



Empathy as the Critical Link Between Self-Compassion and Social Dominance Orientation

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Abstract

Objectives According to social dominance theory, intrapersonal and interpersonal mechanisms reciprocally influence social hierarchy through institutional behavior and social structure. The relationship between self-compassion and intergroup attitudes such as social dominance orientation (SDO), or the preference for inequality among social groups, remains unclear. Empathy as an interpersonal construct could represent the bridge between intrapersonal concern and broader social attitudes. This study explored the relationship between self-compassion, empathy, and SDO using psychometric network analysis in diverse college student samples collected before and during the COVID-19 pandemic, a major social disruption that intensified intergroup tensions.

Method This study included two independent undergraduate student samples (total $n = 1034$) collected before ($n = 578$) and during the COVID-19 pandemic ($n = 456$). Psychometric network analysis estimated connections between self-reported levels of self-compassion, empathy, and SDO, network centrality indices, and network stability, and compared the pre- and during COVID networks.

Results Within both samples, SDO had the strongest connection to empathy, which was in turn connected to the self-compassion sub-network. Empathic concern showed a stronger relationship to SDO than perspective-taking. Findings from this study advance the notion that empathy may be a critical part of SDO theory building. Invariance analysis confirmed that network structure, global strength, and strength and expected influence of the individual variables remained notably similar despite a major social disruption due to COVID-19.

Conclusions Empathy is a critical link between self-compassion and social dominance orientation. The preference for social equality is related to intrapersonal and interpersonal traits, such as self-compassion and empathy.

Preregistration This study is not preregistered.

Keywords Empathy · Self-compassion · Social dominance orientation · Network analysis · Prosocial

Increasingly, self-compassion has been explored as a self-regulation strategy in which personal suffering is met with an orientation characterized by self-kindness, mindfulness, and the understanding that failures and

inadequacies are a shared part of the human condition (Neff, 2003a, 2003b). Such an orientation nurtures positive emotions toward oneself while simultaneously fostering a sense of compassion for others (Neff, 2003a, 2003b). The balancing of concern for self and others has been considered optimal for psychological functioning (Blatt, 1995). Numerous studies indicate that individuals with higher levels of self-compassion tend to have lower levels of stress, neuroticism, less psychopathology, and greater life satisfaction (Gilbert, 2009; Li et al., 2021a, 2021b; MacBeth & Gumley, 2012; Neff, 2016; Zessin et al., 2015). While an accumulating body of evidence supports the benefits of self-compassion at the individual level, the investigation of the putative benefits of self-compassion at the interpersonal and societal level has

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remained largely theoretical. For example, Brown (1999) proposed that self-compassion fosters a sense of interconnectedness by recognizing how oneself is equally deserving of compassion when faced with suffering.

In this study, we examined the relationships between self-compassion as an intrapersonal construct and two theoretically related constructs that expand concern to others—empathy and social dominance orientation. Due to the onset of the COVID-19 pandemic, we had an opportunity to investigate whether those relations were robust to major social disruptions. The pandemic induced a change in social conditions, particularly on college campuses, that could affect the relationships between constructs under investigation due to disruptions to day-to-day campus life (Nelson et al., 2020, Tasso et al., 2021), stress on social relationships (Wang et al., 2020), inability to effectively cope without a social network (Birmingham et al., 2023), and an intensification of biases and intergroup conflict (Tei & Fujino, 2022). The pandemic also exacerbated intergroup relationships through fear-induced bias by heightening feelings of threat for those with marginalized identities (Nosek, 2023), immigrants (Esses & Hamilton 2021), and undermining a feeling of common belonging with other groups (Fuochi et al., 2021). Social disruptions like the COVID pandemic exemplify how individuals might be simultaneously affected on multiple levels of social functioning. Therefore, this study aims to explore the relationships between self-compassion, empathy, and social dominance orientation before and during the COVID-19 pandemic.

We propose that the way individuals relate to themselves on an intrapersonal level shapes how they relate to others, extending from personal relationships (interpersonal level) to broader intergroup dynamics (societal level). Specifically, we suggest that self-compassion is associated with greater empathy toward others, which in turn is linked to stronger egalitarian attitudes. In the following sections, we review prior research that offers preliminary evidence for these connections.

Self-compassion has been described as “being caring and compassionate towards oneself in the face of hardship or perceived inadequacy” (Neff et al., 2007, p. 140). According to Neff (2003a), self-compassion is characterized by positive and negative indicators on three key dimensions that include self-kindness vs. self-judgment, mindfulness vs. over-identification (of thoughts and emotions), and isolation vs. common humanity, or the understanding that failures, problems, and stress are experiences shared by all. The positive indicators of self-compassion are considered protective factors that foster emotional resilience (Neff, 2009). Conversely, their negative counterparts, which include self-judgment, isolation, and over-identification, point to the deficit of self-compassion and resemble pervasive features of psychopathology, including self-criticism, loneliness, and

ruminant (Lyubomirsky & Nolen-Hoeksema, 1995; Rubin & Coplan, 2004). Emerging research suggests that the positive aspects of self-compassion protect against psychopathological symptoms whereas the negative aspects are highly correlated with it (Mills et al., 2007; Muris & Petrocchi, 2016; Ying, 2009).

The concept of social dominance orientation (SDO) originated from social dominance theory, which postulates that societies attempt to minimize intergroup conflict by converging on ideologies that justify the superiority of certain groups over others (Sidanius, 1993; Sidanius & Pratto, 1993). Social dominance theory aims to bridge psychological and sociological domains. From the perspective of social dominance theory, SDO can be conceptualized as a broad attitudinal orientation toward intergroup relations that predicts a generalized preference for inequality expressed through ideologies that affect intergroup relations. When communities collectively endorse these ideologies, they might incidentally legitimize discrimination and prejudice toward certain social groups.

Pratto et al. (1994) originally theorized that SDO would predict a range of personality variables, ideologies, and policy attitudes. In support of their hypothesis, higher levels of SDO were found to be associated with lower levels of certain individual difference variables that reflect hierarchy-attenuating beliefs, such as concern for others, communality, tolerance, and empathy. A growing body of support suggests that SDO is a generalized factor of prejudice that predicts attitudes across various social, political, national, racial, sexual, and professional domains (Chiao et al., 2009; Freeman et al., 2009; Halabi et al., 2008; Ho et al., 2012; Kteily et al., 2012; Michinov et al., 2005; Sidanius & Pratto, 2001; Sidanius et al., 1994, 2006). Consequently, SDO is central to the discussion of the antecedents and maintaining factors of group-based dominance attitudes and its ramification on the dynamics of intergroup relations.

While extensive research exists on SDO and individual differences that influence relationships with others, how SDO relates to the relationship to the self has received less attention. At the same time, an individual’s relationship to themselves might be more malleable than stable personality factors, beliefs, and social structures. Therefore, there is an opportunity to better understand potential intervention targets that could effectively attenuate SDO and promote prosocial intergroup attitudes and behaviors.

Independently, the constructs of self-compassion and SDO have received considerable attention. However, the relationship between these two constructs has not been sufficiently studied. To the authors’ knowledge, the only study that directly examined the relationship between self-compassion and SDO was Martin et al. (2015). In a sample of

business students, the authors found that SDO was weakly negatively correlated with overall self-compassion, measured with the shortened 12-item Self-Compassion Scale. However, it is unknown how SDO is connected to the different facets of self-compassion. Theorists speculate that common identity, which relates to the self-compassion facet of common humanity, can reduce intergroup tension that has been exacerbated during the pandemic (Dovidio et al., 2020). Investigating how the six subscales of self-compassion relate to SDO could provide nuance to this understudied relationship.

Compassion is a closely related construct and has been referred to as the parent construct of self-compassion (Neff, 2003a, 2003b; Mills, et al., 2007). According to Pommier's conceptualization of compassion (Gilbert, et al., (2011), common humanity and kindness are incompatible with anti-egalitarianism attitudes and intolerance. A series of studies demonstrated that compassion was associated with heightened perception of self-other similarity, particularly to those more vulnerable (Oveis et al., 2010). In line with these findings, Sinclair and Saklofske (2019) found compassion negatively correlated with SDO along with the opposition to other hierarchy-attenuating policies such as economic redistribution, social welfare, social rights for racial and sexual minorities, and sustainability policy. Therefore, it remains to be tested whether self-compassion might mitigate fear-based bias and promote a recognition of common humanity. Understanding how intrapersonal constructs could reduce SDO and promote empathy between social groups could have a significant impact on individuals and societies alike (Tei & Fujino, 2022).

Empathy is defined as an "other-oriented emotional response elicited by and congruent with the perceived welfare of someone else" (Batson et al., 2002, p. 486). Early philosophers theorized that empathy is multidimensional and constitutes a quick, intuitive, and emotional component as well as a cognitive component (Smith, 1759; Spencer, 1870). The emotional component was initially examined to understand how similar emotions resonated between people (Lipps, 1926; McDougall, 1908). The shift to the cognitive approaches to empathy was catalyzed by the works of Piaget (1932) and Dymond (1950) who conceptualized empathy as "the ability to transpose oneself into the thinking, feeling, and acting of another" (p. 344). Empathy emerged as a multifaceted construct that includes perspective-taking, the ability to adopt the perspective of others, and empathic concern, the capacity to assess "other-oriented" feelings of sympathy and concern for those disenfranchised. Prior studies have demonstrated that empathy can be enhanced through various psychoeducational and contemplative interventions (Hoseinian et al., 2019; Nooripour et al., 2023).

In relation to social dominance orientation, theorists originally postulated that empathy would be the most predictive

individual difference variable (Pratto et al., 1994). Indeed, they found that people high in SDO express less perspective-taking and empathic concern for others than do people low in SDO. Interestingly, in that study, empathic concern had a stronger negative correlation to SDO than perspective-taking across multiple samples. As considerable evidence accumulates for SDO as a predictor of intergroup attitudes and behaviors (Guimond et al., 2003; Ho et al., 2012; Kteily et al., 2012; Sibley & Liu, 2010), recent research has focused on a more nuanced relationship between SDO and empathy (McFarland, 2010; Sidanius et al., 2013). Understanding the nuances of this relationship will require research designs that consider empathy as a global construct as well as its individual components.

Self-compassion is considered the compassionate attitude toward oneself (Neff, 2003b). Compassion toward others is more generally placed within a broader category of related psychological states, including sympathy, empathy, and pity, that share a focus on ameliorating the suffering of others, but contrasts in its cognitive and behavioral components (Keltner & Lerner, 2010). Theorists have posited that compassion is an evolved motivational system that helps regulate negative affect through the attunement to the distress of self and others, as well as by extending sentiments of warmth and safety (Gilbert, 1989; Spikins et al., 2010). Neff and Pommier (2013) found a general pattern that self-compassion is significantly linked with other-focused concerns, such as empathy, altruism, and compassion for humanity, although the strength of this association differs by age, gender, and meditation experience. This appears to support Neff's (2003a) original postulation that self-compassion leads people to feel more connected to others and less isolated. Gilbert et al. (2011) found support that only the positive indicators of self-compassion were related to compassionate love for others. This suggests that cultivating self-compassion may indirectly benefit society by helping individuals reduce self-judgment, feelings of isolation, and over-identification, while promoting mindfulness, self-kindness, and a sense of common humanity (Neff, 2003b, p. 96).

The relationship between self-compassion, empathy, and intergroup attitudes such as social dominance orientation remains unclear. In this study, we investigated the relationships between these variables in a diverse sample of undergraduate students using psychometric network analysis. This method is better suited to our aim than approaches like mediation analysis, as it does not require specifying the direction of relationships between variables. While we theorize that empathy may function as a bridge between self-compassion and social dominance orientation (SDO), there is currently insufficient evidence to hypothesize the direction of these associations. From a network perspective, social and psychological constructs can be conceptualized

as emergent systems within a complex network of reciprocal interactions (De Schryver et al., 2015). Psychometric network analysis supports a methodological approach that maps dynamic relationships that might not be well understood and is therefore well suited for such an exploratory task (Costantini et al., 2019). Since network analysis is largely data driven, it is important to empirically test if the network structure replicates across different datasets (Fried et al., 2018). Thus, we explored the generalizability of our findings using two independent samples of undergraduate students from the same university collected prior to and during the COVID-19 pandemic, a major social disruption that may have affected the relationships between study constructs.

Method

Participants

The data were collected from 1034 students at a large American public university in the Pacific. Participants' demographic characteristics are presented in Table 1. Participants could select their gender and racial/ethnic identity from the provided list or specify their identity if none of the

categories fit. The sample had a greater representation of ethnic minority students (76.6%) compared to the US average of 47.7% (Hanson, 2025). Pre- and post-COVID samples were demographically equivalent. There were no significant differences in the gender ratio, according to a chi-square test ($\chi^2 = 3.37$, $df = 1$, $p = 0.07$; participants who identified as "other gender" were excluded from comparison due to the small numbers in this category that would bias the statistical test). The proportions of races/ethnicities were not significantly different either according to Fisher's exact test with Monte Carlo simulation ($p = 0.06$). The groups significantly differed by age, according to the Wilcoxon signed-rank test, $p < 0.01$, Cohen's $d = -0.09$ ($M = 20.11$ vs. $M = 19.99$ in the pre- and post-COVID groups respectively). However, the difference was less than one standard deviation in the total sample.

Procedure

The participants were recruited via the Sona System, a web-based software through which students can participate in online studies and earn course credit. Students' demographic and other relevant information are stored in the Sona System university account. Researchers set eligibility criteria, and students can only view and enroll in studies for which

Table 1 Sample demographics

	Pre-COVID	Post-COVID	Total
Sample size	578	456	1034
Age			
Mean (SD)	20.11 (3.82)	19.99 (3.95)	20.06 (3.88)
Median	19	19	19
Gender: <i>n</i> (%)			
Female	393 (67.99%)	335 (73.46%)	728 (70.41%)
Male	182 (31.49%)	119 (26.1%)	301 (29.11%)
Other	3 (0.52%)	2 (0.44%)	5 (0.48%)
Race/ethnicity: <i>n</i> (%)			
White	119 (20.59%)	123 (26.97%)	242 (23.4%)
East Asian	150 (25.95%)	84 (18.42%)	234 (22.63%)
Bi- or multi-ethnic/racial	115 (19.9%)	101 (22.15%)	216 (20.89%)
Southeast Asian	85 (14.71%)	68 (14.91%)	153 (14.8%)
Latinx	27 (4.67%)	22 (4.82%)	49 (4.74%)
Native Hawaiian	22 (3.81%)	14 (3.07%)	36 (3.48%)
Other Polynesian or Pacific Islander	8 (1.38%)	9 (1.97%)	17 (1.64%)
Black	7 (1.21%)	7 (1.54%)	14 (1.35%)
American Indian, Alaskan Native, or other Aboriginal	2 (0.35%)	5 (1.1%)	7 (0.68%)
South Asian	3 (0.52%)	0 (0%)	3 (0.29%)
Not listed	1 (0.17%)	0 (0%)	1 (0.1%)
Not reported	39 (7%)	23 (5%)	62 (6%)

Note. SD, standard deviation

they qualify. Participation is entirely voluntary, and students choose in which studies to participate. Our study was available to the students who were at least 18 years old. After completing the consent form, they proceeded to the questionnaire. The consent form included the study investigator's contact information if students had further questions. The participants could not skip questions. They could withdraw at any time before submission, in which case their data were not recorded. After completing the survey, the participants could retrieve their extra credit for a class through the Sona System. The data were collected in two waves: before the COVID-19 pandemic (Spring and Fall semesters, 2019; $n = 578$) and during the pandemic (Fall semester, 2020; $n = 456$).

An analog of power analysis in network modeling is selecting a sample size that allows an estimation of an expected weighted network, including the network structure (which variables are connected and which are not) and the strength of the connections (Epskamp & Fried, (Epskamp, et al., 2018). To our knowledge, the relations between social dominance orientation, empathy, and self-compassion have not been studied with network analysis; hence, we did not have a ground to hypothesize expected network structure and parameters. We evaluated the necessary sample size based on a simulated network with nine variables using Epskamp and Fried (Epskamp, et al., 2018) instructions. The results indicated that a sample of $n = 500$ achieved a correlation of 0.99 between the “true” and estimated network parameters, a correlation of over 0.98 for centrality indices, as well as sensitivity (the rate of correctly detected connections between variables) of 1 and specificity (the rate of correctly omitted connections between variables) of 0.81. Thus, we aimed at collecting samples approaching $n = 500$. As recommended by Epskamp and Fried (Epskamp, et al., 2018), we also conducted post hoc network stability analysis and estimated the network on two independent samples to determine its replicability. The code used for these estimations is available on the OSF.

Measures

Self-Compassion

Self-compassion was assessed using the Self-Compassion Scale (SCS; Neff, 2003a). SCS is a 26-item self-report measure and consists of six subscales that measure three components of self-compassion (Neff, 2003a, 2003b). These components consist of opposing pairs: self-kindness (e.g., “I’m kind to myself when I’m experiencing suffering”) vs. self-judgment (e.g., “I’m disapproving and judgmental about my own flaws and inadequacies”); common humanity (e.g.,

“I try to see my failings as part of the human condition”) vs. isolation (e.g., “When I fail at something that’s important to me, I tend to feel alone in my failure”); and mindfulness (e.g., “When I’m feeling down I try to approach my feelings with curiosity and openness”) vs. over-identification (e.g., “When something upsets me I get carried away with my feelings”). Participants respond on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Subscale scores are computed by calculating the mean of the subscale item responses. High scores reflect greater levels of the facets of self-compassion. Internal consistencies ranged from good to excellent: overall scale ($\omega = 0.92$), self-kindness subscale ($\omega = 0.83$), self-judgment subscale ($\omega = 0.83$), common humanity subscale ($\omega = 0.80$), isolation subscale ($\omega = 0.79$), mindfulness subscale ($\omega = 0.74$), and over-identification subscale ($\omega = 0.75$).

Empathy

Empathy was assessed using the Interpersonal Reactivity Index (IRI; Davis, 1983). This multidimensional measure consists of four subscales: perspective-taking, empathic concern, personal distress, and fantasy. The full measure contains 28 items using a 5-point Likert scale with responses ranging from 1 (*does not describe me well*) to 5 (*describes me very well*). Sample items include “When I see someone being taken advantage of, I feel kind of protective towards them”; “When I see someone get hurt, I tend to remain calm” (reverse-scored); and “Before criticizing somebody, I try to imagine how I would feel if I were in their place.” Items for subscales are averaged. Higher scores indicate greater facets of empathy. The IRI demonstrated good internal consistency ($\omega = 0.80$). In later research, empathy was increasingly measured using only empathic concern and perspective taking subscales (Duriez, 2004; McFarland, 2010). In the present study, we also used those two subscales, with higher scores indicating increased levels of empathy. Empathic concern and perspective taking subscales had acceptable internal consistency ($\omega = 0.75$ and $\omega = 0.77$ respectively) in the current study.

Social Dominance Orientation (SDO)

Social Dominance Orientation (SDO-6; Pratto et al., 1994) is a self-report measure that assesses one’s degree of preference for inequality among social groups. The SDO measure asks questions such as “Which of the following objects or statements do you have a negative or positive feeling towards?” The 16-item scale is measured on a 7-point Likert scale which represents the degree of positive and negative feeling to each statement, ranging from 1 (*very negative*) to

7 (*very positive*). Sample items include the following: “Some groups of people are simply inferior to others”; “All groups should be given an equal chance in life” (reverse-scored); and “No one group should dominate in society” (reverse-scored). Items are averaged for a total score. High scores indicate a greater preference for social inequality between groups, and lower scores indicate a preference for egalitarian worldviews. In the present study, the McDonald’s omega reliability estimate of SDO was 0.88.

The measures were selected based on their validity evidence and frequent use in prior literature to ensure consistency with previous research. No modifications were made to the items or response scales.

Data Analyses

We used psychometric network analysis in this study. This approach is extensively used in other fields, but it is relatively new in psychology. The purpose of network analysis is to estimate the structure of connections among variables (which are connected, and which are not) and the statistical parameters describing those connections (e.g., partial correlations). Network analysis is well suited to explore the structure of multivariate data when there is not enough prior research to formulate hypotheses on how variables are related. Network analysis differs from other exploratory techniques in psychological research, such as exploratory factor analysis, by treating psychological constructs as systems of interrelated processes rather than as manifestations of a single underlying latent construct. This approach is well suited to our study aim of examining the relationships among social dominance orientation, empathy, and self-compassion. Network analysis offers powerful visualization of patterns of pairwise conditional dependencies in the data, as well as descriptive statistics (centrality indices) of the overall network and each variable within it. The results of network analysis provide a foundation for causal hypotheses for future research (Borsboom et al., 2021). We conducted the analysis in three steps. First, we estimated the networks for the pre- and post-COVID samples and calculated their centrality indices. Then, we estimated the stability of the networks. Stability refers to the extent to which the network is robust to sampling error and accuracy of network parameters estimation. Finally, we tested pre- and post-COVID networks for invariance in terms of their structure and centrality indices. All analyses were carried out in R version 4.1.1 in RStudio 2021.09.0 Build 351.

In network analysis, variables are called “nodes,” and connections between them are called “edges.” In our analysis, we used the Gaussian Graphical Model (GGM; Lauritzen, 1996), a network in which nodes represented psychological constructs (social dominance orientation,

empathy, and facets of self-compassion, calculated as the means of the items), and edges represented their partial correlations. If two constructs are linked in the resulting graph, they are dependent after controlling for all other constructs. If there is no link, they are thought to be independent. To determine an optimal network, we used the Fused Graphical Lasso (FGL; Costantini et al., 2019; Danaher et al., 2014), a method that applies regularization across multiple networks jointly to retain only the most important edges and reduce spurious edges to zero. FGL applies a penalty on network density (the number and strength of edges) and another penalty on differences among corresponding edge weights in networks estimated on different samples. In sum, this method allows networks to share common structures while preserving the differences. GGM and FGL are standard methods for network estimation recommended in methodological network analysis literature (Costantini et al., 2019; Danaher et al., 2014; Epskamp et al., 2012). Tuning parameters that regulate those penalty terms were selected via Extended Bayesian Information Criterion (EBIC) using *EstimateGroupNetwork* package in R (Costantini et al., 2019). Networks were visualized with *qgraph* package in R (Epskamp et al., 2012).

We calculated the following centrality indices for each node in the two jointly estimated networks using *qgraph* package in R (Epskamp et al., 2012): strength (sum of absolute edge weights connected to a node), closeness (the inverse of the sum of the distance of the node to all other nodes), betweenness (the number of times when a node is on the shortest way between other nodes), and expected influence (sum of non-absolute edge weights connected to a node).

Stability of the networks was estimated via *bootnet* package in R (Epskamp et al., 2018). Stability estimation has not yet been implemented for jointly estimated networks; hence, following the example of Fried et al. (2017), we evaluated the stability of pre- and post-COVID networks estimated separately with a penalty only on network density. Since independently estimated networks employ samples separately, they are less powered and stable than jointly estimated networks. Hence, the stability of independently estimated networks represents the lower bound of the stability of jointly estimated networks. To evaluate the stability of the edge weights, we calculated their 95% confidence intervals with 5000 nonparametric bootstraps. The stability of centrality metrics was assessed with 5000 case-dropping bootstraps used to calculate the correlation stability (CS) coefficient that shows the largest proportion of the sample that can be dropped while maintaining a correlation of 0.70 between the original centrality indices and those obtained from bootstrapped subsets. Values above 0.25 indicate moderate stability and above 0.50 indicate strong stability (Epskamp et al., 2018).

Finally, we compared pre- and post-COVID networks. First, to assess their similarity, we calculated a correlation coefficient for the edge weights in the two networks (Borsboom et al., 2017; Rhemtulla et al., 2016). Then, we conducted a Network Comparison Test (NCT), implemented in *NetworkComparisonTest* package in R (van Borkulo et al., 2020). NCT is a permutation-based hypothesis test that assesses the difference between two networks using several invariance measures. We started the analysis with an omnibus test that showed whether all edges were exactly the same. We also tested the invariance of global strength (the sum of absolute edge weights in each network), as well as the strength and expected influence of individual nodes. As a final step, we visualized the cross-sample network with edge weights averaged between pre- and post-COVID samples.

We used the following procedures to ensure data quality. First, as recommended by Greszki et al. (2015), we removed the data of the participants who completed in less than 50% of the median time ($n = 44$, 4.26% of the sample). Next, we checked for univariate and multivariate outliers. Six univariate outliers (z -scores outside of ± 3.29 range; Tabachnick & Fidell, 2013) were detected and Winsorized (replaced with a value corresponding to the z -score of 3.29). We also removed 11 multivariate outliers, resulting in the final sample of 979 participants ($n = 543$ in the pre-COVID sample and $n = 436$ in the post-COVID sample). Participants were not excluded from the main study analyses based on demographic characteristics. Skewness and kurtosis of all variables were within ± 1 range (Table 1).

Results

As a preliminary step, we calculated descriptive statistics for all study variables (Table 2). Mean levels of the study variables were not significantly different in the pre- and post-COVID groups, except for the Over-Identification subscale of the Self-Compassion Scale (Table 3). Participants in the post-COVID group identified more with their thoughts

Table 3 Pre-post t -tests for means of study variables

Variable	Statistic	df	p -value (Holm-adjusted)
Social Dominance Orientation	-1.63	957.15	0.82
IRI Empathic Concern	1.37	949.30	1.00
IRI Perspective Taking	-1.42	910.74	1.00
SCS Self-Kindness	0.31	890.54	1.00
SCS Self-Judgment	0.64	898.71	1.00
SCS Common Humanity	-0.61	890.55	1.00
SCS Isolation	1.42	922.28	1.00
SCS Mindfulness	-0.54	887.69	1.00
SCS Over-Identification	2.80	933.65	0.05

Note. IRI, Interpersonal Reactivity Index; SCS, Self-Compassion Scale; df , degrees of freedom

and feelings than those in the pre-COVID group ($M = 3.36$ vs. $M = 3.51$).

Jointly estimated pre- and post-COVID networks are demonstrated in Fig. 1. The pre-COVID network contained 24 edges (out of possible 36), 17 of them were positive and seven were negative. The post-COVID network also contained 24 edges, 17 of them were positive and seven were negative. “Positive” psychological constructs dominated the networks as they contained five “positive” nodes (Empathic Concern, Perspective Taking, Self-Kindness, Mindfulness, and Common Humanity) and four “negative” nodes (SDO, Self-Judgment, Over-Identification, and Isolation). Hence, higher network activation signified improved psychological functioning. Network structures were remarkably similar and differed only in the weakest edges. In both of them, SDO had the strongest edge only with empathic concern, which in turn was connected to perspective-taking and several nodes in the self-compassion part of the network. Thus, empathic concern and perspective-taking served as a bridge between SDO and self-compassion, which showed only weak connections. Self-compassion was distinctly split into highly

Table 2 Descriptive statistics of study variables

Variable	Mean	SD	Min	Max	Skewness	Kurtosis
Social Dominance Orientation	1.95	0.76	1.00	4.45	0.70	-0.18
IRI Empathic Concern	3.94	0.61	1.85	5.00	-0.48	-0.05
IRI Perspective Taking	3.69	0.66	1.49	5.00	-0.24	-0.23
SCS Self-Kindness	2.88	0.82	1.00	5.00	0.08	-0.23
SCS Self-Judgment	3.60	0.85	1.00	5.00	-0.39	-0.17
SCS Common Humanity	3.20	0.89	1.00	5.00	-0.05	-0.53
SCS Isolation	3.45	0.93	1.00	5.00	-0.26	-0.50
SCS Mindfulness	3.15	0.76	1.00	5.00	0.06	-0.10
SCS Over-Identification	3.43	0.84	1.00	5.00	-0.21	-0.37

Note. IRI, Interpersonal Reactivity Index; SCS, Self-Compassion Scale; SD , standard deviation

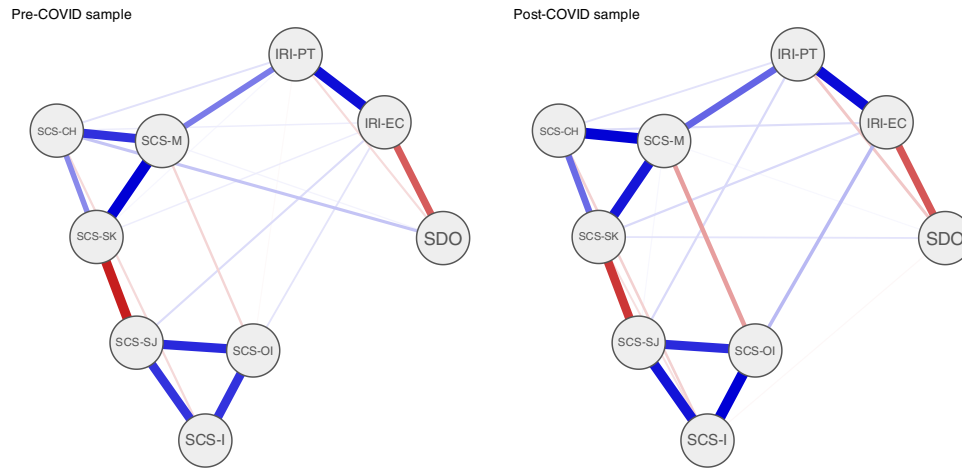


Fig. 1 Regularized partial correlation networks of pre- and post-COVID samples. Blue edges represent positive associations, red edges represent negative associations. Edge thickness and saturation indicate strength of association. *Note.* *SDO*, Social Dominance Orientation; *IRI-EC*, Interpersonal Reactivity Index, Empathic Concern subscale; *IRI-PT*, Interpersonal Reactivity Index, Perspective Taking

subscale; *SCS-SK*, Self-Compassion Scale, Self-Kindness subscale; *SCS-SJ*, Self-Compassion Scale, Self-Judgment subscale; *SCS-CH*, Self-Compassion Scale, Common Humanity subscale; *SCS-I*, Self-Compassion Scale, Isolation subscale; *SCS-M*, Self-Compassion Scale, Mindfulness subscale; *SCS-OI*, Self-Compassion Scale, Over-Identification subscale

intercorrelated “positive” (Self-Kindness, Mindfulness, Common Humanity) and “negative” (Self-Judgment, Over-Identification, Isolation) parts.

Centrality indices in pre- and post-COVID networks followed the same patterns (Fig. 2). Betweenness showed larger discrepancies, but those could be due to the low stability

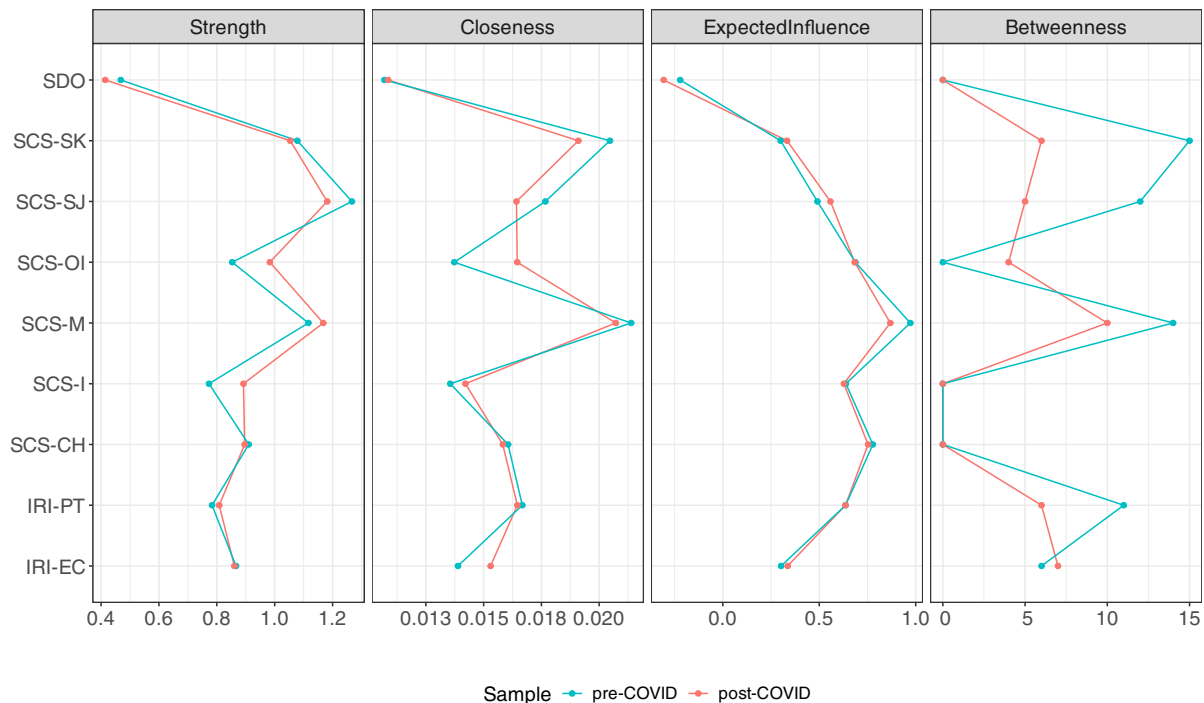


Fig. 2 Network centrality indices. *Note.* *SDO*, Social Dominance Orientation; *IRI-EC*, Interpersonal Reactivity Index, Empathic Concern subscale; *IRI-PT*, Interpersonal Reactivity Index, Perspective Taking subscale; *SCS-SK*, Self-Compassion Scale, Self-Kindness subscale; *SCS-SJ*, Self-Compassion Scale, Self-Judgment subscale; *SCS-CH*,

Self-Compassion Scale, Common Humanity subscale; *SCS-I*, Self-Compassion Scale, Isolation subscale; *SCS-M*, Self-Compassion Scale, Mindfulness subscale; *SCS-OI*, Self-Compassion Scale, Over-Identification subscale

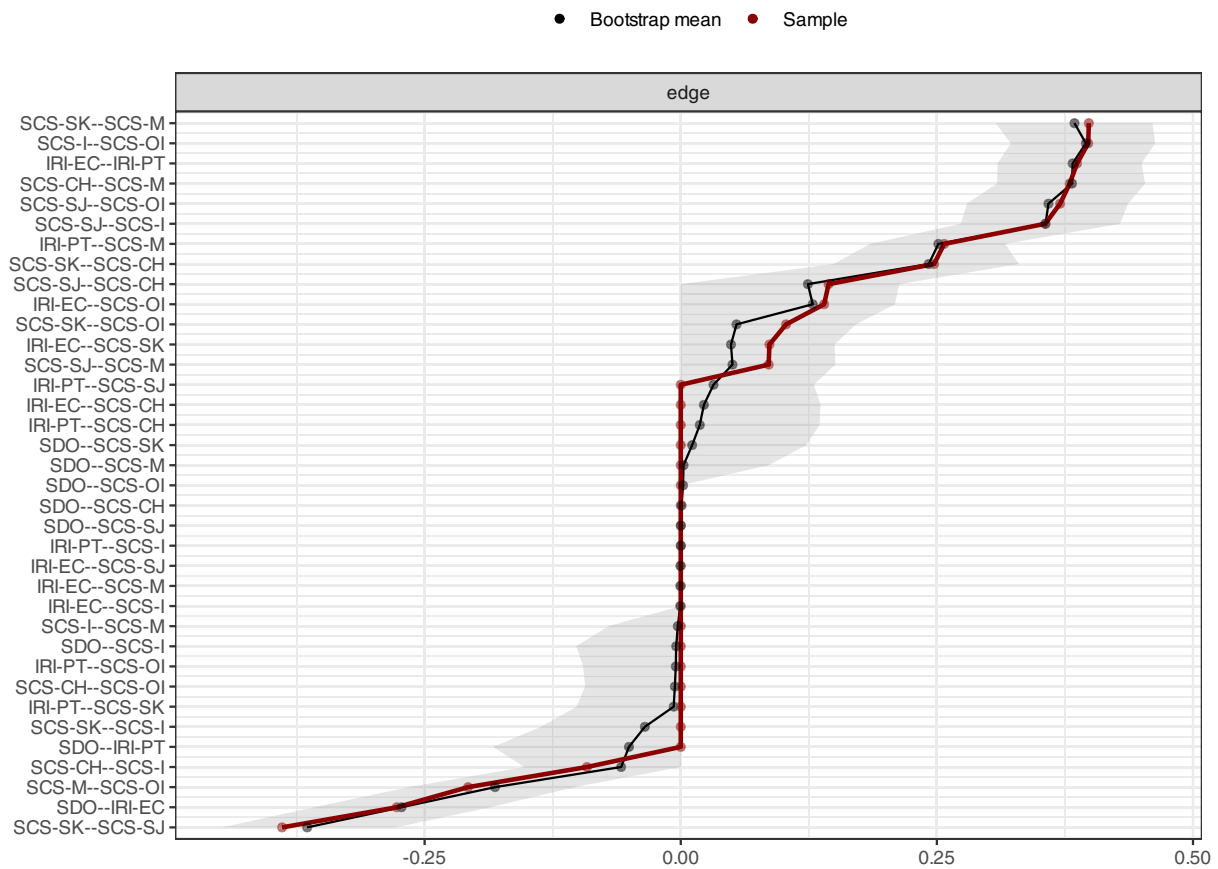


Fig. 3 Bootstrapped confidence intervals of estimated edge weights of the pre-COVID network. The red line indicates the sample values and the gray area the bootstrapped CIs. The black line indicates the mean of the bootstrapped sample values. Each horizontal line represents one edge of the network, ordered from the edge with the highest edge weight to the edge with the lowest edge weight. *Note.* *SDO*, Social Dominance Orientation; *IRI-EC*, Interpersonal Reactivity

Index, Empathic Concern subscale; *IRI-PT*, Interpersonal Reactivity Index, Perspective Taking subscale; *SCS-SK*, Self-Compassion Scale, Self-Kindness subscale; *SCS-SJ*, Self-Compassion Scale, Self-Judgment subscale; *SCS-CH*, Self-Compassion Scale, Common Humanity subscale; *SCS-I*, Self-Compassion Scale, Isolation subscale; *SCS-M*, Self-Compassion Scale, Mindfulness subscale; *SCS-OI*, Self-Compassion Scale, Over-Identification subscale

of this index (see details in the next section); hence, we do not discuss this index. *SDO* showed the lowest strength and closeness because it was on the periphery of the network, with a strong edge only with empathic concern and a low overall number of edges. However, it had the lowest negative expected influence (the sum of the edge weights), meaning that its increase exerted the strongest negative influence on the overall network activation (compromised psychological functioning), while higher overall network activation (improved psychological functioning) undercut *SDO*. Empathic concern and perspective-taking demonstrated moderate centrality. Within the self-compassion part of the network, self-judgment had the highest strength (the sum of its absolute edge weights), followed by mindfulness and self-kindness, meaning that those variables were the most strongly connected with other nodes. Mindfulness had the highest closeness and potential positive influence in the network. Its increase was associated with higher overall

network activation, while lower network activation dampened it.

To evaluate the accuracy of the edge weights of the separately estimated pre- and post-COVID networks, we calculated their 95% bootstrapped confidence intervals (Figs. 3 and 4). In both networks, CIs of some of the edges overlapped substantially, indicating that comparison of those edge weights should be avoided.

Then, we evaluated the stability of the centrality indices of separately estimated networks (Figs. 5 and 6). The stability of strength and expected influence in both networks was good, with correlation stability (CS) coefficients of 0.75, the largest possible value. This means that even when the bootstrapped samples contained only 25% of the original sample, network strength in those subsets was still highly correlated with network strength in the full sample. The stability of closeness in both networks was acceptable, with a CS coefficient of 0.52. The stability

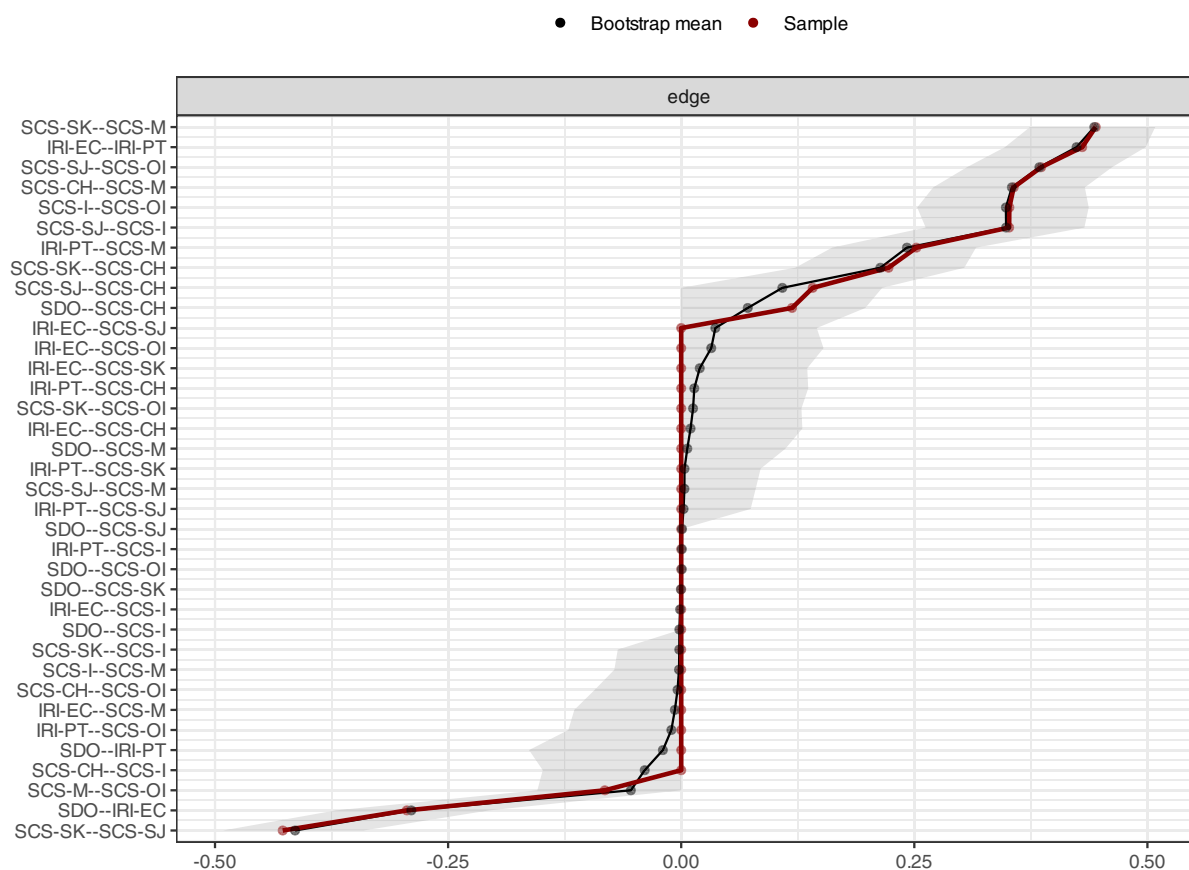


Fig. 4 Bootstrapped confidence intervals of estimated edge weights of the post-COVID network. The red line indicates the sample values and the gray area the bootstrapped CIs. The black line indicates the mean of the bootstrapped sample values. Each horizontal line represents one edge of the network, ordered from the edge with the highest edge weight to the edge with the lowest edge weight. *Note.* *SDO*, Social Dominance Orientation; *IRI-EC*, Interpersonal Reactivity

Index, Empathic Concern subscale; *IRI-PT*, Interpersonal Reactivity Index, Perspective Taking subscale; *SCS-SK*, Self-Compassion Scale, Self-Kindness subscale; *SCS-SJ*, Self-Compassion Scale, Self-Judgment subscale; *SCS-CH*, Self-Compassion Scale, Common Humanity subscale; *SCS-I*, Self-Compassion Scale, Isolation subscale; *SCS-M*, Self-Compassion Scale, Mindfulness subscale; *SCS-OI*, Self-Compassion Scale, Over-Identification subscale

of betweenness in the post-COVID network was acceptable, with a CS coefficient of 0.59. However, in the pre-COVID network, the CS coefficient of betweenness was 0.44, which is below the recommended threshold of 0.50 (Epskamp et al., 2017).

First, we calculated the Spearman correlation of edge weights in pre- and post-COVID networks. The coefficient was 0.87, indicating high similarity. Then, we used Network Comparison Test (NCT, van Borkulo et al., 2020) to compare edge weights in the two networks. The results of the omnibus test indicated that none of the corresponding edge weights significantly differed ($p=0.73$). Global strength (the sum of all absolute edge weights) in the two groups did not significantly differ either ($p=0.96$), meaning that network connectivity was similar. Strength, closeness, and expected influence of separate nodes did not significantly differ either (all p -values > 0.14). Together, those results point to considerable similarity between the two networks. Although the

networks were estimated on two independent samples collected in different social conditions (before and during the COVID-19 pandemic), their structures and centrality indices were similar. Finally, we computed a cross-sample network by averaging all edge weights. Figure 7 depicts the network, and Fig. 8 shows strength, closeness, and expected influence of its nodes.

Discussion

The aim of the present study was to explore the relationship between self-compassion, empathy, and SDO using network analysis in samples collected before and during the COVID-19 pandemic. Within both samples, network analysis indicated that SDO had the strongest connection to empathy, which was in turn connected to self-compassion. Empathic concern had a stronger relationship to SDO than

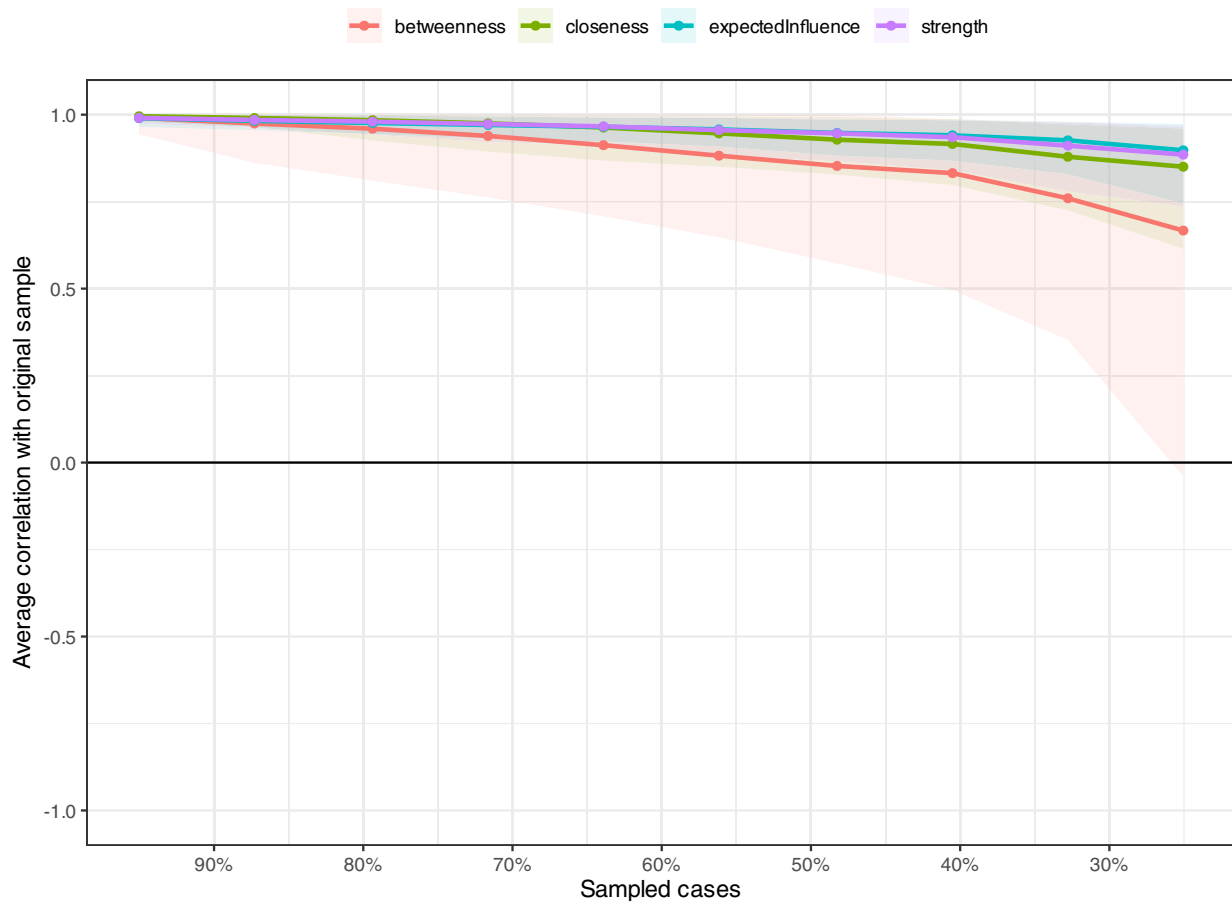


Fig. 5 Average correlations between centrality indices of pre-COVID sample networks sampled with cases dropped and the original sample. Lines indicate the means and areas indicate the range from the 2.5th quantile to the 97.5th quantile

perspective-taking, after accounting for other variables in the network. Invariance analysis confirmed that network structure, global strength, and strength and expected influence of the individual variables remained notably similar despite a major social disruption due to the onset of the COVID-19 pandemic.

The findings from the present study have novel theoretical implications, as they suggest that the link between self-compassion and egalitarian attitudes could be stably connected through trait empathy. Previously, there was a gap in the research that examined how self-compassion is linked to SDO. To our knowledge, only one study attempted to address the relationship between self-compassion and SDO, using a sample of business students (Martin et al., 2015). That study found a weak yet significant negative correlation between SDO and self-compassion, as measured by the short-form SCS scale. Using a larger sample and the full SCS scale, the present study investigated this connection in more detail.

According to social dominance theory (Pratto et al., 1994), intrapersonal and interpersonal mechanisms

reciprocally influence social hierarchy through institutional behavior and social structure. This theory has reliably predicted the inverse relationship between empathy and hierarchy-enhancing attitudes. Findings from the present study build on the work of Martin et al. (2015) and advance this theoretical framework by suggesting that self-compassion and preference for social equality are indirectly linked through trait empathy. A similar study found that compassion for others mediated the relationship between self-compassion and intergroup attitudes (Vu & Rivera, 2022). Self-compassion may serve as a bridge between personal attitudes and intergroup dynamics. Extant studies have demonstrated that compassion training can improve intergroup relationships and increase moral expansiveness (Chow et al., 2023; Kirby et al., 2024). The results of the present study provide valuable hypotheses-generating structures that invite further investigation into whether nurturing self-compassion at the individual level might indirectly affect broader prosocial attitudes, such as the preference for social equality. Future research studies will have the

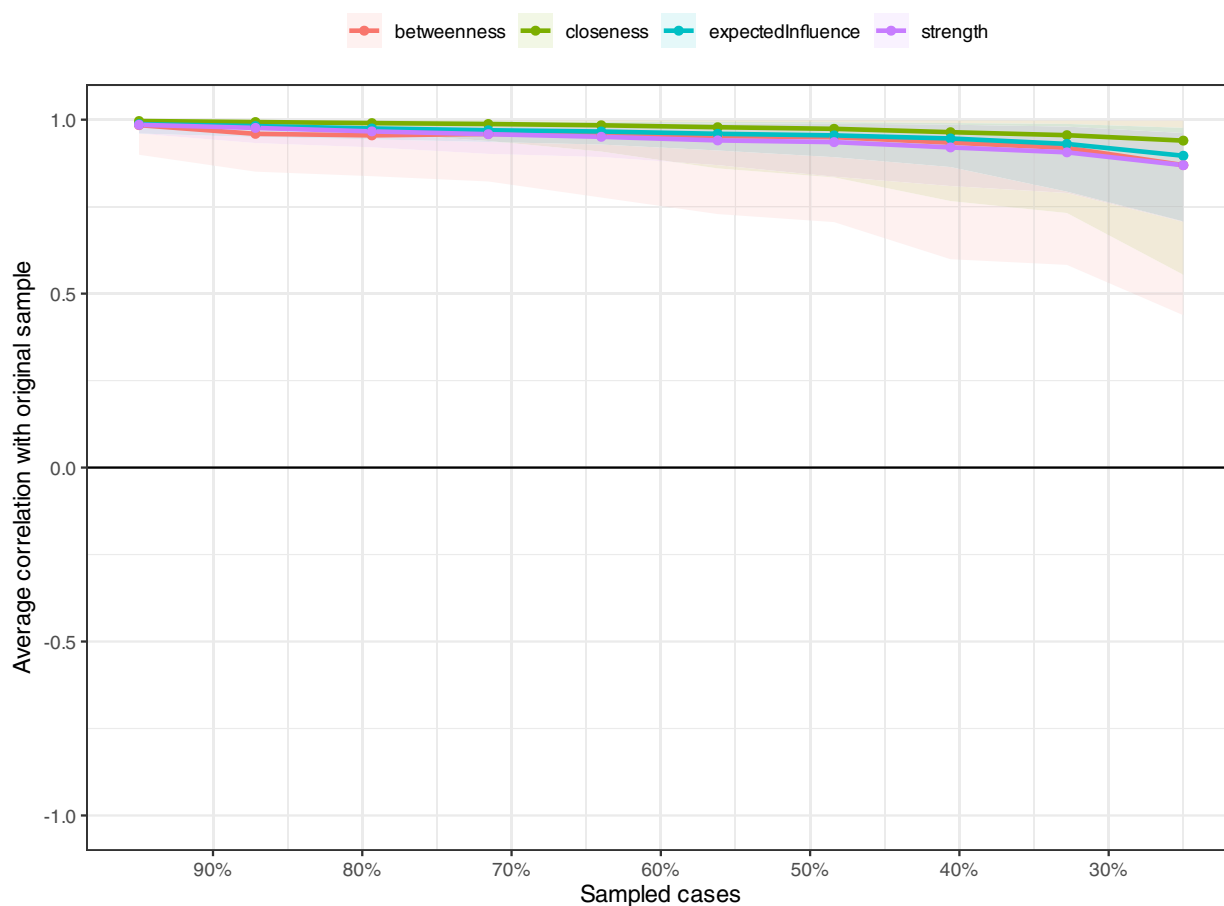


Fig. 6 Average correlations between centrality indices of post-COVID sample networks sampled with cases dropped and the original sample. Lines indicate the means and areas indicate the range from the 2.5th quantile to the 97.5th quantile

opportunity to directly test such hypotheses with self-compassion interventions.

The current results also replicate the findings from Pratto et al. (1994) that demonstrated that the emotional component of empathy has a stronger inverse relationship to SDO than the cognitive component. Previous studies found that perspective-taking can have mixed effects (Ku et al., 2015), is target and context specific (Galinsky et al., 2005; Lucas & Kteily, 2018) and can even have a detrimental effect when the perspective taker feels threatened (Sassenrath et al., 2016). For these reasons, it is possible that emotional concern is less context-dependent than the cognitive component of empathy and therefore has a stronger relationship to SDO. These findings invite further investigation with experimental designs that test causal connections.

Despite the widespread disruption of the COVID-19 pandemic, the relationships between self-compassion, empathy, and SDO appear stable. While the effects of the COVID-19 pandemic are now better understood, early studies indicate that college students reported a moderate to severe impact

(Odrizola-González et al., 2020) and felt more socially isolated (Vaterlaus et al., 2025). These results reliably show these relationships are stable across two independent, racially diverse college samples in normal social conditions and during a major social disruption. The robustness of the study findings across varying social conditions suggests that the observed network structure reflects fundamental processes connecting intrapersonal, interpersonal, and societal domains, rather than context-dependent associations. Since network analysis provides sophisticated regularization procedures to retain only the most important connections between the variables and statistical tests to compare the networks in samples collected in different social conditions, these findings reveal complex interactions that may be missed using simpler analytic techniques such as correlation analysis. The findings from this study contribute to an expanding body of network analysis research that seeks to map the complex interplay between compassion and other adaptive variables of interest (Aizik-Reebs et al., 2021; Medvedev et al., 2021; Roca et al., 2021). Future studies will have the opportunity to test the generalizability of these findings beyond a college sample.

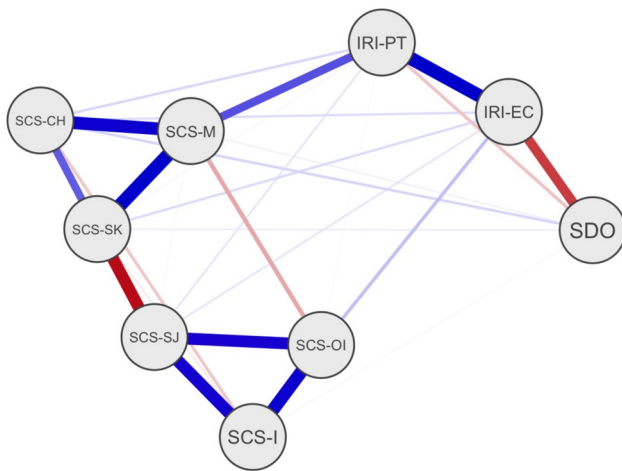


Fig. 7 Cross-sample network ($n=979$) showing the average of pre- and post-COVID networks. Blue edges represent positive associations, red edges represent negative associations. Edge thickness and saturation indicate strength of association. *Note.* *SDO*, Social Dominance Orientation; *IRI-EC*, Interpersonal Reactivity Index, Empathic Concern subscale; *IRI-PT*, Interpersonal Reactivity Index, Perspective Taking subscale; *SCS-SK*, Self-Compassion Scale, Self-Kindness subscale; *SCS-SJ*, Self-Compassion Scale, Self-Judgment subscale; *SCS-CH*, Self-Compassion Scale, Common Humanity subscale; *SCS-I*, Self-Compassion Scale, Isolation subscale; *SCS-M*, Self-Compassion Scale, Mindfulness subscale; *SCS-OI*, Self-Compassion Scale, Over-Identification subscale

These results provide preliminary evidence that self-compassionate attitudes are related to interpersonal traits and broader social preferences. Previous studies have linked the ability to recognize and express emotions with heightened self-perceptions of compassionate behaviors (Gu et al., 2017). It has been theorized that this personal self-awareness directly contributes to an awareness of another person's suffering and the prosocial desire to alleviate their suffering (Di Fabio, 2019; Gu et al., 2017). Indeed, recent studies support this link between self-compassion and compassion for others (Cha et al., 2023; Sahdra et al., 2023). These findings suggest that the compassionate attitude that an individual has for themselves might also relate to hierarchy-enhancing attitudes and social behaviors toward those in different social groups. As a growing body of evidence supports the putative relationship between prosocial attitudes and behaviors and personal well-being (Brown et al., 2008; Deci et al., 2006), interventions that teach self-compassion and mindfulness might benefit intrapersonal well-being while simultaneously improving intergroup relationships during crises, when social cohesion is increasingly vulnerable.

Limitations and Future Directions

The present investigation should be interpreted in the context of several important limitations. The study sample was

composed of undergraduate students from the same university; thus, future research should include other social groups. Future studies should also consider key demographic variables such as gender, race, ethnicity, and socioeconomic status as well as context specificity that may influence network structures (Lucas & Kteily, 2018). For example, individuals from marginalized backgrounds may develop higher empathic concern through firsthand exposure to inequality, potentially strengthening links between empathy and both self-compassion and rejection of SDO. Conversely, individuals from dominant social groups may show weaker or more context-dependent connections among these constructs, especially if their social environments reinforce hierarchical worldviews. Future studies could help identify whether network structures differ across subgroups, offering insight into how identity and social context modulate the psychological links between intrapersonal, interpersonal, and societal processes. Furthermore, the current study's cross-sectional design was not able to determine the directionality of the relationships between the study variables. Cross-sectional network models allow an examination of interpersonal differences; however, they do not provide ground to investigate intrapersonal mechanisms and dynamics.

Future studies might benefit from directly testing interventions that activate the self-compassion network, such as Mindful Self-Compassion (Neff & Germer, 2012) in longitudinal designs, to test whether enhancing self-compassion temporally influences this specific network of variables and makes people more empathic and supportive of intergroup equality. Following these potential theoretical implications, the practical application of self-compassion training for a group or generation could nurture more self-compassion, cultivate more empathy, and engender more egalitarian views—perhaps reciprocally. Stakeholders might benefit from considering its potential as a foundational educational tool to develop socioemotional learning across a generation with far-reaching social benefits.

The present study extends previous findings by highlighting how empathy is a critical link between self-compassion and social dominance orientation. The results suggest that preference for social equality is related to intrapersonal and interpersonal traits, such as self-compassion and empathy. While an accumulating body of research already supports the benefits of self-compassion on the intrapersonal and interpersonal levels, these findings provide novel theoretical and empirical evidence that self-compassion might also influence broader social preferences such as social equality. Our study does not establish causal relationships between these constructs, but it lays the groundwork for future longitudinal and experimental research to examine these connections and the direction of

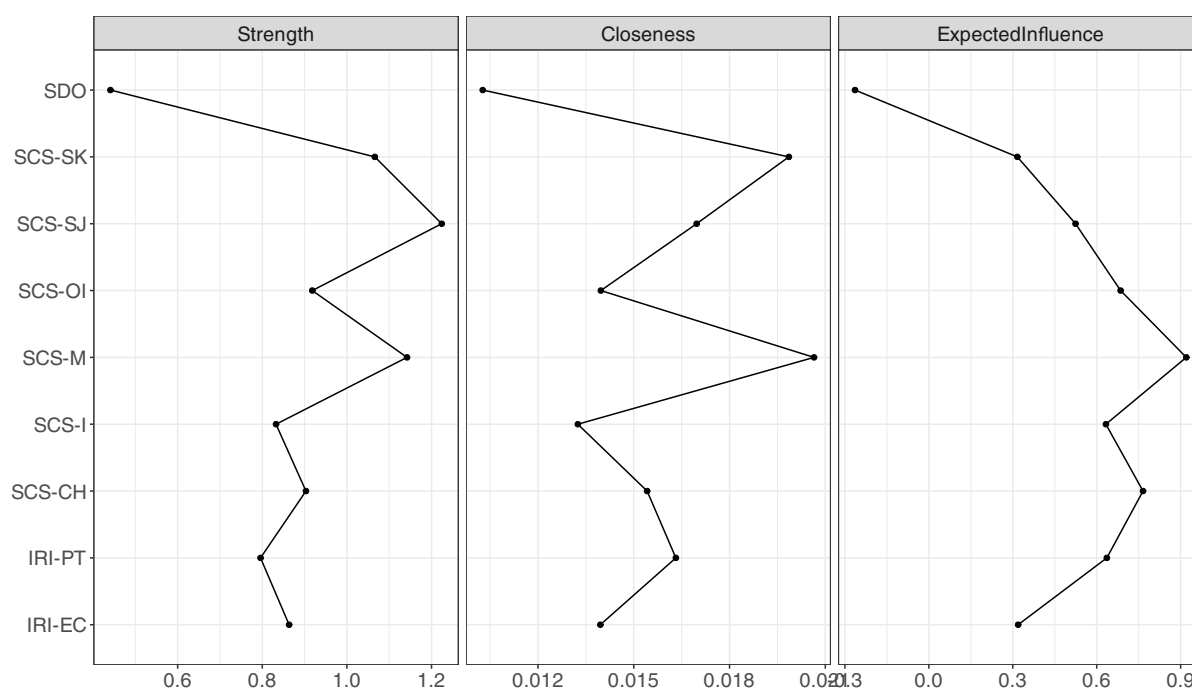


Fig. 8 Centrality indices of the cross-sample network. *Note.* *SDO*, Social Dominance Orientation; *IRI-EC*, Interpersonal Reactivity Index, Empathic Concern subscale; *IRI-PT*, Interpersonal Reactivity Index, Perspective Taking subscale; *SCS-SK*, Self-Compassion Scale, Self-Kindness subscale; *SCS-SJ*, Self-Compassion Scale, Self-Judg-

ment subscale; *SCS-CH*, Self-Compassion Scale, Common Humanity subscale; *SCS-I*, Self-Compassion Scale, Isolation subscale; *SCS-M*, Self-Compassion Scale, Mindfulness subscale; *SCS-OI*, Self-Compassion Scale, Over-Identification subscale

their influence. Future studies of self-compassion might offer insights into whether cultivating this kind and caring attitude toward oneself might reciprocally influence social connectivity, reduce group polarization, and promote equality. The development of self-compassion might confer similar benefits to society by undermining psychological and social structures that perpetuate societal ills such as racism, bigotry, and xenophobia. As such, self-compassion as a topic may hold promise for fields like positive and social psychology that support human flourishing across individual, interpersonal, and societal levels (Seligman & Csikszentmihalyi, 2000).

Author Contribution Michael Juberg: conceptualization, methodology, data collection, data curation, writing—original draft preparation, writing—reviewing and editing. Polina Beloborodova: conceptualization, methodology, data curation, software, visualization, data analysis, writing—original draft preparation, writing—reviewing and editing.

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Data Availability Study materials, analysis code, and data are available on Open Science Framework (<https://osf.io/fpm5b/>).

Declarations

Ethics Approval The study was approved by the Institutional Review Board at the University of Hawai'i at Manoa. All procedures performed in this study involving human participants were in accordance with the ethical standards of the institution and with the 1964 Helsinki Declaration and its later amendments.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest The authors declare no competing interests.

Use of Artificial Intelligence Artificial intelligence was not used.

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