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A multinational study of social attitudes, moral beliefs, and personality traits: A network analysis approach

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ABSTRACT

This study investigates psychological variables central to promoting social cohesion and prosocial behavior across cultures. Using network analysis on data from 44,407 participants in 54 countries, we examined relationships among seven constructs: social belonging (SB), individual narcissism (Nrc), national narcissism (NrN), trait optimism (TrO), self-esteem (SE), moral identity (MI), and morality as cooperation (MC). Positive relationships were found among SB, SE, and TrO. Notably, individual narcissism was negatively associated with SB and TrO, highlighting its detrimental impact on social cohesion. Centrality analysis identified moral identity (MI) as the most interconnected variable, linking both forms of narcissism and contributing to greater SB, TrO, and MC. Self-esteem also played a significant role by bridging connections with narcissistic traits. Overall, the findings underscore a distinction between individual and social motives: while narcissists may use self-esteem and moral identity for self-serving purposes, positive traits like social belonging enhance and contribute to societal well-being and progress.

As societies face various disruptions—ranging from political polarization to economic instability—individuals' ability to maintain meaningful relationships and contribute to collective well-being has become more urgent than ever. At the heart of these dynamics are core social attitudes (i.e., social belonging, self-esteem, and collective narcissism), moral beliefs (i.e., moral identity, morality as cooperation), and personality traits (i.e., self-esteem, trait optimism, narcissism), which shape how individuals interact with one another and how they perceive their place within their communities. These traits influence whether people foster empathy and cooperation or, conversely, promote division and self-interest.

The relevance of these psychological constructs extends beyond individual well-being; they have far-reaching implications for collective outcomes. A strong sense of social belonging not only enhances personal happiness but also encourages prosocial behaviors that contribute to societal harmony (Pavey et al., 2011). Conversely, traits like narcissism, which prioritizes self-enhancement at the expense of others, can erode trust and cooperation, undermining social cohesion (Sedikides & Campbell, 2017) by seeking admiration rather than meaningful connection (Hyatt et al., 2018). These patterns, when magnified at a collective level, could even manifest in collective or national narcissism, with individuals deriving self-worth from the perceived superiority of their social group, further contributing to intergroup conflict and reducing social belonging (Golec de Zavala & Lantos, 2020). In light of these dynamics, this study seeks to explore how individual differences in personality traits and social attitudes interact to influence broader social outcomes.

The present research builds on previous work highlighting the importance of belonging and self-esteem in fostering social connections (Baumeister & Leary, 1995; Deci & Ryan, 2000), while also exploring the more complex and less understood roles of narcissism and moral identity. Importantly, the focus is not just on individual traits in isolation but on how these traits interact to influence broader patterns of social behavior and cohesion. Using a network analysis, we identify key

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psychological constructs that serve as central nodes in fostering or undermining social cohesion. In doing so, we contribute to the ongoing discourse on the psychological foundations of social harmony and conflict, offering new perspectives on how individual psychological characteristics shape the collective experiences of society.

1. Social attitudes and personality traits

Research from various disciplines has long demonstrated the significance of belongingness as a fundamental human characteristic (Allen et al., 2021; Baumeister & Leary, 1995). According to the Basic Psychological Needs Theory (BPNT), part of Self-Determination Theory (SDT), humans possess innate needs for autonomy, competence, and relatedness—the latter being the most universally experienced (Deci & Ryan, 2000). This need is fulfilled when individuals form close relationships, feel they belong, and see themselves as part of a group. Conversely, exclusion leads to harmful psychological effects (Allen et al., 2021).

Social Identity Theory (Tajfel & Turner, 1979) provides insights into the complex role of self-esteem in social and individual motives. High self-esteem enhances how people perceive acceptance, facilitating positive interactions and strengthening feelings of belongingness (Cameron & Granger, 2020). Individuals with high self-esteem have positive self-assessments, unlike those who view themselves less favorably, though not necessarily negatively (Baumeister et al., 2003). However, it's important to distinguish high self-esteem from narcissism, as narcissists also rate themselves highly (Gruda et al., 2021). While self-esteem and narcissism are positively correlated (Cichocka et al., 2023), they differ significantly in their effects on relationships. High self-esteem promotes constructive interactions, while narcissists prioritize self-enhancement and power, often disregarding others' needs. Hence, despite their initial charm (Gruda et al., 2023), narcissists often display hostility when not sufficiently admired (Hyatt et al., 2018; Sedikides & Campbell, 2017). Importantly, these behaviors are linked to different sub-types of narcissism, namely grandiose and rivalry (Rogoza et al., 2016). Grandiose narcissism correlates positively with self-esteem, while rivalry narcissism, marked by hostility and devaluation of others, correlates negatively (Rogoza et al., 2016).

Studies on narcissism and belongingness have yielded mixed results: some show negative, positive, or no associations (Jonason & Zeigler-Hill, 2018). However, when distinguishing between types, grandiosity shows a small but stable positive relationship with belonging, with no link to rivalry narcissism (Zeigler-Hill & Dehaghi, 2023). Given that narcissists often prioritize their own needs over others, they may have a diminished need for belongingness, viewing relationships as a means to an end (e.g., gaining status) rather than building meaningful connections. At the collective level, national narcissism extends individual grandiose narcissism to one's social group. Here, individuals idealize their group, boosting self-esteem by assuming group superiority (Golec de Zavala & Lantos, 2020). Since narcissism involves inflated self-importance and the need for admiration—traits linked to high self-esteem—we further examine the relationships between narcissism, social belonging, and self-esteem, hypothesizing a negative relationship between narcissism and social belongingness.

Finally, grounded on the BPNT framework, optimism also plays a significant role in understanding the dynamics of social belonging. Defined as a dispositional belief in positive future outcomes, optimism affects how people perceive and react to life experiences (Scheier & Carver, 2018). It enhances feelings of belongingness through improved social interactions and support. Interestingly, evidence suggests that social networks and optimism can reinforce each other. For example, Segerstrom (2007) discovered that expanding social networks over a decade was associated with increased optimism during the same period. Optimistic individuals tend to have a positive outlook on life, which can make them more approachable and likable, which is likely to be reflected in a positive relationship with general belongingness and self-esteem.

1.1. The role of moral beliefs

Social cognitive theory provides a useful framework for understanding the role of moral identity in shaping behavior (Xu et al., 2024). Aquino and Reed (2002) define moral identity as a self-concept composed of moral traits that influence how a moral individual thinks, feels, and behaves. This construct comprises two dimensions: internalization, reflecting an individual's intrinsic moral orientation, and symbolization, which involves the outward display of moral traits for social approval and impression management (Aquino & Reed, 2002; Winterich et al., 2013). In our study, we focus on internalization because it directly relates to intrinsic moral values. Moral identity also predicts prosocial behaviors and high-quality relationships since being moral is significant in social interactions and related to cooperative behavior (for example, in social dilemmas where individual interests conflict with collective welfare; Aquino et al., 2009).

Expanding our focus, we explore how moral beliefs intersect with narcissism and social belonging. Zuo et al. (2016) found a positive correlation between narcissism and moral identity, particularly when self-esteem is low, suggesting that narcissists may center their self-concept around morality under certain conditions. Despite their sense of superiority, narcissists require external approval to maintain their fragile self-image, with displays of high personal morality serving as a strategy for social acceptance (Hart et al., 2019). We posit that moral identity significantly influences narcissism, affecting behavior as individuals seek to uphold a positive self-image (Aquino & Reed, 2002).

Moral identity, characterized by a tendency towards prosocial action (Lefebvre & Krettenauer, 2019), may also fulfill needs for self-esteem and belongingness. Morality as cooperation recognizes social challenges that may be resolved by engaging in cooperative conduct, such as helping others or reciprocating favors (Curry et al., 2019). Individuals who adopt this perspective likely integrate cooperative moral principles into their core identity, strengthening moral identity. It follows that the interplay between self-esteem, belongingness, moral identity, and cooperation could be mutually reinforcing. Thus, we examine the associations between moral identity, narcissism, general belongingness, self-esteem, and collective narcissism.

1.2. The current study

The present multinational study explores the interrelationships between social attitudes, moral beliefs, and personality traits to identify the most influential dimensions.

We employ network analysis, a robust tool for examining complex structures, offering insights into system-level relationships where variables mutually reinforce each other (Clifton & Webster, 2017). Unlike other statistical methods, network analysis allows us to understand the overall structural organization and the functions of specific variables within the system (Hevey, 2018). This approach enables us to determine central constructs as well as identify clusters of highly interconnected constructs.

We posit complex interrelations among the constructs, with social belonging playing a central role in fostering positive social and personal outcomes, alongside self-esteem, trait optimism, and moral identity. In contrast, narcissism and collective narcissism are expected to have more negative social implications. By mapping these relationships, we aim to uncover the underlying structure of these psychological constructs and provide insights that could inform interventions to enhance social well-being.

2. Method

2.1. Sample and procedures

Data for this research was derived from the Social & Moral Psychology of COVID-19 project (Azevedo et al., 2023), conducted between April 22 and June 3, 2020. The original study received ethical approval from the University of Kent. The original dataset included 51,089 participants and is publicly available(see Azevedo et al., 2023, https://osf.io/tfsza/). However, after removing samples with empty answers and non-contributing data, the present study analyzed data from 44,407 participants (M = 43.07, SD = 16.07; 51.7 % women) across 54 countries.

The sample size estimation was conducted using the 'powerly' package, based on the inclusion of seven nodes (variables) with a sensitivity of 0.60, a confidence level of 80 %, and a network density of 0.40. These parameters indicated that a minimum of 182 assessments per country would be sufficient to ensure the robustness of the analysis. Most countries had at least 200 observations, with three exceptions (see Table 1 for more details).

Table 1
Sociodemographic data description.

		n	%
Sex	Male	21,310	48
	Female	22,937	51.7
	Other	160	0.3
Age group	Young group	27,134	61.1
	Middle age group	11,234	25.3
	Elderly group	6039	13.6
Participants with children	Male with children	11,394	25.66
	Female with children	12,540	28.24
	Other with children	55	0.12
	Childless	20,418	45.98
Country	Argentina	721	1.6
	Australia	2114	4.8
	Austria	1291	2.9
	Bangladesh	383	0.9
	Belgium	1090	2.5
	Brazil	1751	3.9
	Bulgaria	620	1.4
	Canada	944	2.1
	China	1030	2.3
	Colombia	919	2.1
	Croatia	471	1.1
	Denmark	566	1.3
	Ecuador	148*	0.3
	Finland	685	1.5
	France	1065	2.4
	Germany	1418	3.2
	Ghana	152*	0.3
	Greece	630	1.4
	Hungary	498	1.1
	India	569	1.3
	Iraq	493	1.1
	Ireland	698	1.6
	Israel	1103	2.5
	Italy	1243	2.8
	Japan	1123	2.5
	Korea	484	1.1
	Latvia	1008	2.3
	Macedonia	614	1.4
	Mexico	1208	2.7
	Morocco	537	1.2
	Nepal	313	0.7
	Netherlands	1224	2.8
	New Zealand	489	1.1
	Nigeria	503	1.1
	Norway	497	1.1
	Pakistan	450	1
	Philippines	483	1.1
	Poland	1809	4.1
	Romania	975	2.2
	Russian Federation	558	1.3
	Senegal	242	0.5
	Serbia	731	1.6
	Singapore	514	1.2
	Slovakia	1217	2.7
	South Africa	328	0.7
	Spain	1005	2.3
	Sweden	1479	3.3
	Switzerland	1056	2.4
	Taiwan	833	1.9
	Turkey	1404	3.2
	Ukraine	536	1.2
	United Arab Emirates	179*	0.4
	United Kingdom	542	1.2
	United States of America	1464	3.3

* **Note:** Countries with a sample size of less than 200 that were not included in the present study.

2.2. Measures

2.2.1. National Narcissism (NrN)

National Narcissism was measured using two items of the Collective Narcissism Scale (de Zavala et al., 2009). The scale assesses the degree of exaggerated and irrational pride in one's own country, as well as the tendency to view one's nation as superior to others. Included items were "[My national group] deserves special treatment" and "Not many people seem to fully understand the importance of [my national group]".

2.2.2. Morality as Cooperation (MC)

Morality as Cooperation was measured using the (7-item) Morality-as-Cooperation Questionnaire (MAC-Q, Curry et al., 2019), which measures various cooperative moral behaviors, such as helping groups. Participants were instructed to assess the relevance of the questions in relation to their judgment of whether a behavior is right or wrong. Example items included "Whether or not someone worked to unite a community," and "Whether or not someone showed courage in the face of adversity."

2.2.3. Moral Identity (MI)

Moral Identity (i.e., individuals' self-identification based on principles or values of good towards others) was assessed using the 10-item Moral Identity Scale (MIS; Aquino & Reed, 2002), primarily focusing on internalization because it directly relates to intrinsic moral values. Participants read nine moral ratings (caring, compassionate, fair, friendly, generous, helpful, hardworking, honest, and kind) and visualized a person with these characteristics. Subsequently, they answered items such as: "It would make me feel good to be a person who has these characteristics" and "Being someone who has these characteristics is an important part of who I am". A higher score suggests that the person sees themselves as more consistent with these attributes.

2.2.4. Narcissism (Narc)

Narcissism was assessed using the (6-item) Narcissistic Admiration and Rivalry Questionnaire (NARQ, Back et al., 2013). This questionnaire measures the desire to be admired and recognized by others, as well as a competitive and defensive attitude to avoid being perceived as inferior. Example items include "I react annoyed if another person steals the show from me".

2.2.5. Trait Optimism (TrO)

Trait optimism was assessed using the Life Orientation Test-Revised (LOT-R; Scheier et al., 1994). This instrument captures a person's tendency to anticipate that things will go well and to maintain a positive attitude towards challenges and obstacles. Two items from the original 10-item scale were used: "As a person, I am optimistic about my future" and "Overall, I expect more good things to happen to me than bad".

2.2.6. Social Belonging (SB)

The (4-item) General Belongingness Scale (GBS, Malone et al., 2012)

was used to assess the motivation to be accepted by others and to avoid rejection. Example items included "When I am with other people, I feel included".

2.2.7. Self-Esteem (SE)

Self-esteem was measured using the Single-Item Self-Esteem Scale (SISE; Robins et al., 2001), which consisted of the item: "I have high self-esteem".

2.3. Statistical analysis

As our analyses relied on previous validations conducted with the same publicly available dataset, we did not conduct independent measurement invariance tests on the scales used. Notably, Studies by Elbaek (2023) and Pavlović et al. (2022) found that the respective scales exhibited acceptable levels of invariance across multiple countries and languages, with non-invariance well within acceptable limits.

We began by exploring the global network properties, measuring density (D), transitivity (C△), and average shortest path length (APL) to characterize the network structure. The small world index (S) was also estimated to assess network efficiency. The analysis followed the protocol for psychological network analysis (Burger et al., 2023), using ggmModSelect and Spearman correlations in RStudio to handle asymmetric data (Isvoranu & Epskamp, 2023). Centrality indices were examined, focusing on Expected Influence (EI) for networks with negative connections (Robinaugh et al., 2016) and Bridge Expected Influence (BEI) to assess inter-community connections (Jones et al., 2021). Visualization was done using the Fruchterman-Reingold algorithm, with positive and negative correlations denoted by green and red edges, respectively (Epskamp & Fried, 2018). Predictability indices (R^2) were included to indicate the variance explained by each node. Accuracy and stability were evaluated through bootstrapping and centrality stability analyses, with correlation stability (CS) indicating the minimum data retention required for reliable centrality estimates (Epskamp & Fried, 2018). More information can be found in the Appendix.

3. Results

The descriptive analysis of psychological variables (see Table 2), shows that MI had the highest average influence on the network (=0.12), while MC registers the lowest (=0.07), reflecting its relatively low impact on the dynamics of the network.

In addition, TrO explained the largest proportion of the variance within the model (R2 = 0.333), in contrast to MC (R2 = 0.129), indicating its limited explanatory capacity. The relationship between SB and SE was particularly robust (= 0.31), suggesting that an increase in the perception of belonging seems strongly linked to improvements in self-esteem. No significant correlation was found between NarcN and SB, suggesting that these constructs operate independently of each other within this network.

3.1. Network centrality

Network density was 90.48 % (19 of 21 edges reported a non-zero value). Social belonging emerged as the most central and influential node, holding the highest value for betweenness (1.88) and closeness (1.47), which underlines its critical role in connecting and affecting other nodes in the network. Morality as cooperation exhibited a remarkably low centrality (= − 1.31) and strength (−1.70), indicating its peripheral position and weak connections within the network. Trait optimism showed relatively high strength (0.68), highlighting its strong relationships, while MI registers the highest expected influence (0.91), reflecting its potential to positively impact the network. In contrast, Narc showed a negative expected influence (−1.31), suggesting a limited or adverse impact on the network structure. For more detail see Table 3.

Social belonging and SE emerged as central nodes with multiple significant connections, highlighting an especially strong correlation between them ($r = 0.31$), which suggests that the perception of social inclusion can have a direct and positive impact on individual self-esteem. Additionally, the network reveals a negative relationship between SB and Narc ($r = -0.11$), indicating that a greater sense of

Table 3
Network Centrality measures.

Node	Betweenness	Closeness	Strength	ExpectedInfluence
NarcN	−0.75			
MC	−0.75			
MI	0.83			
Narc	−0.23			
TrO	−0.75			
SB	1.88			
SE	−0.23			
NarcN		−1.28		
MC		−1.31		
MI		0.52		
Narc		0.28		
TrO		−0.04		
SB		1.47		
SE		0.36		
NarcN			−0.98	
MC			−1.70	
MI			0.19	
Narc			0.37	
TrO			0.68	
SB			1.20	
SE			0.25	
NarcN				−0.44
MC				−1.28
MI				0.91
Narc				−1.31
TrO				0.54
SB				0.60
SE				0.98

Note. NarcN = National narcissism, MC = Morality as cooperation, MI = Moral identity, Narc = Narcissism, TrO = Trait optimism, SB = Social belonging, SE = Self esteem.

Table 2
Descriptive analysis and weights of network edges.

	Mean	SD	Skew	Kurtosis	R2	NarcN	MC	MI	Narc	TrO	SB	SE
NarcN	0.09	0.09	0.49	−1.68	0.174	–						
MC	0.07	0.06	0.28	−1.32	0.129	0.06	–					
MI	0.12	0.09	−0.02	−1.85	0.270	0.22	0.11	–				
Narc	0.07	0.13	−0.15	−1.92	0.189	0.21	0.09	0.21	–			
TrO	0.11	0.15	0.46	−1.63	0.333	0.06	0.07	0.07	−0.07	–		
SB	0.11	0.15	−0.13	−1.73	0.331	0.00	0.17	0.16	−0.11	0.31	–	
SE	0.12	0.12	0.48	−1.57	0.303	0.08	0.00	0.04	0.16	0.32	0.23	–

Note: NarcN = National narcissism, MC = Morality as cooperation, MI = Moral identity, Narc = Narcissism, TrO = Trait optimism, SB = Social belonging, SE = Self-esteem, R^2 = explained variance.

community could counter narcissistic tendencies. These interactions are visually represented with green lines for positive and red lines for negative correlations (Fig. 1). Here, the connection between SE and TrO ($r = 0.32$) stands out as the most robust, suggesting that optimism in contexts of betrayal could be an important predictor or consequence of high self-esteem.

3.2. Bridge centrality analysis

Bridge Expected Influence (1-step) analysis results (see Fig. 2) showed that MI and SE emerged as the variables with the greatest expected influence, pointing out that they play fundamental roles in the connection and affectation of other variables. Both were identified as crucial for any intervention since strengthening moral identity or self-esteem could positively influence related characteristics such as social belonging and optimism.

National Narcissism, MC, and Narc showed lower influence, with Narc, in particular, suggesting that its role could be less central or more contextual within the dynamics of the network.

3.3. Network stability

As shown in Panel A (Fig. 3), the strength metric maintains a constant value of 1.0 across different sampling percentages of the original dataset, indicating remarkable stability and robustness of the connections between the variables, regardless of the sample size used. This

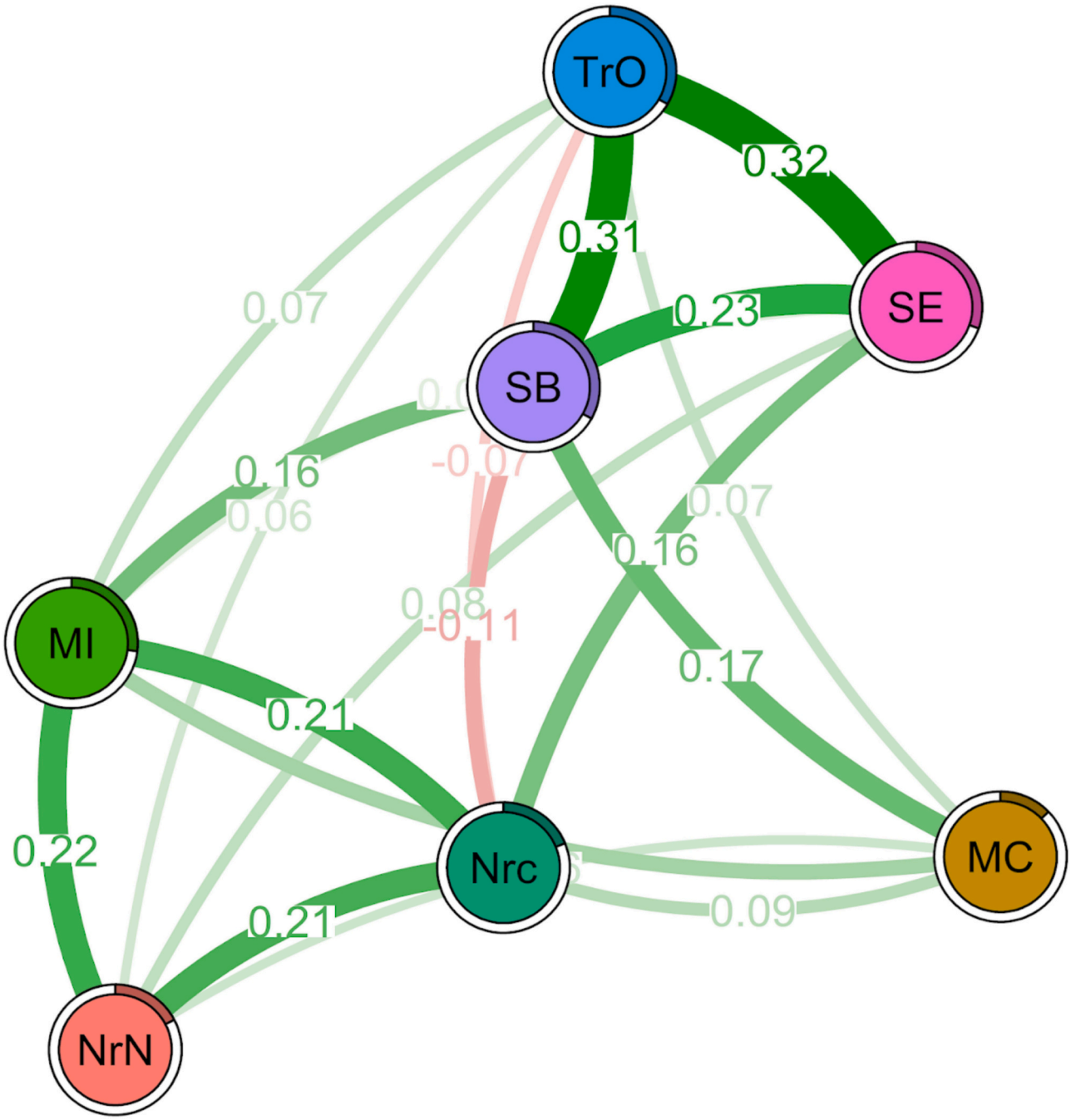

Fig. 1. Estimation of the network
Note: NarcN = National narcissism, MC = Morality as cooperation, MI = Moral identity, Narc = Narcissism, TrO = Trait optimism, SB = Social belonging, SE = Self esteem.

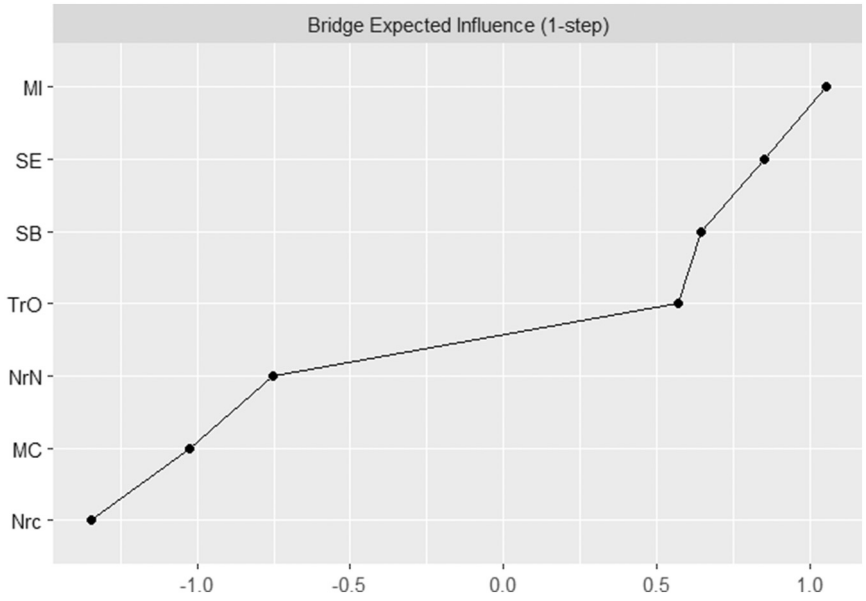

Fig. 2. Bridge centrality analysis
Note: Selection of the bridge strength, upper 80th percentile: "MI" and "SE". NarcN = National narcissism, MC = Morality as cooperation, MI = Moral identity, Narc = Narcissism, TrO = Trait optimism, SB = Social belonging, SE = Self-esteem.

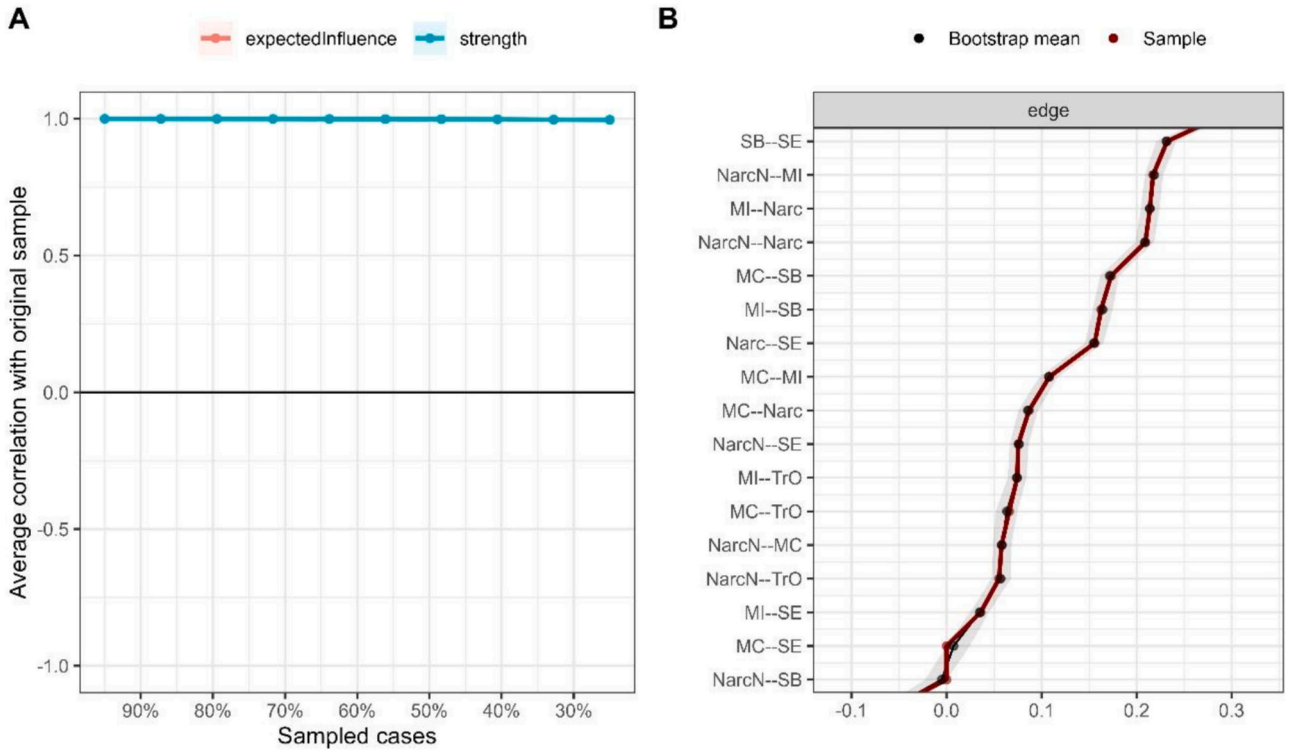

Fig. 3. Stability of the network: robustness and the significance of relationships between variables
Note: A: Network stability, B: bootstrapping of the network edges.

suggests that the detected relationships are genuinely strong and consistent across different subsets of data.

In Panel B (Fig. 3), a robustness analysis for specific bootstrap connections showed that the bootstrap means closely aligned with the values observed in the original sample. This verifies the reliability of the estimated correlations and shows that the measurements are not a product of chance, but reflect stable relationships within the network. The connections are ordered from the most negative to the most positive, highlighting the strength and direction of each relationship, with the strongest correlations visually highlighted towards the top end of the graph.

In Panel A (Fig. 4), an expected influence matrix is observed where variables such as MI (=0.79) and SB (=0.77) demonstrated the strongest influences. Trait Optimism and SE also exhibited high influences with values of 0.72 and 0.70, respectively. In contrast, MC had the least influence (=0.41).

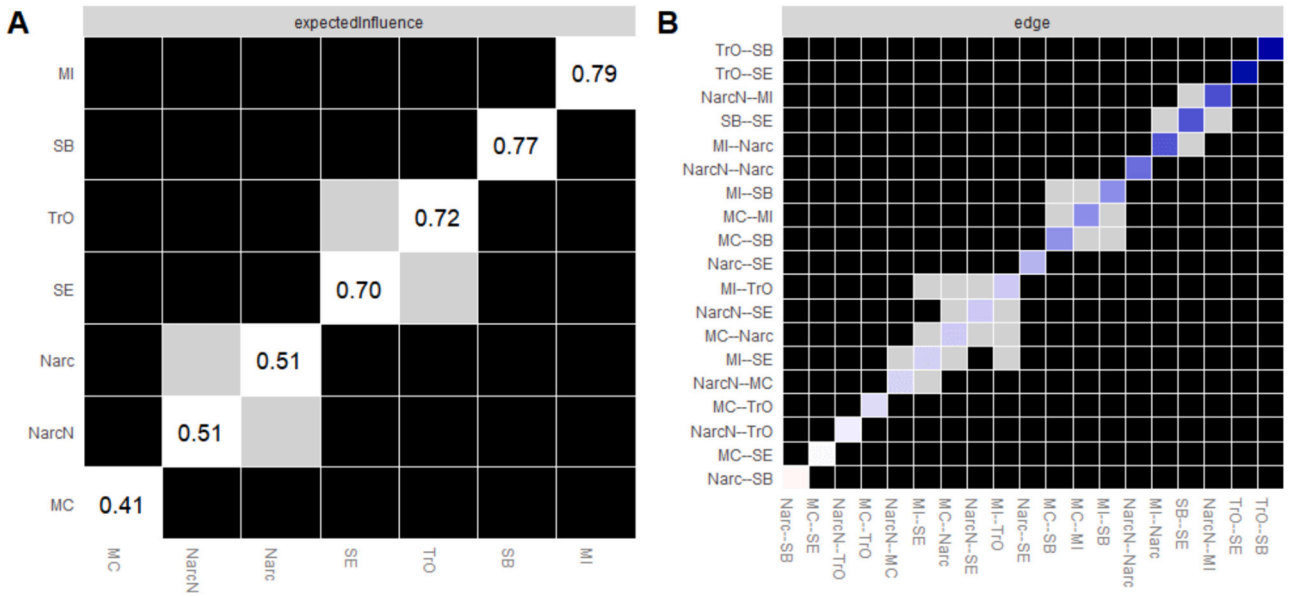

Fig. 4. Stability of the network: matrix of influence and correlations between variables
Note. A: Differences in centrality test matrix, B: Difference test for network edges.

Panel B (Fig. 4) complemented this analysis by showing a correlation matrix, where the darker blue intensities indicate stronger correlations between the variables, such as the notable ones between TrO and SB, TrO and SE, and NarcN and MI. Integrating both matrices, the complete figure provides a deeply detailed perspective of the structure and internal functioning of the network, highlighting specific variables such as MI, SB, and TrO as the most central and influential.

4. Discussion

The first objective of this study was to examine the relationships among seven psychological constructs across 54 countries and identify key features in the network. We found a significant connection between social belonging and optimism, aligning with prior research showing that strong social ties foster optimism (Çıkrıkçı & Gençdoğan, 2022). This suggests that across regions, social support encourages a positive outlook (Scheier & Carver, 2018), contributing to better psychological adjustment.

Another critical finding was the mutual reinforcement between trait optimism (TrO) and self-esteem (SE). Optimistic individuals tend to have higher self-esteem, and vice versa (Furnham & Robinson, 2023), though excessively high self-esteem may lead to unrealistic optimism and eventual disappointment (Baumeister et al., 2003). Understanding this balance is important for promoting stable self-esteem and realistic optimism.

Social belonging and self-esteem emerged as central nodes in the network, underscoring the role of self-esteem in fostering stronger social ties. Conversely, we found a negative association between social belonging and narcissism, indicating that narcissists, by prioritizing their own needs, may alienate themselves from others, weakening social bonds. Relatedly, we also identified a link between moral identity (MI) and narcissism (Narc), supporting earlier studies that suggest narcissists may use moral identity as a tool for self-enhancement (Hart, 2019). Put differently, narcissists often present themselves as moral to gain social approval, despite potential discrepancies between their moral values and actual behavior (Matsuo & Brown, 2018).

The second objective was to identify key bridge variables in the multinational network. Self-esteem and MI were the most influential, with SE being interconnected with social belonging and optimism. Social belonging boosts self-esteem (Baumeister & Leary, 1995), which in turn enhances optimism (Furnham & Robinson, 2023). This interconnection highlights the relationship between collective identity and psychological well-being and suggests that deactivating MI and SE nodes would significantly impact the global network structure, particularly given their mutual reinforcement through social belonging. Experimental evidence supports the centrality of these nodes. For instance, individuals with strong moral identity often extend moral concerns to out-group members without additional triggers, and awareness of group belonging enhances self-reported moral identity independent of religious factors (Thomson, 2015).

Our analysis also showed interconnections between MI, Narc, and SB. Narcissists, often socially rejected due to their self-centeredness (Gruda et al., 2023), may still engage in moral behavior as long as these behaviors align with self-enhancement goals and social approval (Matsuo & Brown, 2018; Xu et al., 2024). Hence, while narcissism typically leads to social alienation, some aspects of narcissism may foster moral behaviors if aligned with self-enhancement goals, which in turn increase SB.

Finally, we also found positive correlations between national narcissism, individual narcissism, and moral identity, suggesting that narcissists may also exhibit strong national pride and moral self-concepts. Though narcissism and moral identity may seem contradictory (Jones et al., 2017), narcissists may adopt a moral persona to justify their actions and seek social approval (Matsuo & Brown, 2018). Collective narcissism (involving bias and potentially unethical behavior towards out-group members; Golec de Zavala & Lantos, 2020), in turn, may enhance in-group pride, linking narcissism with a shared moral identity that serves self-image and social validation. Thus, narcissism, moral identity, and collective narcissism could stem from underlying demands for social validation and self-enhancement.

5. Limitations

This study has several limitations. The respective data are cross-sectional and self-reported, introducing potential social desirability bias and limiting our ability to determine causality between variables. Thus, even though the network analysis shows connections between constructs, it does not establish the direction of these relationships. To overcome this limitation, we would encourage future longitudinal studies, which in addition to enabling a better understanding of how

these relationships evolve would also allow for stronger causality claims and insights into the dynamics of collective and individual psychological traits and how they influence each other.

6. Conclusion

This study employed a multinational network analysis to examine the interrelationships among social attitudes, moral beliefs, and personality traits—including narcissism—across diverse cultural contexts. Social attitudes and optimism occupy central roles in the network, underscoring their importance in shaping both individual well-being and social cohesion. In particular, the strong links between social belonging, self-esteem, and optimism suggest that interventions aimed at enhancing these aspects could effectively promote positive personal and collective identities.

CRediT authorship contribution statement

Cristian Ramos-Vera: Writing – review & editing, Methodology, Formal analysis, Conceptualization. **Iraklis Grigoropoulos:** Methodology, Formal analysis, Data curation. **Antonio Serpa Barrientos:** Methodology, Formal analysis, Conceptualization. **Dennis Calle:** Methodology, Formal analysis, Conceptualization. **Royer Olivera-Cercado:** Methodology, Formal analysis, Conceptualization. **Luis Hualparuca-Olivera:** Methodology, Formal analysis, Conceptualization. **Dritjon Gruda:** Writing – review & editing, Resources.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work, the authors used ChatGPT 4o and o3-mini to clarify and rephrase several written paragraphs throughout the manuscript. After using this tool, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A

Statistical analyses

Before proceeding with the analysis of the network, a preliminary exploration of the variables or nodes of interest was carried out using the global properties of the network to characterize its structure. This exploration included the measurement of density (D), which indicates the proportion of effective connections present in the graph; transitivity (C△), which measures the average tendency of nodes to cluster or form communities within the network; and the average shortest path length (APL), which reflects the average number of links or connections needed to connect one node to another. In addition, the small world index(S) was estimated, which evaluates the ability of association between nodes, and whose ideal value is greater than 1 (Isvoranu & Epskamp, 2023), indicating an efficient network structure. The network analysis was continued using the RStudio environment, following the protocol recommended by the reporting standards for psychological network analysis (Burger et al., 2023).

To estimate the network, the ggmModSelect function, and the Spearman correlation were used within the RStudio environment. This combination allows for the handling of asymmetric data, as referred to in the literature (Isvoranu & Epskamp, 2023). Subsequently, the centrality indices were analyzed. Initially, the Expected Influence Index (EI) was evaluated, and preferred for its adequacy in networks with negative connections (Robinaugh et al., 2016). Additionally, to analyze the nodes in various communities, we opted for the Bridge Expected Influence Index (BEI), which sums the edges (considering the signs) between a node and others outside its community (Jones et al., 2021). Other centrality measures such as proximity and intermediation were not estimated, since they are not sufficient to interpret psychological variables (Bringmann et al., 2019) and due to potential network instability issues (Hallquist et al., 2021).

The network itself is visualized by nodes (circles) interconnected by edges (lines), whose thickness varies to represent the intensity of the interaction. Positive and negative correlations are denoted in green and red, respectively (Epskamp & Fried, 2018). The Fruchterman-Reingold algorithm was used to arrange the nodes so that the strongest interactions appear in the center and the weakest in the periphery (Fruchterman & Reingold, 1991). The predictability indices (R2) were also included to show the percentage of variance that each node explains with respect to other nodes in the network.

The accuracy of the edge weights in the network was evaluated using the bootstrap method. This method consisted of repeatedly modeling random samples of the dataset, calculating the edge values at each iteration, and determining their accuracy using 95 % confidence intervals. In addition, a graph was created to show how often the edges received a value of zero. Stability was analyzed by means of a graph that showed changes in the centrality indices after eliminating 70 % of the data. Comparing these samples with the original data, a correlation mean (Stability Correlation; CS) was calculated. This metric indicates how much of the data can be removed while maintaining a minimum correlation of 0.70 with the original centrality indices (Epskamp & Fried, 2018).

Data availability

This study relies on a publicly available data. The respective data set is specified in the methods section.

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