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“Closing” on Group-Centrism: A systematic meta-analysis on the relationship between the need for cognitive closure with the binding and individualizing moral foundations

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Abstract

Inspired by the career of Lucia Mannetti, we conducted meta-analyses on the correlation between the need for cognitive closure and the binding moral foundations, as an aspect of group-centrism, as well as the individualizing moral foundations, which conceptually have a less clear link to group-centrism. We included all studies, indexed in either Scopus or Google Scholar, that included correlations between the need for cognitive closure with either the binding or individualizing foundations. The R packages meta, metasens, and dmetar were used to conduct meta-analyses and follow-up tests. We identified a total of 28 studies (n=7591) that included eligible measures of need for cognitive closure and the binding foundations and 24 studies (n=6731) that included eligible measures of need for cognitive closure and the individualizing foundations. After controlling for heterogeneity and small sample size effects, we observed a larger adjusted effect size for the binding foundations ($r=.31$ [95%CI: .24;.38]) than for the individualizing foundations ($r=.13$ [95%CI: .04;.23]). In general, the larger effect size for the relationship between the need for cognitive closure and the binding foundations is consistent with the literature on the need for cognitive closure and group-centrism, however we identified areas for future research for both the binding and individualizing foundations.

Keywords:

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Introduction

This work is dedicated to our esteemed colleague Lucia Mannetti, an expert both in the phenomenon of group centrism, as well as the role played by the need for cognitive closure, or the desire for stable and certain knowledge (NCC; Kruglanski et al., 2006). Mannetti and her collaborators made significant contributions to the fields of need for cognitive closure and group-centrism (Chirumbolo et al., 2004, 2005; De Grada et al., 1999; Kosic et al., 2004; Kruglanski et al., 2006; Livi et al., 2015; Mannetti et al., 2010); in the current work, we intend to follow up on her contributions by systematically reviewing and meta-analyzing the relationship between the need for cognitive closure and the binding moral foundations, an aspect of group-centrism that has been emphasized in recent research.

It is well understood that individuals with specific characteristics, or in specific situations, can strongly rely on groups to gain and validate knowledge. Although to a degree this is necessary, individuals in groups differ in group-centrism, or a syndrome of the endorsement of autocratic group structure which can lead to suppression of dissent, antipathy of diversity, ingroup favoritism; group glorification, perceived ingroup victimhood, and veneration of group norms, traditions, and views (Kruglanski et al., 2006; Dugas et al., 2018). In other words, individuals characterized by group-centrism are more likely to turn to, and accept, their groups' shared reality, or mode of interpreting the world (e.g., Hardin & Higgins, 1996), in a wide variety of situations. Consequently, we should expect that group-centrism should be appealing to individuals with a high NCC, as these groups can satisfy the desired epistemic certainty inherent in the NCC.

Research over the past decade (e.g., Federico et al., 2016) has made the connection between the NCC and different aspects of group-centrism. One interesting aspect of group-centrism that has been highlighted in recent research are the binding moral foundations (Haidt & Joseph, 2004), or the group-focused principles that underlie moral judgments and perceptions. Although research has observed relationships between NCC and moral foundations (e.g., Baldner & Pierro, 2019a; Federico et al., 2016), in addition to consequences of the constructs—namely, forms of prejudice—there has not yet been a systematic meta-analysis of these results. Our objective is to conduct the first meta-analysis on the relationship between NCC and the moral foundations, which will help inform future research on these constructs.

Need for Cognitive Closure and the Push towards Group-Centrism

The NCC reflects the mere desire for stable and certain knowledge and can be assessed both as a stable individual difference and as a manipulatable situational feature. The NCC is moderately but consistently associated with conservative political belief in Western countries (e.g., Baldner et al., 2018) and is consistently associated with prejudice (e.g., Baldner et al., 2019). Why would the mere desire for knowledge be associated with any political ideology or with specific prejudices? It is possible that individuals characterized by a NCC are attracted to perceptions of stable and certain knowledge inherent in both harmful stereotypes and prejudice,

which are both difficult to change and cover large groups of people, as well as to conservative political thought.

An intriguing and related aspect is that individuals from the general population can rely on cultural traditions that can themselves be politically conservative as well as opposed—in the form of stereotypes and prejudice—to groups opposed to these traditions. These cultural traditions are of course not a group in a literal sense. However, individuals who endorse these traditions could perceive themselves as members of a group of like-minded people, with these traditions fulfilling the role of group norms.

Research on the NCC is broadly supportive of these points. For instance, researchers have convincingly argued that individuals characterized by an NCC are committed to *epistemic authorities*, or sources of perceived—but not necessarily accurate—knowledge on a particular topic; indeed, groups, broadly construed (e.g., cultures and their traditions) can serve as epistemic authorities (for examples, see Dugas et al., 2018; Dugas & Kruglanski, 2018; Kruglanski et al., 2006, 2009). Similarly, researchers have noted that the NCC can push individuals to accept prominent *shared realities* (Hardin & Higgins, 1996), or interpretations of the individuals' social worlds that are shared with the ingroup (for examples, see Kruglanski et al., 2002; Mannetti et al., 2010). The conclusion that underlies these related pieces of research is that NCC drives individuals towards sources that can (be perceived to) guarantee stability and certainty in their knowledge. This, in turn can explain, individual behavior in group-centric attitudes and behavior in reference to small groups (De Grada et al., 1999; Pierro et al., 2003) and to the very large (e.g., prejudice towards cultural outgroups; Baldner et al., 2019; Dugas et al., 2018). In other words, researchers have observed that the NCC can push individuals towards group-centrism. There are two important points that we have not yet discussed: first, that recent research has also identified the binding moral foundations as an aspect of group-centrism and, second, that there has not yet been research which have systematically analyzed the relationship between NCC and aspects of group-centrism. We will turn to the first point in the following section.

Moral Foundations Theory: Past and Current Directions

The Moral Foundations and how they are related to group centrism

The moral foundations theory (MFT; e.g., Haidt & Joseph, 2004) argues that individuals across the world are born with specific intuitions, or foundations, that guide their moral development and which are adapted, through experience, to the rules of a specific individual's culture. The authors of the MFT initially argued for five foundations which reflect the kinds of situations that individuals regard as morally important: Harm/Care (i.e., if people are harmed), Fairness/Reciprocity (i.e., if people get what they deserve), Ingroup/Loyalty (i.e., if people are loyal to their group), Respect/Authority (i.e., if people respect authority figures), and Purity/Sanctity (i.e., if people are free from physical and social "impurities"). The first two

foundations—harm/care and fairness/reciprocity—are often grouped together as the “individualizing” foundations whereas the latter three—ingroup/loyalty, respect/authority, and purity/sanctity—are likewise grouped together as the “binding” foundations. These sets of foundations can be described as being concerned with the rights of individuals and with group cohesion, respectively (e.g., Federico et al., 2016). Graham and colleagues (2013) argued that these foundations could explain differences in morality across cultures; later research also concluded that it could also explain differences in morality across the left-right political spectrum in the United States. Koleva and colleagues (2012) argued that left-wing individuals primarily endorsed the two individualizing foundations whereas right-wing individuals draw on all five foundations; more recent research (e.g., Baldner et al., 2018) has nonetheless found that right-wing individuals tend to endorse the binding foundations whereas left-wing individuals tend to endorse the individualizing foundations. More importantly, researchers have specifically argued that the binding foundations, which comprise a focus on group cohesion, represent an aspect of group-centrism (e.g., Baldner et al., 2018; Federico et al., 2016; GJoneska et al., 2019).

The relationship between the need for cognitive closure and the individualizing foundations is less clear. The individualizing foundations are essentially moral principles regarding how people should be treated; these moral principles could themselves provide stable and certain knowledge (e.g., people in need should always be given assistance). On the other hand, the inherent focus on the individual vs. the group could threaten epistemic certainty and stability insofar as individuals’ needs can conflict with those of the larger group; consequently, one must consider more a larger number of more dynamic variables (e.g., changing relationships between different individuals and different groups). As a result, the relationship between the NCC and the individualizing foundations is potentially subject to contrasting forces which could cloud the simple bivariate relationship.

However, it is important to note that the research in this review used the moral foundations in two ways that its creators did not intend but that nonetheless could be valid. First, they did not intend for their theory to explain group-centrism or the resulting consequences; instead, it was simply a way in which to broadly categorize moral principles without reference to a single culture and its norms. The reasoning behind this decision is that the binding foundations, with their focus on being loyal to the group, respecting authority, and avoiding (socially-determined) impurities, also represents adherence to cultural traditions consistent with group-centrism. Consequently, outgroups who are perceived to stand opposed to, or simply apart from, the traditionally powerful groups in a given culture can be at-risk for prejudice and for the stereotypes that provide their justification. On the other hand, there is less reason to suppose that the individualizing foundations would have these effects. As these foundations focus on the desire to protect individuals and their rights it could be less likely that they would also be associated with prejudice towards vulnerable groups.

Second, the creators of the MFT clearly intended for their theory to reflect the basic foundations of moral attitudes. This idea is, of course, implicit in the name “moral foundations” but

was also made explicit in the idea that the moral foundations are intuitions present from birth; clearly, there is not much room for other variables exogenous to these foundations. Contrary to this point of view, the research cited in this meta-analysis uses the moral foundations as an outcome of other variables—principally, the NCC. However, research has identified predictors of the moral foundations, which under the creators’ strict point of view should not be possible (for a recent example of this research see Brown et al., 2021). The research cited in this view, instead, treats the moral foundations as specific form of moral attitudes which naturally have both antecedents and consequences. Consistent with Federico et al. (2016), we propose that group-centrism, derived from the need for closure, can manifest itself in the form of binding moral foundations. Indeed, if dispositional and situational NCC promotes adoption and perpetuation of attitudes and behaviors, collectively referred to as a syndrome of group-centrism, then we would expect that the endorsement of the binding foundations, as manifestation of group centrism, is motivated by NCC; the relationship between the need for cognitive closure and the individualizing foundations is less clear.

Group-centric consequences of NCC and the moral foundations

Research on the relationship between the NCC and both the binding and individualizing moral foundations has become popular since the publication of Federico and colleagues’ (2016) groundbreaking work. This research typically features mediation models (though see Baldner et al., 2018 for an example of moderation models). This research, moreover, has hypothesized and found support for mediational models in which NCC leads to the binding foundations which, in turn, leads to some relevant outcome—or in some cases, several relevant outcomes in serial mediational models. For instance, the research of Albarello and colleagues (2023) studied this mediated effect on negative attitudes towards various outgroups. Taking a more specific focus, Bianco and colleagues (Bianco et al., 2021, 2022; Bianco & Kopic, 2022), Baldner and Pierro (2019b), De Cristofaro and colleagues (2019), and Di Santo and colleagues (2022) each used an outcome or outcomes related to negative attitudes towards immigrants. Baldner and Pierro (2019a) instead studied these effects on negative attitudes towards women leaders; Giacomantonio and colleagues (2017) on acceptance of torture; and Strupp-Levitsky and colleagues (2020) on system justification. That these studies can explain different yet related phenomena speaks to the strength of the relationship between the NCC and the binding, if not individualizing, foundations. More to the point, these studies, as well as other studies that tested the basic relationship between the NCC and the moral foundations (Baldner et al., 2018; Federico et al., 2016) generally found moderate effects for the relationship between the NCC and the binding foundations and small effects for the relationship between the NCC and the individualizing foundations. This is consistent with the idea that the binding, but not the individualizing, foundations represent aspects of group-centrism. However, as of yet there has not been any research which has systematically studied these effects across studies.

The Present Research

We intend to meta-analyze and summarize recent research into the need for closure and both the binding and individualizing moral foundations. Our objective is to assess the strength of the relationships between the NCC with the binding and individualizing foundations, to summarize how this can help explain the relationships between the NCC and various outcomes related to group centrism, and to propose future directions for the relationship between the NCC and both the binding and individualizing foundations. The meta-analysis was conducted according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) 2020 checklist (Page et al., 2021). R syntax is available as supplementary materials at: https://osf.io/48kx6/?view_only=141e6173d9d841cd926ffba58618a0d9

Methods

Eligibility Criteria. The eligibility criteria included written language of the research study, type of measure for NCC and moral foundations used by the researchers, and the availability of correlations between NCC and the two superordinate moral foundations (i.e., individualizing and binding foundations). Specifically, included studies could be either in English or Italian; could assess NCC through either of the short form measures designed by Pierro and Kruglanski (2005), Roets and van Hiel (2011), the original extended form by Webster and Kruglanski (1994), or through experimental studies; could assess the moral foundations through either the 30- or 20-item version developed by Graham and colleagues (2011); correlations had to include at least one of the two superordinate moral foundations and could not solely report correlations with the five subordinate foundations (i.e., harm/care, reciprocity/fairness, ingroup/loyalty, respect/authority, purity/sanctity).

Information sources and search strategy. We search for articles in both Google Scholar and Scopus. The search using Google Scholar was conducted on 27 November 2023 and used the following search terms: (“need for cognitive closure” OR “need for closure”) (“binding foundations” OR “binding foundation” OR “individualizing foundations” OR “individualizing foundation”). There were 219 results, including duplicates. The search using Scopus was conducted on the same date and used the following search terms: ALL (“need for closure” OR “need for cognitive closure”) AND (“binding foundation*” OR “individualizing foundation*”). There were 38 results.

Selection and Data Collection Processes. The first author read each study to assess if it met the eligibility criteria and collected data (i.e., correlations) from each eligible study. No automation tools were used.

Data items and Effect Measures. The reported outcomes for each study were the pearson correlations between the NCC and (a) the binding foundations and (b) the individualizing foundations.

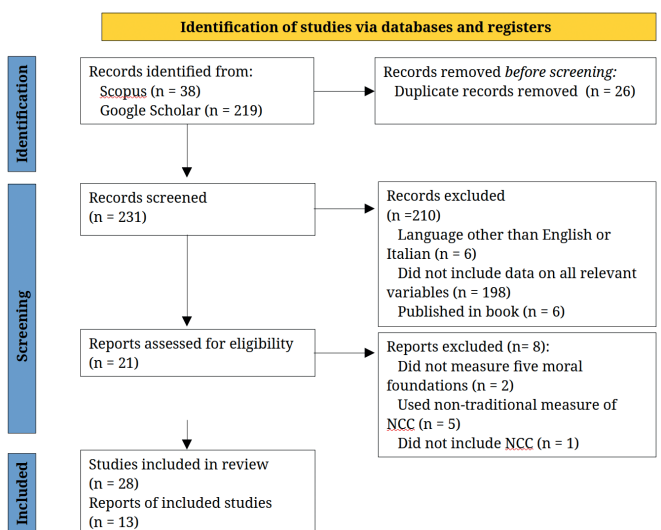
Synthesis Methods. In order to conduct our meta-analyses, we used R 4.3.2 (R Core Team, 2022) with the metasens

(Schwarzer, Carpenter, & Rucker, 2023) and meta (Balduzzi, Rucker, & Schwarzer, 2019) packages. Correlations between NCC and either the binding or individualizing foundations were used as the input. We interpreted the random effects model which, contrary to the fixed (or common) effects model, allows for the possibility that there are different true effects in different studies. In order to assess the possibility of publication bias, we also used Rucker and colleagues’(2011) limit meta-analysis method with accounts for discrepancies due to small study size effects. In this approach a bias term is created; this term interacts with the error term such that bias increases as error increases. This bias term is entered as a covariate in the model which calculates the meta-analyzed effect. In order to investigate a potential cause of heterogeneity, we used the “find.outliers” function from the dmetar package (Harrer et al., 2019). This function detects studies in which either the upper bound of the 95% confidence interval is lower than the lower bound of the pooled effect confidence interval or the lower bound of the 95% confidence interval is higher than the upper bound of the pooled effect confidence interval.

Results and Discussion

Study Selection. In sum, for the meta-analysis of the binding foundations we had 28 studies comprising 7,591 participants. For the individualizing foundations we had 24 studies comprising 6,731 participants. The selection process is shown via a flowchart presented in Figure 1. Likewise, the studies conducted by Bianco and colleagues (2021) and by Federico and colleagues (2016) were excluded because they did not report correlations between NCC and the two superordinate (i.e., binding and individualizing) foundations.

Fig. 1. Study Selection Flowchart



Study Characteristics and Results of Individual Studies. Each included study along with its characteristics and outcomes are presented in Table 1.

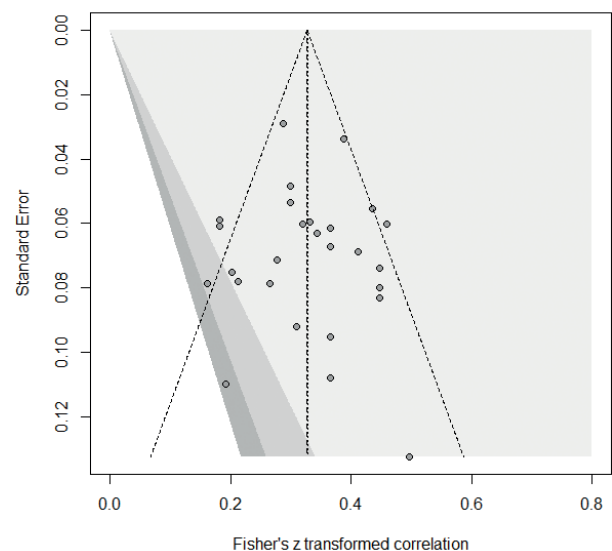
Tab. 1. Summary of Studies

Report	Study	Culture	n	NCC measure	r	
					NCC & IF	NCC & BF
Albarello et al., 2023	2	Italy	875	Pierro & Kruglanski (2005)	.08	.37
Baldner & Pierro, 2019a	1 (M)	US	89	Pierro & Kruglanski (2005)	.14	.35
	1 (F)	US	60	Pierro & Kruglanski (2005)	.01	.46
	2 (M)	US	86	Pierro & Kruglanski (2005)	-.12	.19
	2 (F)	US	121	Pierro & Kruglanski (2005)	-.08	.30
Baldner & Pierro, 2019b	1	Italy	159	Pierro & Kruglanski (2005)	.13	.42
	2	US	279	Pierro & Kruglanski (2005)	.08	.31
	3	US	148	Pierro & Kruglanski (2005)	-.006	.42
	4	US	113	Pierro & Kruglanski (2005)	-.001	.35
Baldner et al., 2018	1	Italy	328	Pierro & Kruglanski (2005)	.15	.41
	2	US	255	Pierro & Kruglanski (2005)	.12	.33
Baldner et al., 2020	1	Italy	267	Pierro & Kruglanski (2005)	.04	.35
	2	Italy	167	Pierro & Kruglanski (2005)	-.05	.21
	3	Italy	186	Pierro & Kruglanski (2005)	.05	.42
Bianco & Kusic, 2022	1	Italy	351	Pierro & Kruglanski (2005)	N/A	.29
Bianco et al., 2022	1	Malta	224	Pierro & Kruglanski (2005)	-.28	.35
De Cristofaro et al., 2019	1	Italy	164	Pierro & Kruglanski (2005)	N/A	.26
	2	Italy	180	Pierro & Kruglanski (2005)	N/A	.20
	3	Italy	165	Manipulation	N/A	.16
Di Santo et al., 2022	1	Italy	286	Pierro & Kruglanski (2005)	.04	.32
	2	Italy	290	Manipulation	.09	.18
	3	US	278	Pierro & Kruglanski (2005)	-.09	.43
dos Reis, 2021	1	Brazil	1182	Roets & van Hiel (2011)	.24	.28
dos Reis & Pilati, 2021	1	Brazil	427	Roets & van Hiel (2011)	.15	.29
Giacomantonio et al., 2017	2	Italy	214	Pierro & Kruglanski (2005)	.17	.39
	3	US	200	Pierro & Kruglanski (2005)	.10	.27
Strupp-Levistksy et al., 2020	1	US	225	Webster & Kruglanski (1994)	.11	.35
	2	US	272	Webster & Kruglanski (1994)	.14	.18

Results of Meta-analyses. The correlations between NCC and the binding foundations ranged between .18 and .46. The initial meta-analysis indicated an effect size of $r = .32$ (95% CI: .29; .35) under the random effects model; in fact, this was almost identical to the fixed, or common, effects model. See Figure 3 for a forest plot. The between-study heterogeneity variance was estimated at $\tau^2 = .003$ (95% CI: .0005; .011) with an I^2 value of 45.7% (95% CI: 15.2; 65.2%). The prediction interval, or the interval which contains the effect size of a new study selected at random from the same population of the studies already included in the meta-analysis, ranged from $g = .20$ to .42, indicating that positive and at least fairly moderate effects are likely for future studies. Moreover, between-study heterogeneity is relatively low; for a funnel plot between each study's correlation, transformed into a z-score, and the respective standard error, see Figure 2. Lower between-study heterogeneity is indicated by the relative symmetry in the funnel plot. There were no outlier studies under the random effects model.

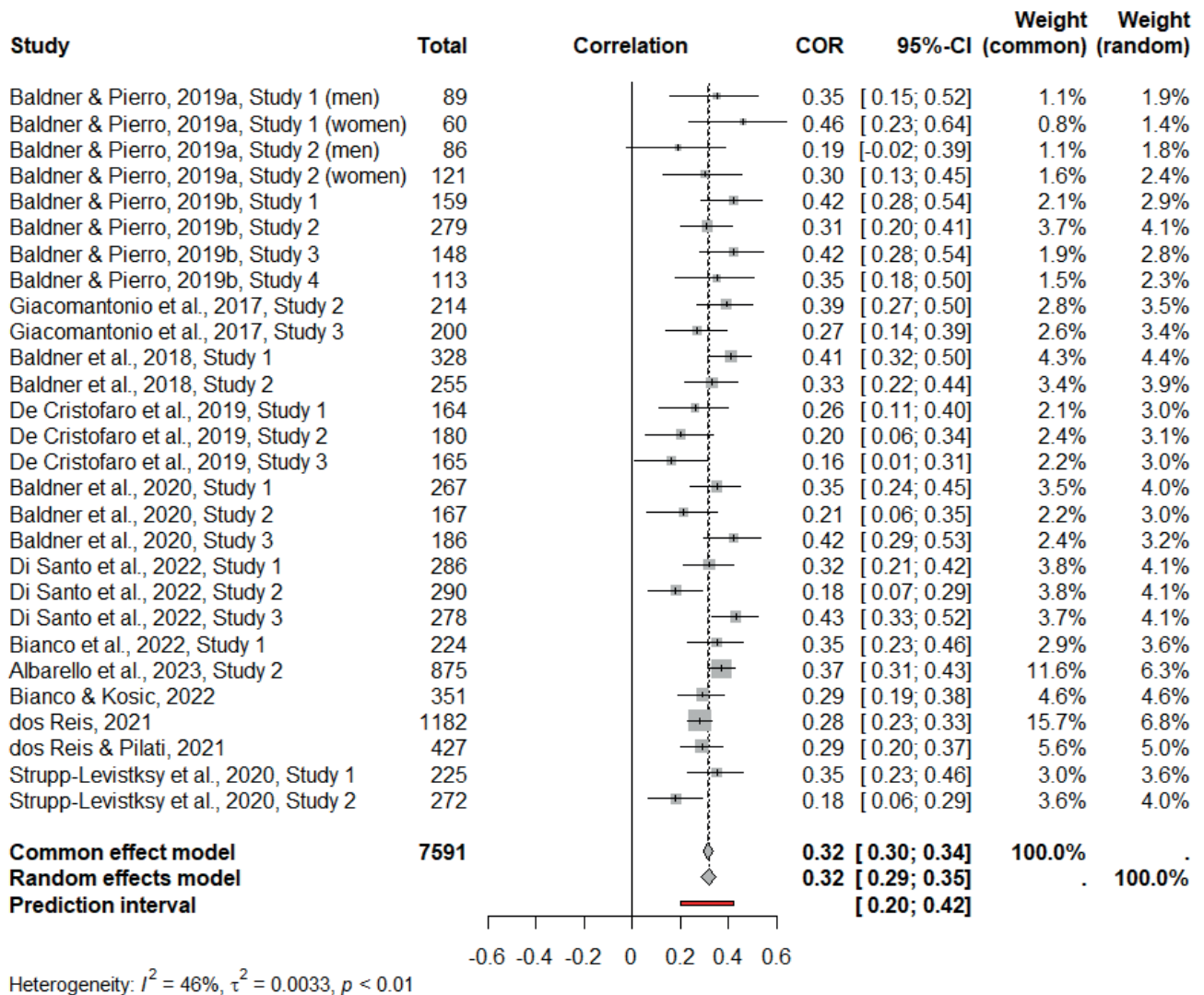
In order to assess the possibility of small study effects, we computed the adjusted effect size according to Rucker and colleagues' (2011) limit meta-analysis approach. Using all studies, the adjusted effect was $r = .31$ (95% CI: .24; .38). The small difference between the adjusted and the unadjusted effect sizes indicates little effect accounted for by small studies. We then conducted subgroup analyses by national origin of participants. According to Harrer and colleagues (2019), it is not ideal to conduct subgroup analyses when they are fewer than ten studies per subgroup. Consequently, it is not advisable

Fig. 2. Funnel plot for NCC-Binding Foundations



to conduct subgroup analyses on correlational vs. experimental design, or between the types of NCC measure, considering that most studies were correlational in nature and measured NCC with the Pierro and Kruglanski (2005) scale. However, participants' national origin does not have this limitation. Of the 28 studies that assessed the binding foundations, 13 were conducted with Italian participants, 12 with American participants, 2 with Brazilian participants, and 1 with Maltese participants. In order to have sufficient studies, we conducted

Fig. 3. Forest plot for NCC-Binding Foundations



subgroup analyses with a subsample consisting solely of the Italian and American studies. These analyses are displayed on Table 2; as can be observed, the correlations between the Italian and American studies were nearly identical. Although heterogeneity also increased, this could have been due to reducing the number of studies.

Tab. 2. Subgroup analysis by culture (Binding foundations)

Culture	<i>r</i>	95%CI		<i>p</i>	<i>I</i> ²	<i>p</i> _{subgroup}
		Lower bound	Upper bound			
Italy	.32	.27	.37	<.001	34.6	
US	.31	.26	.35	<.001	59.9	.72

The correlations between NCC and the individualizing foundations ranged between -.28 and .24. The initial meta-analysis indicated an effect size of $r = .06$ (95% CI: .01; .11) under the random effects model. See Figure 5 for a forest plot. The between-study heterogeneity variance was estimated at $\tau^2 = .001$ (95%CI: 0.003-0.02) with an I^2 value of 74.2% (95% CI: 61.5; 82.7%). The prediction interval ranged from $g = -.15$ to .26, indicating that future studies could fail to find an

effect. Moreover, there is evidence for substantial between-study heterogeneity; in particular, the funnel plot on Figure 4 displays noticeable asymmetry.

Fig. 4. Funnel plot for NCC-Individualizing Foundations

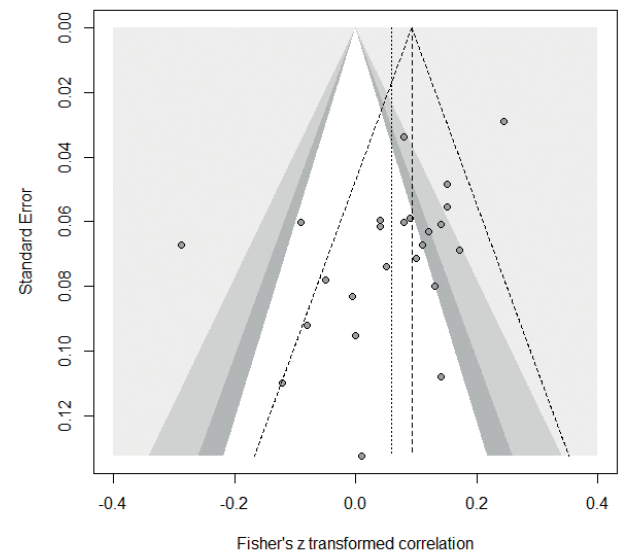
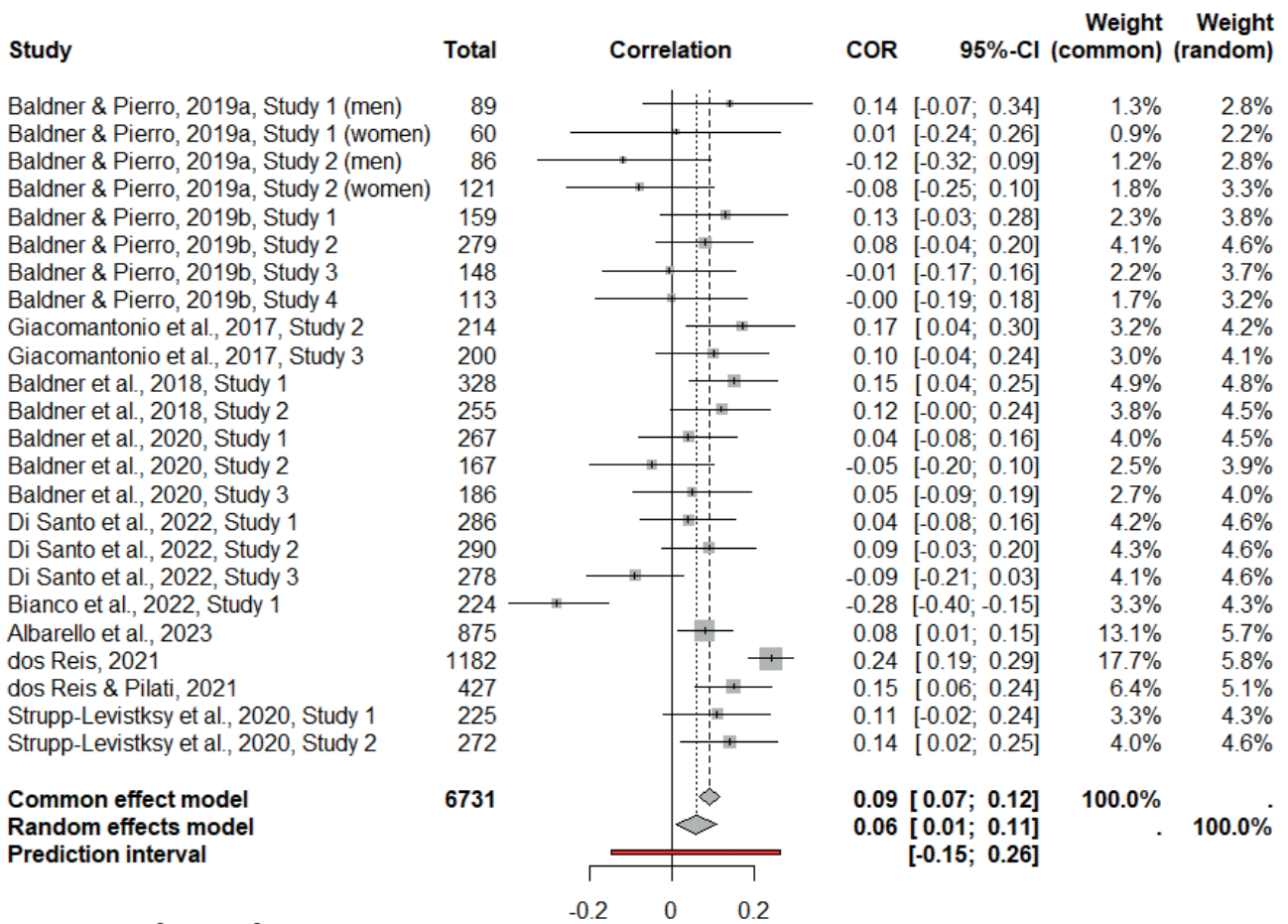


Fig. 5. Forest plot for NCC-Individualizing Foundations



Two studies—Bianco and colleagues (2022, Study 1; $r[222] = -.28$) and dos Reis (2021; $r[1180] = .24$)—were identified as outliers under the random effects model. Removing these studies, which provided the highest and lowest correlations reported earlier, dramatically reduced heterogeneity: $\tau^2 = .001$ (95% CI: .000; .008); $I^2 = 25.2\%$ (95% CI: 0; 55.6%); prediction interval from $g = -.01$ to .15; effect size $r = .07$ (95% CI: .04; .10). However, the prediction interval suggests that future studies could fail to find an effect.

In order to assess the possibility of small study effects, we computed the adjusted effect size according to the limit meta-analysis approach with and without the outlier studies. Using all studies, the adjusted effect increased to $r = .13$ (95% CI: .04; .23); after excluding the outlier studies the adjusted effect was effectively unchanged: $r = .13$ (95% CI: .05; .22). The difference between the adjusted and the unadjusted effect sizes (i.e., .07 vs. .13) indicates a potential effect for small sample size bias.

As with the binding foundations, we also conducted subgroup analyses for the individualizing foundations. Of the 24 studies that assessed the individualizing foundations, 9 were conducted with Italian participants, 12 with American participants, 2 with Brazilian participants, and 1 with Maltese participants. As with our previous subgroup analyses, we selected a subsample consisting solely of the Italian and American studies. These analyses are displayed on Table 3.

Although correlations were low across culture, the Italian subsample did not reach traditional levels of significance.

Tab. 3. Subgroup analysis by culture (Individualizing foundations)

	<i>r</i>	95%CI		<i>p</i>	<i>I</i> ²	<i>p</i> _{subgroup}
		Lower bound	Upper bound			
Culture						.30
Italy	.04	-.0006	.09	.052	32.9	
US	.08	.03	.12	<.001	0	

Summarizing the results of the meta-analyses, there is evidence for a moderate relationship between the NCC and the binding foundations which does not seem to be influenced by participants' national origin. On the other hand, the relationship between the NCC and the individualizing foundations is noticeably weaker, even if some studies have found an elevated effect. Moreover, there is evidence for heterogeneity and small sample size effects in the studies on the NCC and individualizing foundations. The reason behind these effects is not clear from the current evidence, however it is possible the bivariate relationship between the NCC and the individualizing foundations is the result of at least two forces. As the individualizing foundations are themselves moral principles that can be held strongly, we could expect a positive correlation with the NCC. Insofar as there exists groups which

hold these beliefs, this could be associated with group centrism. On the other hand, the individualizing foundations clearly focus on individual motivations which could cast doubt on the utility of large groups to secure stable and certain knowledge; consequently, we could expect a negative correlation. The generally small but positive correlation between the NCC and the individualizing foundations could be a result of these two forces. This would also suggest that there are moderators, as of yet unstudied, that influence this relationship.

However, in general our findings are consistent with the idea that the binding foundations provide sources of stable and certain knowledge that are attractive to individuals with an NCC. Although many recent studies have assessed the relationship between the NCC and the moral foundations, and have generally found a moderate relationship between the NCC and the binding foundations, until now there has not been a systematic analysis of these effects. This work supports the ideas that the NCC is associated with group-centrism and can inform power analyses on future studies on these constructs.

Future research should also assess potential exogenous and moderating variables which could further our understanding of how prejudice can be reduced. On one hand, these variables could include factors which simply reduce dispositional NCC. Although there are experimental methods which can induce lower levels of NCC, there has not yet been attempts to induce long-term change in the NCC. Consequently, this approach could require testing the longitudinal effects of complex interventions. On the other hand, these variables could also include those which can moderate the relationship between NCC and the binding foundations—more specifically, that can reduce the relationship even when the NCC is in full force. Given the nature of the NCC, one approach is to identify ways to reduce the epistemic appeal of the binding foundations. Although the literature has not systematically asked these research questions, it could be an interesting and useful area for future research.

This work has a number of limitations that can also be addressed in future work. We used correlations as the input for the meta-analysis; consequently, these results cannot speak to the causal effect of the NCC on either of the moral foundations. However, some of the cited works included experimental manipulations of NCC instead, or in addition to, correlations. Specifically, Baldner and Pierro (2019b, Study 4), Di Santo and colleagues (2022, Study 2) and De Cristofaro and colleagues (2019, Study 3) all included experimental manipulations of the NCC as well the effects on at least one of the superordinate moral foundations. In general, there has been less research conducted on experimental manipulations of the NCC and future research could profitably turn in this direction. In addition, our meta-analysis did not consider the mediated, indirect effects of the NCC on various outcomes through the moral foundations. In addition, most studies on the NCC are conducted in the US and Italy and, although we did not find a moderating role of culture, it is not known if this would generalize to other cultures. However, our goal was to assess the basic relationship between the NCC and the moral foundations and future work can build upon the current work in order to assess more complex designs.

Conclusions

Although many researchers have assessed the relationships between the need for cognitive closure and the moral foundations with a group-centric framework, until the present research there has not been a systematic analysis. Meta-analyses have shown that there is a moderate relationship between the NCC and the binding moral foundations and a near zero relationship between the NCC and the individualizing foundations. Moreover, there are not significant differences between studies conducted in Italy and in the United States. This is consistent with the group-centric functions of the NCC. However, there is noticeable between-study heterogeneity, particularly with the individualizing foundations which could indicate the presence of untested moderators in primary research. Nonetheless, the relationship between the NCC and the binding foundations could explain how group-centrism, and its consequences, is formed and maintained; future work can investigate ways to mitigate negative consequences of this relationship.

Ethical approval

not applicable

Data availability statement

R syntax is available as supplementary materials at https://osf.io/48kx6/?view_only=141e6173d9d841cd926ffba58618a0d9

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Authors' contribution

All authors contributed equally to the meta-analyses.

Declaration of Conflicting Interests

The authors declare that they have no competing interests.

Supplementary Materials

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