianism.

---

7Including the direct paths from NFC to ideology did not substantively change any of the key indirect effect results we report in the main text; however, adding these paths led to saturated models in each data set, making it impossible to test global fit. In addition, when the NFC to ideology paths was included, NFC did not have an indirect relationship with binding foundation endorsement via ideology (all p > 0.20).

8To be sure, our cross-sectional data did not allow us to verify the causal order implied by these mediation models. However, the ordering is consistent with extant work assuming that personality and sociopolitical attitudes constrain moral intuition (Federico et al., 2013; Graham et al., 2009). More importantly, it is also consistent with longitudinal analyses suggesting that sociopolitical orientations predict changes in endorsement of the moral foundations but not vice versa (Smith, Alford, Hibbing, Martin, & Hatemi, in press). It is also congruent with recent behaviour genetic analyses indicating that variation in endorsement of the moral foundations is strongly shaped by environmental factors (Smith et al., in press), whereas NFC and RWA have much larger heritable components (Funk et al., 2013; Ksiazkiewicz, Ludeke, & Krueger, in press) and have manifestations that are apparent at early ages (Reiften Tagar, Federico, Lyons, Ludeke, & Koenig, 2014).

9Omitting the non-significant direct path from NFC to binding morality in sample 2 did not markedly alter the global fit of the model: χ²(2) = 1.33, p > 0.50; RMSEA < 0.001; CFI = 1.00. Moreover, the indirect effect estimates remained similar: that is, 0.19 (boothstrapped 95% CI: 0.12, 0.27), for the indirect effect via RWA alone; 0.02 (0.002, 0.05), for the indirect effect via the NFC to RWA to ideology to binding morality path; and 0.22 (0.14, 0.29), for the total indirect effect via both pathways.
Turning to the indirect effect estimates in Table 6, we find a strong pattern of support for Hypothesis 2. NFC had relatively strong indirect relationships with binding morality via RWA alone (i.e. via the pathway leading from NFC to RWA to binding morality; all \( ps < 0.05 \)). In terms of effect size (again given the 0–1 variable codings), these estimates indicate that going from the minimum to maximum value of NFC was indirectly associated with increases in binding foundation endorsement of 19%, 18% and 12% via RWA alone in the three samples. NFC also had more modest but still significant indirect relationships (\( ps < 0.05 \)) with binding morality via the ‘longer’ pathway leading from NFC to RWA to ideology to binding foundation endorsement. Summing these two indirect effects in each data set, NFC was indirectly associated with increases in binding foundation endorsement of 22%, 20% and 14% via both pathways together. In each case, a considerable percentage of the total effect of NFC passed through these two indirect paths: that is, 63%, 80% and 52% in samples 1, 2 and 3, respectively. The percentages of the total effect of NFC that passed through RWA alone only were also sizable and accounted for most of the overall indirect effect of NFC: that is, 54%, 72% and 44% in samples 1, 2, and 3. Thus, the data provide a consistent pattern of evidence for our second hypothesis.

**Discussion**

In this study, we examined the relationship between individual differences in epistemic needs—specifically, the need for closure (Webster & Kruglanski, 1994)—and the structure of moral intuitions. Moral foundations theory contends that moral concerns can be classified into two general clusters: individualizing moral foundations dealing with harm avoidance and fairness, and group-oriented binding moral foundations focused on in-group loyalty, respect for authority, and purity and sanctity (Haidt & Graham, 2009; Haidt & Joseph, 2007; Shweder et al., 1997). An emerging body of research suggests that a number of factors predict variation in support for the individualizing and binding foundations. Left/right ideology and other sociopolitical attitudes have received the lion’s share of attention in this regard (Graham et al., 2009, 2011, 2013; Haidt & Graham, 2007; see also Federico et al., 2013). In contrast, the link between epistemic dispositions and support for the individualizing and binding foundations remains underexplored.

Given that NFC is associated with a desire for group cohesion (Kruglanski et al., 2006), our first hypothesis was that it would be more strongly associated with support for the subset of moral intuitions that serve to integrate individuals into group life, that is, the binding moral foundations, than it would be with support for the individualizing foundations. We expected this asymmetry to manifest itself in a pattern of moral intuition where those low in NFC would show reduced support for the binding relative to the individualizing foundations, whereas those high in NFC would endorse both the individualizing and binding foundations. In turn, our second hypothesis was that the relationship between NFC and endorsement of the binding foundations would be mediated by RWA—a sociopolitical orientation strongly linked to a moral emphasis on conventional group morality (Duckitt & Sibley, 2010; Federico et al., 2013; Stenner, 2005). Across three samples, we found strong and consistent support for both hypotheses.

The results presented here contribute to the broader literatures on moral intuition and the interface between epistemic needs and sociopolitical attitudes in several important ways. Above all, they strengthen our understanding of how varying patterns of moral intuition relate to underlying individual differences in personality. Although the relationship between sociopolitical attitudes and the moral foundations has been relatively well explored (e.g. Federico et al., 2013; Graham et al., 2011; Kugler et al., 2014), links between the moral foundations and personality variables related to epistemic needs have been largely unexamined, despite their importance in the literature (Jost et al., 2003). The present study fills this gap and adds to a literature on other non-political predictors of support for the moral foundations (e.g. threat sensitivity; Graham et al., 2011; Horberg et al., 2009; van Leeuwen et al., 2012; van Leeuwen & Park, 2009). By the same token, our findings suggest that epistemic dispositions like NFC play a significant role in explaining social attitudes in yet another key domain. In this vein, sizable bodies of research indicate that NFC is reliably associated with political conservatism (Jost et al., 2003, 2009) and stronger in-group biases (e.g. Kruglanski et al., 2006). Our results suggest the implications of NFC extend to the moral domain as well. Just as endorsing a politically conservative outlook might help fulfill the need for certainty, so too might the endorsement of certain moral concerns.

At the same time, our results also suggest that not all moral concerns are equivalent with respect to how well they align with epistemic needs. In this regard, our data suggested an especially strong alignment between NFC and the binding moral foundations: while dispositional NFC was strongly associated with support for the binding foundations, it was largely unrelated to support for the individualizing foundations. This pattern is consistent with the idea that NFC—as a variable associated with ‘group-centrism’—is primarily relevant for binding moral concerns whose primary focus is the preservation of group cohesion. The role of RWA—a sociopolitical dimension conceptually and empirically linked to support for conventional in-group morality—in mediating the relationship between NFC and support for the binding foundations reinforces this point. Thus, insofar as binding moral concerns like in-group loyalty, respect for authority, and purity reinforce ties within groups, endorsing these concerns should satisfy NFC among individuals who endorse them most strongly.

Finally, our results also shed light on the dispositional correlates of patterns of moral intuition that emphasize individualizing concerns like harm avoidance and fairness. One of the key arguments made by moral foundations theory is that a morality rooted solely in individualizing concerns is relatively uncommon in social and historical terms and characteristic primarily of liberal-minded individuals in
developed Western societies (Graham et al., 2009, 2011, 2013). Thus, despite the fact that the binding foundations do not ‘seem’ moral to many Westerners (Haidt & Graham, 2009; Kugler et al., 2014), the existence of solely individualizing patterns of moral intuition may actually require more in the way of explanation than the importance of the binding foundations. In this respect, the present study implies that a morality centred on the individualizing foundations may flourish best when epistemic needs—such as those captured by individual differences in NFC—are easily met. One set of individuals for whom this should be the case are those whose needs for certainty are dispositionally low, that is, those low in NFC. However, beyond the individual differences that are our present focus, social conditions that minimize threats to certainty may also accomplish this. Accordingly, it is perhaps not surprising that patterns of moral intuition that eschew binding concerns are most common in affluent societies where individuals face fewer basic survival threats or sources of disorder (e.g. Graham et al., 2013; van Leeuwen et al., 2012). Further examination of how environmental variation in sources of uncertainty relates to impact moral functioning—or perhaps moderate the influence of personality—is thus warranted.

Further work should also examine the role of individual differences in NFC as they relate to other taxonomies of moral concerns. Specifically, Janoff-Bulman and Carnes (2013; see also Janoff-Bulman et al., 2008) point to two distinct moral concerns that are group focused. The first—proscriptive group-based morality—focuses on concerns for social order and solidarity and is consistent with the binding foundations of moral foundations theory. The second—prescriptive group-based morality—focuses on concerns for social justice and communal responsibility and arguably is not addressed in moral foundations theory. Another way to articulate the difference between the two types of group-level moral concerns is that the first revolves around individuals’ responsibility to the group and an avoidance of things that damage group cohesion, whereas the second focuses on the group’s responsibility to individuals and an approach orientation toward social improvement. Given that NFC is associated with group-linked restraints and predisposes individuals toward greater avoidance of that which threatens social consensus and order (Kruglanski et al., 2006), we would expect such a tendency to be associated with the former but not the latter category of group-level moral concern. That is, we would expect NFC to be associated with endorsement of proscriptive group-level moral concern, but not endorsement of prescriptive social justice-focused morality. Future work is necessary to explore this expectation.

Although we believe that our results make a number of important contributions to the literature, our analyses did have a few limitations. First, while our results were robust to the inclusion of political ideology as a covariate, the cross-sectional nature of our data limited our ability to make firm claims about the precise direction of the relationship between dispositional NFC and the individualizing and binding foundations. Future studies might seek to use longitudinal data—with both NFC and the moral foundations measured at multiple time points—in order to better assess directionality (Finkel, 1995). Second, all three of our samples comprised undergraduate students from the American Midwest. Although our findings were highly consistent across the three data sets we examined, our exclusive reliance on these data may limit the extent to which they generalize to beyond this population. In particular, it is possible that endorsement of the various moral foundations may not satisfy dispositional epistemic needs to the same extent in samples from other populations. For example, political psychologists have noted that identity and values are in greater flux during the college years than in later adulthood, possibly skewing the results of research using students (e.g. Sears, 1986). In the present context, this could have a variety of implications. On one hand, the relative uncertainty associated with this formative period may have left our participants with fewer sources of certainty, amplifying their reliance on assertions of moral identity and leaving our results more pronounced than they might be in a more representative sample of the population. On the other hand, the fact that social attitudes are generally less crystallized during the flux of the college years might also mean that our results would be stronger in a representative sample of adults with more crystallized attitude structures (Jennings & Niemi, 1981). As another example, it is possible that our results are constrained by the peculiarities of American political culture and the emphasis that current debates in the US place on social issues that invoke binding moral concerns (debates over religion, sexuality and so on; Haidt, 2012). That is, binding concerns may have an unusually strong ability to meet epistemic needs in American political culture. To some extent, this concern is allayed by results suggesting that ideological differences in endorsement of the individualizing and binding foundations generalize across national boundaries (Graham et al., 2013). Nevertheless, both this concern and the aforementioned concerns about reliance on student data call for additional work using more representative samples from multiple political cultures.

Despite these limitations, we believe that our findings—in conjunction with other recent research (e.g. Federico et al., 2013; Graham et al., 2011)—reinforce the idea that individual differences in personality have clear implications for various kinds of moral concern. As such, our results underscore the need for continued exploration of dispositional factors that may lead to different patterns of moral intuition.

DECLARATION OF CONFLICTING INTERESTS

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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SUPPORTING INFORMATION

Additional supporting information may be found in the online version of this article at the publisher’s web site.

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