Psychological Assessment

Support for the Three-Factor Model of Narcissism and Its Personality Underpinnings Through the Lens of the Network Psychometrics

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Recent literature on narcissism argues that there are three factors covering the construct: agentic, antagonistic, and neurotic. Within the current study, we aim to (a) empirically test whether this hypothesized structure reproduces using, for the first time, network psychometrics with eight distinct narcissism measures as well as reanalysing data from eleven narcissism measures from Crowe et al. (2019) and (b) scrutinize the personality underpinnings of the differentiated facets through the lens of the circumplex of personality metatraits (CPM) model. Within the study, $N = 465$ Polish adults were administered eight distinct narcissism measures, comprising 13 scales capturing different aspects of narcissistic personality and a measure of personality metatraits. Results revealed that the three-factor structure reproduces well in the network approach across both data sets. The circumplex analyses provided further evidence for the personality underpinnings of the three factors. We discuss the role of pathological narcissism within the three-factor conceptualization of narcissism. Findings of the current article facilitate the understanding of narcissistic personality.

Public Significance Statement
This study assesses the structure of narcissism using the network psychometrics. Results support the three-factor structure of narcissism and emphasize the central role of antagonism.

Keywords: narcissism, structure, network psychometrics, circumplex of personality metatraits

A three-factor structure of narcissism (comprised by agentic, antagonistic, and neurotic facets) has been proposed in recent years (Back, 2018; Krizan & Herlache, 2018; Miller et al., 2016). Within

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this "trifurcated" model of narcissism, antagonism/entitlement is identified as the "core" narcissistic trait in that it is shared by the grandiose and vulnerable dimensions (Ackerman et al., 2019; Back, 2018; Miller & Campbell, 2008; Wright & Edershile, 2018). In this sense, antagonism is particularly important to the narcissistic construct. It is also uniquely related to power values (Rogoza et al., 2016), unstable self-esteem (Geukes et al., 2017), lack of forgiveness (Fatfouta et al., 2017), interpersonal coldness (Grove et al., 2019), and pursuit of status (Grapsas et al., 2020).

Typically, the structure of narcissistic personality is investigated through factor analytic methods (Crowe et al., 2019; Krizan & Herlache, 2018; Miller et al., 2016). There is, however, also an alternative method called network psychometrics which may offer novel insights for personality research not available through factor analytic approaches (Costantini et al., 2015). While network modeling and exploratory factor analytic methods are statistically comparable, network models offer a visual map of item-level associations not easily available through exploratory factor analytic (EFA) approaches (Golino et al., 2020). Network models have already been applied to understand individual differences in narcissistic traits. For instance, Trahair et al. (2020) assessed how the agentic and antagonistic factors of narcissism could account for the shared variance with Machiavellianism and psychopathy, and Jordan et al. (2022), used network modeling to examine the relationship between grandiose and vulnerable narcissism and pathological personality traits. However, past attempts at using network psychometrics to understand narcissism's internal structure have been limited. While

there is a large breadth of measures for narcissistic personality traits, usually only few of them were analyzed simultaneously, therefore limiting findings to the respective measures. For instance, Dinić et al. (2021) applied network modeling to the subscales of four narcissism measures and identified four communities (i.e., factors), but the comprehensive coverage of past factor analytic examinations (e.g., Crowe et al., 2019; Krizan & Herlache, 2018) was lacking. Thus, the goal of the present study is to use network modeling assess the structure of narcissism using the broadest-to-date set of narcissism measures.

Personality Underpinnings of Narcissistic Personality

The personality underpinnings of narcissism are often understood from the perspective of the five factor model (Miller et al., 2016). The circumplex of personality metatraits (CPM; Strus & Cieciuch, 2017; Strus et al., 2014) is an alternative model equally capable of integrating normal and pathological personality traits. Within the Table 1, we present the theoretical meaning of each personality metatrait distinguished within the model and their circumplex organization is presented in Figure 1. Furthermore, the CPM has been argued to be able to delineate between theoretical boundaries of dark personality traits (Rogoza, Kowalski, et al., 2022). The CPM assumes that the personality structure could be viewed as a circumplex, organized across eight unipolar personality metatraits. Metatraits, which are the broadest dimensions of personality structure (DeYoung, 2015), may also serve as a theoretical matrix against which different psychological constructs and models could be modeled (Strus & Cieciuch, 2017). Understanding narcissism in the context of the CPM allows not only the assessment of whether the entire structural model of narcissistic personality is located within a theoretically predicted place, but also it captures, clarifies, and systematizes the relationships between specific narcissism scales. Three metatraits are particularly relevant to narcissistic personality (Rogoza et al., 2019): delta-minus/sensation-seeking (i.e., high emotional liability, stimulation seeking, provocativeness, and expansiveness), alpha-minus/disinhibition (i.e., high level of antisocial tendencies and aggression and antagonism toward people, social norms, and obligations), and Gamma-minus/disharmony (i.e., depressiveness, inaccessibility in interpersonal relationships, pessimism, and proneness to suffer from psychological problems). These three metatraits are furthermore argued to set boundaries of dark personality traits (Rogoza, Kowalski, et al., 2022). The three factors of narcissism, representing the whole spectrum of narcissistic traits, seem to be closely related to these octants (Krizan & Herlache, 2018; Rogoza, Cieciuch, & Strus, 2021). The graphical representation of our expectations is shown in Figure 1.

The Present Study

The goal of the present study is to use network analysis to assess the structure of narcissism and to contextualize the underlying components on the CPM. We test two networks for these analyses. The goal of the first network is to assess if the three factors of narcissism (labeled as communities in network psychometrics) reproduce when using different methodological approach. The goal of the second network is to assess if the antagonistic community is central for the spectrum of narcissism.[1] The first network includes all subscales from each of the narcissism measures. In line with EFA-based analyses, we

expect narcissism to be composed of three communities representing agentic, antagonistic, and neurotic features (Hypothesis 1; Krizan & Herlache, 2018; Miller & Campbell, 2008; Miller et al., 2017). The second network is composed of nodes calculated from the network scores from the first network (i.e., one node representing each identified community). Network scores are analogous to a formative latent variable (i.e., weighted composite) and is comparable to factor scores from an EFA framework (Christensen & Golino, 2021a). In this network, we expect the nodes would be organized within a single community, and the node representing antagonism to be central to the network (as measured by node strength).

To assess the personality underpinnings, we assessed whether the empirically derived structure fits within the theoretically expected location (Rogoza, Cieciuch, & Strus, 2021; Rogoza, Kowalski, et al., 2022). We expect the agentic community to be located in proximity to delta-minus/sensation-seeking, the antagonistic in proximity to alpha-minus/disinhibition, and the neurotic in proximity to gamma-minus/disharmony (Hypothesis 2; Rogoza et al., 2019, Rogoza, Cieciuch, & Strus, 2021). The data and statistical script necessary for the reproduction of analyses of Polish data are available at the Open Science Framework (OSF) website: https://osf.io/vbc5q/. The hypotheses presented within the article were not preregistered.

Method

Participants and Procedure

The study was completed online by $N = 465$ Polish adults aged between the ages 18 and 70 years ($M = 32.08$; $SD = 10.65$; 28.6% males). This study also was a part of a larger data collection effort in which we gathered data on narcissistic personality. Results from this study are presented as an assessment of criterion validity (not reported in the current article). More details could be found in Rogoza, Cieciuch, et al. (2022). The study has been approved by the local institutional review board.

For replication purposes, we also used an independent data set from Crowe et al. (2019). It is comprised of 591 adult participants (62% female) from Amazon's Mechanical Turk website ($M_{age} = 37.0$; $SD_{age} = 11.8$). More details are available in the referenced article.

The Present Study Measures

#### Five Factor Narcissism Inventory (Glover et al., 2012)

We used the short form of the measure (Sherman et al., 2015), which is comprised of 60 items. The composite score for Five Factor

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[1] Within network psychometrics, it is possible to assess the centrality estimates of each node (i.e., scale), which informs among others on the degree of which each node is connected with other nodes (i.e., strength centrality). Although such approach seems to be intuitive choice given our hypothesis, it might not be appropriate. It is a likely scenario that in the network with many similar nodes representing same construct, it is probable that there would be more within-factor than between-factor variance. As result, centrality estimates might be lower in nodes accounting for between-factors shared variance (which would be the exact test of our hypothesis). Furthermore, these centrality estimates would be also biased given the uneven distribution of narcissism measures (with overrepresentation of grandiose narcissism measures). With more similar nodes within a network, the centrality estimates are likely to be artificially high, leading to false rejection of the antagonism-centrality hypothesis (e.g., Dinić et al., 2021; Di Pierro et al., 2019; Jordan et al., 2022).

Table 1

Description of the Eight Metatraits in the Revised Circumplex of Personality Metatraits

Metatrait	Meaning
Delta-Plus (Self-Restraint)	Low emotionality (both negative and positive), high behavioral and emotional control, meticulousness, and perfectionistic tendencies as well as modesty, conventionality and severe social adjustment
Alpha-Plus (Stability)	Stability in the area of emotional, motivational, and social functioning, expressed as a general social adaptation tendency, an ethical attitude toward the world, benevolence, and calmness, as well as the ability to delay gratification, diligence, and perseverance
Gamma-Plus (Integration)	Well-being, a warm and prosocial attitude toward people, both intra- and interpersonal balance and harmony; serenity, openness to the world in all its richness, as well as endurance and effectiveness in attaining important goals
Beta-Plus (Plasticity)	Cognitive and behavioral openness to change and engagement to new experiences, a tendency to explore, self-confidence, initiative and invention in social relations, enthusiasm, and orientation toward personal growth
Delta-Minus (Sensation-Seeking)	Broadly defined impulsiveness, recklessness, emotional volatility, stimulation seeking, and risk taking; self-enhancement and hedonistic tendencies as well as interpersonal dominance and expansiveness
Alpha-Minus (Disinhibition)	High level of antisocial tendencies underpinned by unsustainability, low frustration tolerance, and egotism as well as aggression and antagonism toward people, social norms, and obligations
Gamma-Minus (Disharmony)	Inaccessibility, coldness, and distrust in interpersonal relations; negative affectivity and low self-worthiness; depressiveness, pessimism, and proneness to suffer from psychological problems
Beta-Minus (Passiveness)	Social avoidance and timidity, along with submissiveness and dependency in close relationships; cognitive and behavioral passivity and inhibition; some type of stagnation, apathy, and tendency for anhedonia

Note. Adapted from "Toward a model of personality competencies underlying social and emotional skills: Insight from the Circumplex of Personality Metatraits" by Cieciuch and Strus (2021).

Figure 1

The Circumplex of Personality Metatraits and the Theoretical Locations of the Facets of Narcissism
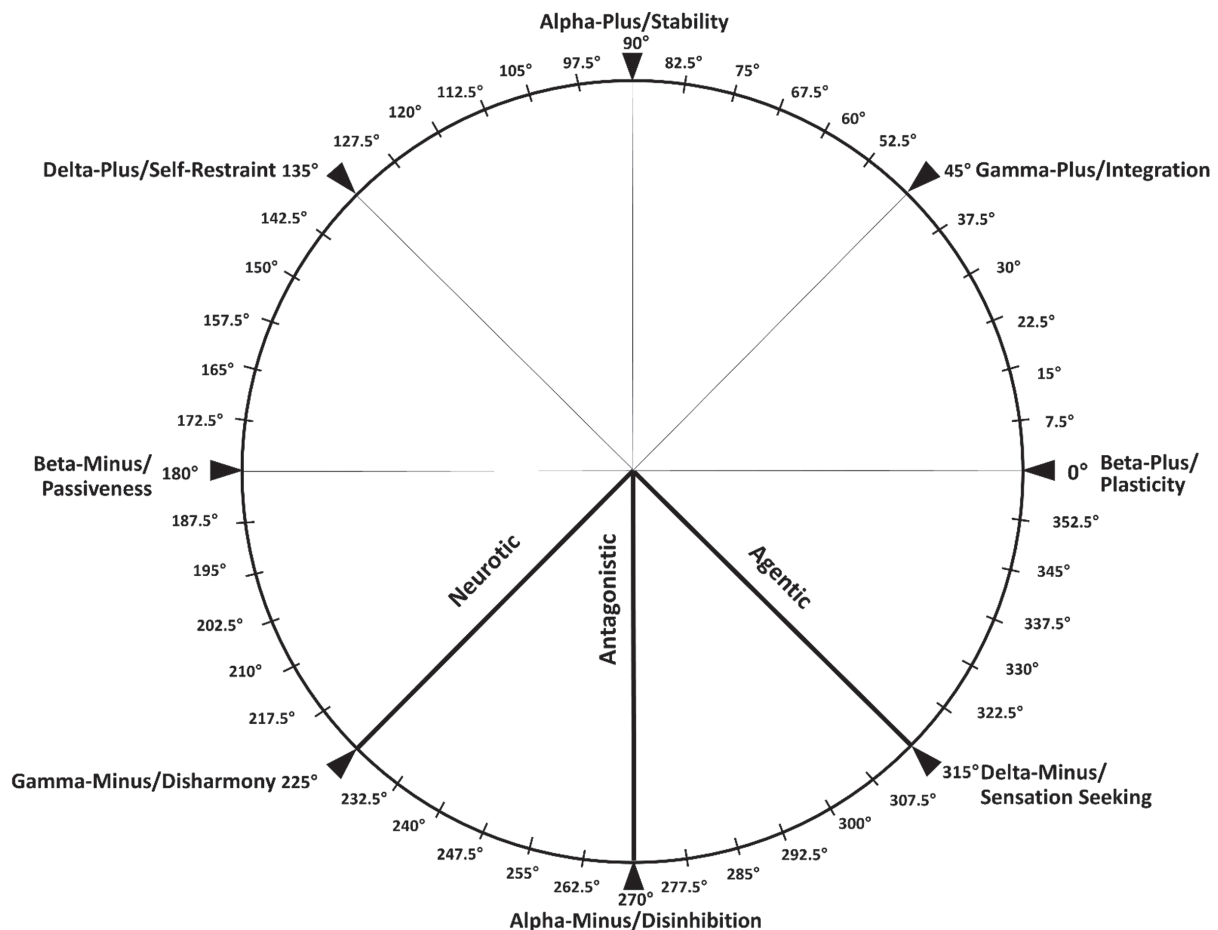
Narcissism Inventory—agentic extraversion (FFNI-AE; α = .90) is obtained as a mean score of the following scales: acclaim-seeking, authoritativeness, exhibitionism, and manipulativeness; self-centered antagonism (FFNI-AN; α = .88) was obtained as a mean of exploitativeness, lack of empathy, entitlement, and distrust; and narcissistic neuroticism (FFNI-NN; α = .90) was obtained as a mean of shame, indifference (reversed), need of admiration, and reactive anger (Rogoza, Cieciuch, Strus, & Kłosowski, 2021). Respondents answered the items using 5-point response scales ranging from 1 (*Disagree strongly*) to 5 (*Agree strongly*).

Narcissistic Personality Inventory-13 (Gentile et al., 2013)

We used the 13-item version of this grandiose narcissism measure (α = .81), which uses a forced-choice response format, asking participants to choose one of two possible responses (i.e., narcissistic vs. nonnarcissistic response).

Hypersensitive Narcissism Scale (Hendin & Cheek, 1997)

This is a 10-item measure of vulnerable narcissism (α = .76), in which participants rate their agreement on a 5-point response scale ranging from 1 (*Disagree strongly*) to 5 (*Agree strongly*).

Pathological Narcissism Inventory (Pincus et al., 2009)

This is a 52-item measure of grandiose and vulnerable expressions of pathological narcissism. Participants rate their similarity using a 6-point response scale ranging from 0 (*Not at all like me*) to 5 (*Very much like me*). The composite score for pathological Pathological Narcissism Inventory—grandiosity (PNI-G; α = .60) is obtained as a mean score of the following scales: exploitativeness, self-sacrificing self-enhancement, and grandiose fantasies. Pathological vulnerability (PNI-V; α = .84) is obtained as a mean score of the following subscales: contingent self-esteem, hiding the self, devaluing, and entitlement rage.

Narcissistic Admiration and Rivalry Questionnaire (Back et al., 2013)

This 18-item measure assesses two facets of grandiose narcissism, that is, admiration (ADM; α = .85) and rivalry (RIV; α = .84). Respondents rate their agreement on a 6-point response scale ranging from 1 (*Not agree at all*) to 6 (*Agree completely*).

Vulnerable Isolation and Enmity Questionnaire (Rogoza, Cieciuch, et al., 2022)

This 24-item measure assesses two facets of vulnerable narcissism, that is, isolation (ISO; α = .92) and enmity (ENM; α = .86). Respondents rate their agreement on a 6-point response scale ranging from 1 (*Not agree at all*) to 6 (*Agree completely*).

Narcissistic Grandiosity (α = .92; Rosenthal et al., 2020) and Vulnerability Scales (α = .84; Crowe et al., 2018)

These two adjective measures comprise 13 and 11 items, respectively. Respondents rate their similarity on a 7-point response scale ranging from 1 (*Not at all*) to 7 (*Extremely*).

Circumplex of Personality Metatraits Questionnaire (Strus & Cieciuch, 2021)

The Circumplex of Personality Metatraits Questionnaire (CPM-Q) comprises 72-items with a 5-point Likert-type response scale ranging from 1 = *definitely disagree* to 5 = *definitely agree*. It measures eight personality metatraits: Beta-Plus/Plasticity (α = .81), Gamma-Plus/Integration (α = .80), Alpha-Plus/Stability- (α = .70), Delta-Plus/Self-Restraint (α = .76), Beta-Minus/Passiveness (α = .75), Gamma-Minus/Disharmony (α = .87), Alpha-Minus/Disinhibition (α = .82), and Delta-Minus/Sensation-Seeking (α = .82).

Crowe et al. (2019) Study Measures

The FFNI-SF, Hypersensitive Narcissism Scale (HSNS), Narcissistic Admiration and Rivalry Questionnaire (NARQ), Narcissistic Grandiosity (NGS), and PNI were also administered in Crowe et al. (2019). In the Crowe et al. (2019) study, all items of all measures were put into a single item pool and presented in a random order with the same 5-point Likert-type response format. Moreover, the adjective based measures (i.e., NGS and Narcissistic Vulnerability Scales [NVS]) were put into full sentence form for the sake of consistency. For additional details, see the referenced study. The following additional measures were also included.

Narcissistic Personality Inventory (Raskin & Terry, 1988)

The Narcissistic Personality Inventory (NPI) contains 40 items assessing global grandiose narcissism.

Grandiose Narcissism Scale (Foster et al., 2015)

The Grandiose Narcissism Scale (GNS) contains of 33 items capturing global grandiose narcissism. This scale was developed as an alternative to the NPI and was based on the Raskin and Terry's (1988) conceptualization of grandiose narcissism.

Short Dark Triad (Jones & Paulhus, 2014)

Nine items measuring grandiose narcissism were retrieved from the measure and administered to the participants.

Personality Diagnostic Questionnaire-4 (Hyler, 1994)

Only the nine items developed to measure each of the narcissistic personality disorder (NPD) symptom criteria in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) were administered to the participants.

Personality Inventory for the DSM-5 (Krueger et al., 2012)

Only the 14 items capturing the NPD trait score that is those measuring: attention seeking and grandiosity were administered.

Structured Clinical Interview for the DSM-IV Personality Disorders Questionnaire—NPD Scale (First et al., 1997)

Only the 17 items regarding the NPD were derived from the self-reported questionnaire derived from the DSM-IV structured clinical interview.

Assessment of Narcissism's Structure

In assessment of both networks, we applied exploratory graph analysis (EGA; Golino & Epskamp, 2017). In EGA, a network is composed of nodes (i.e., item or scale), which are connected by edges (i.e., reflecting the relations between nodes). The width of the edge reflects how strongly nodes are related one to another (i.e., node strength). Within a network, those nodes which are highly related to one another are grouped within communities. Networks are usually estimated using partial correlation matrices, which mean that depicted edges represent associations between variables while taking into account their interrelations with all other nodes.

In EGA, graphical least absolute shrinkage and selection operator (LASSO) estimation is applied to obtain a sparse inverse covariance matrix and limit the number of spurious associations. The number of communities was identified using the Walktrap algorithm which delivers the correct number of communities regardless of network sizes (Yang et al., 2016). EGA has been found to be as accurate as other popular methods such as parallel analysis (Golino & Epskamp, 2017). Moreover, the results of EGA can be used as a subject of bootstrapped simulations (Christensen & Golino, 2021b) to obtain information about two forms of stability: dimension (i.e., in how many simulations the dimensions were reproduced) and item (i.e., in how many simulations items were assigned to a given community).

Assessment of the Personality Underpinnings of Narcissism

These analyses were limited to the Polish sample and followed a three-step procedure (Rogoza, Cieciuch, & Strus, 2021). The first step requires testing whether the CPM model has a circumplex structure (in terms of equal spacing and communalities). This is done through nonstandard structural equation modeling (see Browne, 1992). The circumplex structure is confirmed if the values of comparative fit index (CFI) and root mean square error of approximation (RMSEA) are >.90, and <.13, respectively (Rogoza, Cieciuch, & Strus, 2021). In the second step, we project external variables onto the analyzed circumplex with the structural summary method (SSM; Gurtman, 1992; Zimmerman & Wright, 2017). SSM provides estimates on model fit (i.e., interpretability of variable location); elevation (i.e., effect of general factor); amplitude (i.e., distance from the middle of the circumplex); and angular displacement (i.e., variable location within the circumplex). R^2 values of at least >.80 indicate good model fit (Wright et al., 2009). As CPM does not assume the existence of any general factor, estimates of elevation are expected to be low (i.e., <.15). As narcissism is expected to be more related to the three metatraits (i.e., Gamma-Minus/Disharmony, Alpha-Minus/Disinhibition, and Delta-Minus/Sensation-Seeking) than the others, estimates of amplitude are expected to be notable (i.e., >.15). Angular locations can fall between 0 and 360 (reflecting degrees within the circumplex) but are expected to be primarily located between 225 and 315 degrees of the CPM. In the third step, we analyze whether empirical locations provided by SSM are consistent with theoretical predictions. A congruence coefficient >.95 would indicate a location consistent with our hypothesis (Lorenzo-Seva & ten Berge, 2006).

Results

Hypothesis 1—Assessing the Structure of Narcissism Using Network Psychometrics

Network 1: Subscale Network

Networks were generated from all narcissism subscales and identify the number of communities present in the narcissism domain. Results provide support for a three-factor model of narcissism. Results were highly stable in both samples with three communities being detected 88% of the time in 1,000 bootstrapped cases. Two factors were revealed in 12% (0.01%) of bootstrapped cases (here and after, results in parentheses apply to the, Crowe et al., 2019, sample). The estimated networks are presented in Figures 2 and 3. All scales were located in their expected communities. The stability within these factors was almost ideal in both samples with nearly all scales being placed in their anticipated communities in all bootstrapped samples, the only exception was for measures of the antagonistic facet of narcissism in the Polish sample, which was located as expected in 87%–88% of cases.

Network 2: Community Network

Next, we estimated two networks using the network scores for each of the three communities identified in the previous analysis. In both studies, the communities formed a single network reflecting the structure of narcissistic personality. In both networks, the antagonism community was strongly positively associated to agentic $\rho = .39; p < .001$ ($\rho = .63; p < .001$) and neurotic communities $\rho = .72; p < .001$ ($\rho = .60; p < .001$) which in turn were weakly negatively related $\rho = -.11; p \leq .05$ ($\rho = -.12; p < .01$). To investigate the accuracy of these measures of strength, we looked at their stability within subsets of the data, reestimating the network iteratively with fewer and fewer cases (Epskamp et al., 2018). This creates a metric called the correlation stability coefficient (CS-coefficient) which reflects the maximum proportion of cases that can be dropped, such that with 95% probability the correlation between the original strength and the strength of the reduced samples is .70 or higher. For the strength estimates to be considered stable, the CS-coefficient should be above .50 (Epskamp et al., 2018). The CS-coefficient for both networks was 0.75, above the threshold, and therefore can be considered stable. Consistent with expectations, antagonism was the most central node in both studies, 1.49 (1.64), with a strength centrality estimate substantially greater than that of agentic, 1.10 (1.38), and neurotic nodes, 1.31 (1.37). Bootstrapped 95% confidence intervals of the differences between centrality estimates indicate that, in both samples, antagonism has a significantly greater centrality value than both other nodes: antagonism and agentic node strength difference 95% CI [0.33, 0.45], 95% CI [0.21, 0.30]; antagonism and neurotic node strength difference 95% CI [0.13, 0.22], 95% CI [0.23, 0.32]. Thus, the first hypothesis was supported in full.

Hypothesis 2—Assessing the Personality Underpinnings of Narcissism

Prior to analyses, we tested the most constrained circumplex model with spacing and communalities forced to be equal. The results of the analysis revealed that the circumplex model fit well,

Figure 2

Network Representing the Structure of Narcissistic Personality
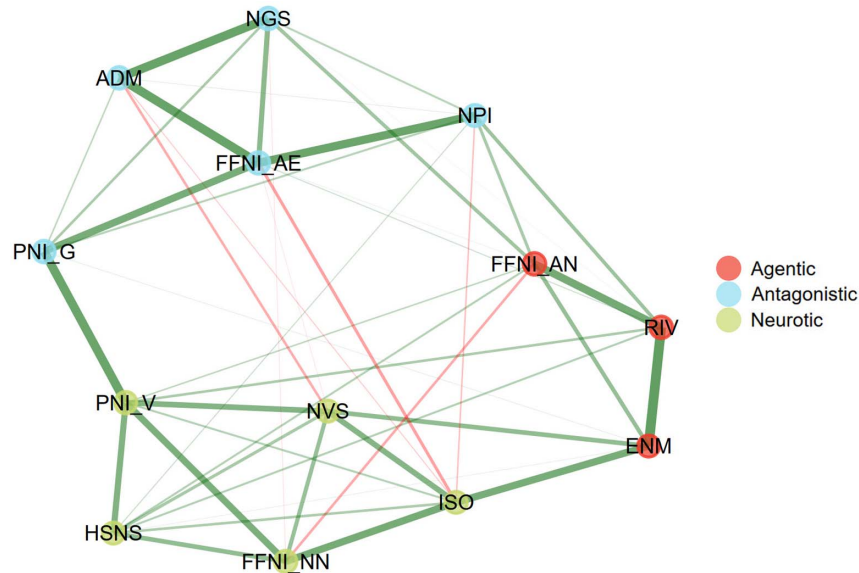
Note. Scale abbreviations are explained in Table 2. Within this network, there were negative associations between the following pairs of nodes: NPI–ISO, FFNI_AN–FFNI_NN, FFNI_AE–ISO, ADM–NVS, ADM–ISO. FFNI–AE = Five Factor Narcissism Inventory—Agentic Extraversion; ADM = admiration; NGS = Narcissistic Grandiosity Scale; PNI-G = Pathological Narcissism Inventory—Grandiosity; NPI = Narcissistic Personality Inventory; RIV = rivalry; ENM = enmity; HSNS = HSNS = Hypersensitive Narcissism Scale; PNI-V = Pathological Narcissism Inventory—Vulnerability; NVS = Narcissistic Vulnerability Scale; ISO = isolation; FFNI-AN = Five Factor Narcissism Inventory—Self-centered Antagonism; FFNI-NN = Five Factor Narcissism Inventory—Narcissistic Neuroticism. See the online article for the color version of this figure.

$\chi^2(24) = 149.60; p < .001; CFI = .930; RMSEA = .106$. Therefore, it is possible to locate external variables within the CPM. The results of the SSM are presented in Table 2, while graphical illustration is provided in Figure 4. The fit of all profiles was adequate; thus, results are interpretable. Estimates of elevation were all low, confirming a lack of the general factor within CPM. As expected, estimates of amplitude were all notable. The locations of narcissism communities were approximately in their hypothesized locations. The overall solution congruence, interpreted as the degree of similarity between theoretical expectations and empirical results, equaled .97, suggesting that the three communities were in their expected locations. The location of specific communities was also all within accepted boundaries (i.e., ≥.95). Therefore, we provided general support for the Hypothesis 2.

To assess the degree to which each specific scale could be seen as an overall indicator of narcissism factors,[2] we also projected them through the means of the SSM. In other words, we assessed the degree to which each specific narcissism measure is congruent with the theoretical space of the given narcissism factor. This was done to assess the degree to which specific measures could be seen as an indicator of specific narcissism factor within the CPM. The results of this analysis are presented in Table 2. Overall solution congruence equaled .95 and thus confirmed the structural boundaries delineated by the three-factor model. All neurotic factor scales met the desired threshold of congruence (i.e., ≥.97). Within the antagonism factor, only the FFNI-AN scale was a good overall indicator (.97) as both

ENM (.87) and RIV (.94) also captured neurotic content. With respect to agentic factor measures, the NPI had perfect congruence (1.00), followed by the PNI-G (.96). The FFNI-AE (.93) and NGS (.93) subscales were just below the assumed congruence threshold. Finally, the admiration subscale of NARQ was the only one to miss the expected location (.74).

Discussion

Within the present study, we found support for the three-factor model of narcissism (Krizan & Herlache, 2018; Miller et al., 2016) through the lens of the network psychometrics approach. Importantly, these findings were not sample specific, as they were successfully replicated on the data from Crowe et al. (2019). Moreover, we provided evidence of the different personality underpinnings of each factor, which were in congruence with the theoretical boundaries delineated by the CPM (Rogoza, Kowalski, et al., 2022).

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[2] For the interested reader, we also conducted even more specific SSM analysis, where we projected all items from all scales. For each facet, we selected 10 items, which were located in the greatest proximity to the hypothesized location. Then, we independently factor-analyzed these items for each facet and again projected on the CPM, finding that they nearly ideally cover hypothesized locations. These items might serve as narcissism factors markers, however, given obvious limitations of this approach, they should be interpreted with great caution. The results of these analyses are available at the OSF project site.

Figure 3

*Network Representing the Structure of Narcissistic Personality Based on Crowe et al.
(2019) Data*
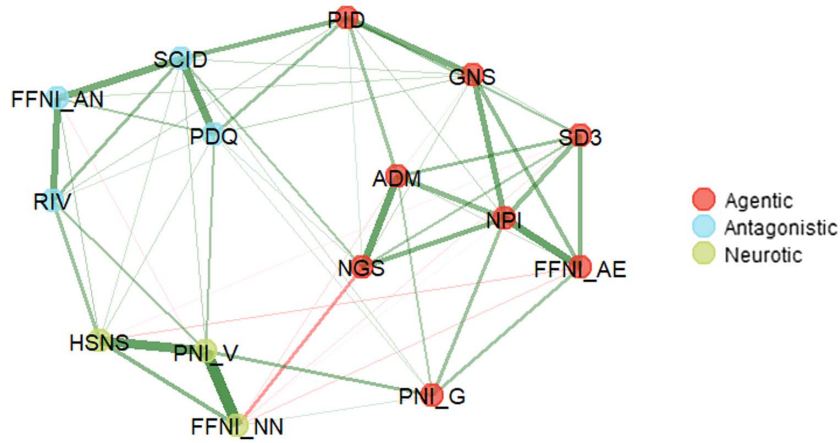
Note. FFNI-AE = Five Factor Narcissism Inventory—Agentic Extraversion; ADM = admiration;
NGS = Narcissistic Grandiosity Scale; SD3 = short dark triad; PNI-G = Pathological Narcissism
Inventory—Grandiosity; NPI = Narcissistic Personality Inventory; GNS = Grandiose Narcissism
Scale; PID = Pathological Inventory for DSM-V; PDQ = Personality Diagnostic Questionnaire;
RIV = rivalry; SCID = structured clinical interview for DSM-IV; FFNI-AN = Five Factor
Narcissism Inventory—Self-centered Antagonism; HSNS = Hypersensitive Narcissism Scale;
PNI-V = Pathological Narcissism Inventory—Vulnerability; FFNI-NN = Five Factor Narcissism
Inventory—Narcissistic Neuroticism. Within this network, there were negative associations
between the following pairs of nodes: FFNI_NN–NGS, FFNI_AE–HSNS, FFNI_AE–FFNI_NN,
SD3–FFNI_NN, and ADM–FFNI_NN; DSM = Diagnostic and Statistical Manual of Mental
Disorders. See the online article for the color version of this figure.

Results from the present study were comparable in terms of their interrelation as well as their locations within the CPM to those reported in factor analytic studies (Rogoza, Cieciuch, & Strus, 2021, Rogoza, Cieciuch, Strus, & Kłosowski, 2021). This is consistent with more recent discussions acknowledging the similarities between network and factor analytic modeling approaches and comparable

Table 2

Structural Summary Profiles of Narcissism Facets Within the Circumplex of Personality Metatraits

Profile	Fit	Elevation	Amplitude	Empirical angle	Theoretical angle	Congruence
Network scores						
Agentic	.96	.11 [.09, .14]	.46 [.40, .51]	330.4 [320.1, 340.6]	315	.98
Antagonistic	.99	.09 [.06, .11]	.59 [.54, .64]	254.7 [248.3, 261.4]	270	.95
Neurotic	.99	.07 [.05, .10]	.61 [.56, .67]	233.6 [227.5, 240.0]	225	1.00
Scales						
FFNI-AE	.97	.10 [.08, .13]	.49 [.43, .54]	341.9 [333.8, 350.8]	315	.93
ADM	.98	.09 [.06, .12]	.45 [.39, .51]	3.1 [353.5, 12.7]	315	.74
NGS	.94	.09 [.06, .12]	.33 [.26, .39]	340.9 [325.9, 356.1]	315	.94
PNI-G	.93	.13 [.10, .16]	.32 [.26, .38]	304.6 [290.7, 320.2]	315	.96
NPI	.97	.04 [.01, .07]	.40 [.34, .46]	315.4 [304.9, 326.8]	315	1.00
RIV	.97	.06 [.03, .09]	.47 [.41,. 53]	255.7 [246.9, 264.8]	270	.94
FFNI-AN	.97	.06 [.03, .09]	.48 [.41, .54]	262.2 [254.6, 271.2]	270	.97
ENM	.99	.06 [.03, .08]	.54 [.48, .60]	246.2 [239.4, 253.3]	270	.87
HSNS	.99	.08 [.04, .11]	.49 [.42, .55]	238.5 [230.6, 246.2]	225	.99
PNI-V	.99	.09 [.06, .12]	.54 [.47, .60]	242.4 [234.5, 249,6]	225	.98
NVS	.99	.07 [.04, .09]	.59 [.54, .65]	232.7 [226.3, 239.0]	225	1.00
ISO	.98	.04 [.01, .07]	.54 [.48, .59]	217.1 [209.8, 224.0]	225	.97
FFNI-NN	.98	.04 [.01, .09]	.44 [.37, .51]	226.5 [216.8, 236.0]	225	1.00

Note. FFNI-AE = Five Factor Narcissism Inventory—Agentic Extraversion; ADM = admiration; NGS = Narcissistic Grandiosity Scale; PNI-G = Pathological
Narcissism Inventory—Grandiosity; NPI = Narcissistic Personality Inventory; RIV = rivalry; FFNI-AN = Five Factor Narcissism Inventory—Self-centered
Antagonism; ENM = enmity; HSNS = Hypersensitive Narcissism Scale; PNI-V = Pathological Narcissism Inventory—Vulnerability; NVS = Narcissistic
Vulnerability Scale; ISO = isolation; FFNI-NN = Five Factor Narcissism Inventory—Narcissistic Neuroticism.

Figure 4
Empirical Locations of the Facets of Narcissism—Network Scores
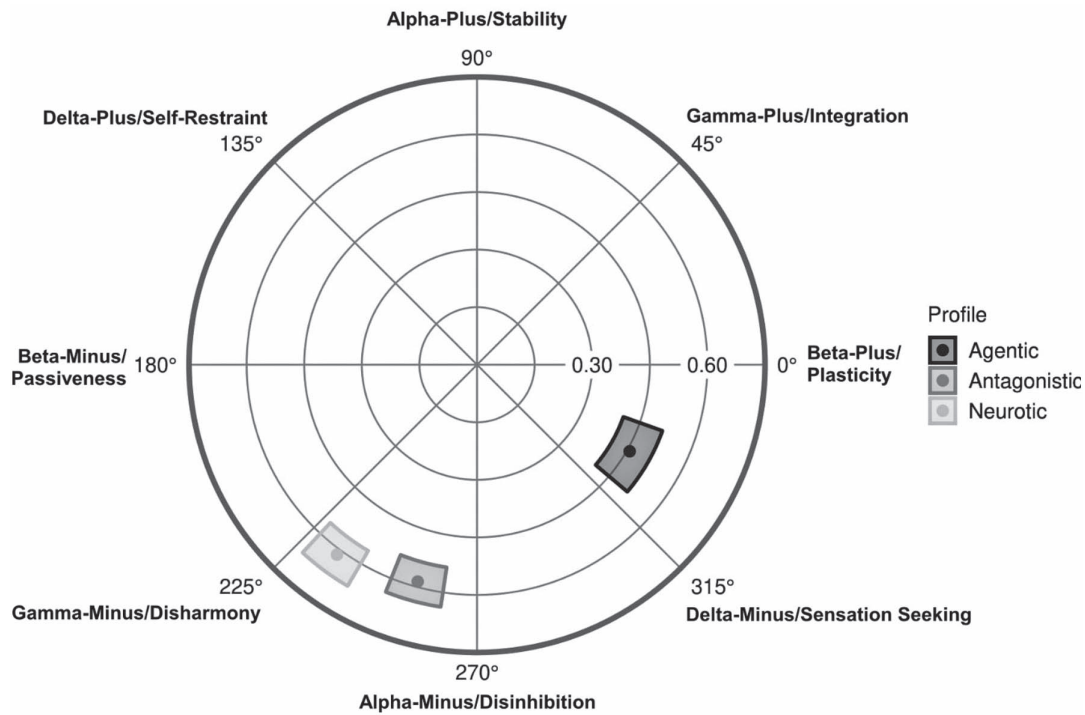
insights they can provide (DeYoung & Krueger, 2020; Fried, 2020). The advantage of the network approach seems therefore to lie within the item-level associations it provides.

The results across both studied samples were highly congruent in each aspect. That is, we have provided evidence that narcissism is organized around three communities corresponding to neurotic, antagonistic, and agentic facets. The scales which were assigned to these communities appeared as stable as across 1,000 simulations, each scale was assigned to the very same community. Furthermore, the analyses carried out on network scores provided further insight into the organization of narcissistic personality. Expectedly, we have found evidence that on the higher order level of organization, the three communities are organized within one network in which the antagonism is a central characteristic, linking neurotic, and agentic facets (Miller et al., 2021). Thus, our hypothesis was confirmed in full.

An interesting and unexpected issue which emerged during the analyses is that one of the agentic facet nodes (i.e., the PNI-G) was directly and positively associated with the neurotic community through shared variance with pathological vulnerability. A potential explanation of this finding might be due the fact that PNI-G captures qualitatively different, more covert elements of grandiosity (e.g., agentic goals hidden in communal self-enhancement; Pincus et al., 2009; Rogoza & Fatfouta, 2019; Wright et al., 2013) as compared to other measures of narcissistic grandiosity. Such a relation might also be due the fact that some of the variance in the PNI-G scale was partialled out with the presence of other grandiose narcissism measures. It also might be due the method variance itself (Podsakoff et al., 2012). This explanation is however less likely given the fact that this connection reproduced on both samples, while the items of all narcissism measures were mixed in one big

item pool in Crowe et al. (2019). Another, albeit more speculative interpretation is that clinical theorists of narcissists (which is where the PNI roots from; Pincus et al., 2009) suggest that there are some fluctuations from grandiose to vulnerable narcissism, which are particularly salient in pathological individuals (Gore & Widiger, 2016; Levy et al., 2007; Oltmanns & Widiger, 2018; Pincus & Lukowitsky, 2010; Ronningstam, 2005). This fluctuation hypothesis is also strengthened by the recent findings which demonstrate that the relation between grandiose and vulnerable narcissism is in fact nonlinear. That is, while they are usually unrelated one to another, narcissistic vulnerability increases at high levels of grandiosity (Jauk et al., 2021). In other words, this relation increases alongside with the narcissistic pathology. This unexpected hypothesis, however, should be further explored through intensive longitudinal assessments as the current results are insufficient to address this question. Our results support PNI-G as a good indicator of agentic facet of narcissism, however, they also support that its role, which is a subject of further exploration, is different than the other scales of narcissistic personality.

In respect to the personality underpinnings, we have found full support for locating the network-based communities within the theoretical space of the CPM as previously identified within the literature (Rogoza et al., 2019; Rogoza, Cieciuch, & Strus, 2021). This finding provides further evidence of the validity of the three-factor model of narcissism and thus, confirming our second hypothesis. Furthermore, we also analyzed the locations of the different narcissism measures. We have provided evidence that all vulnerable narcissism measures tap similar content, which is consistent with theoretical expectations (Krizan & Herlache, 2018). Indicators of the antagonistic factor were less consistent with only the FFNI-AN

appearing as an accurate indicator of the broader factor. This is somewhat consistent with the design of the respective scales as enmity was developed to capture vulnerable expressions of antagonism and rivalry to capture grandiose expressions of antagonism (Back et al., 2013; Rogoza, Cieciuch, et al., 2022). As a result, these two scales are in fact expected to deviate from the overall location by 22.5 degrees in opposite directions (Rogoza, Cieciuch, et al., 2022). While Vulnerable Isolation and Enmity Questionnaire (VIEQ) enmity was located precisely in the expected angle (i.e., empirical = 246.2 vs. theoretical = 247.5; Rogoza, Cieciuch, et al., 2022) NARQ rivalry was, however, located on the vulnerable side of the circumplex (i.e., empirical = 255.7 vs. theoretical = 292.5), raising questions about whether the NARQ-R, as it is currently measured, is more characteristic of grandiose or vulnerable presentations. Finally, the measures of agentic factor of narcissism, except for NARQ admiration were all in close proximity to the hypothesized locations. The NARQ admiration and rivalry scales' slightly deviant locations may be a by-product the measure's unique design as a measure of a narcissistic self-regulatory process model (Back et al., 2013). On the other hand, however, given this problem is consistent across studies (e.g., Rogoza, Cieciuch, et al., 2022), it might as well highlight the need of a revision of both NARQ scales.

Limitations

Limitations associated with the present analyses must be acknowledged. First, it should be emphasized that, while network models are based on a causal theory, all present analyses are cross-sectional and as such no causal inferences can be made. Questions have been raised about the utility of network modeling approaches given emerging insights into equivalencies between network and factor analytic models. For instance, Hallquist et al. (2021) points out that strength centrality metrics are comparable to factor analytic loadings where unmodeled latent variables can account for item-level covariation. We acknowledge this equivalence and chose not to report or interpret centrality metrics in the subscale network as such values would be largely redundant with the latent variable loadings that have previously been reported (e.g., Crowe et al., 2019). In the community network, our use of network scores (which can be interpreted as comparable to factor scores) effectively captures narcissism's three-factor structure. Antagonism's greater centrality in that network could reasonably be interpreted as an indication that it is most representative of a latent narcissism construct. Such an interpretation would be equally appropriate and consistent with previous theory (Krizan & Herlache, 2018; Miller et al., 2016).

As compared to the typical factor analytic models, the RMSEA's cut-off value of >.13 (Rogoza, Cieciuch, & Strus, 2021) might be seen as liberal. In fact, RMSEA might not be the best indicator for assessing circumplex models because in such types of models, high correlations between the proximal variables (which tend to bias RMSEA) are expected (Browne et al., 2002; Saris et al., 2009; Steiger, 2000). Sometimes, in the evaluation of the circumplex structure, researchers test the pattern of zero-order correlations (Tracey, 2000). It has to be noted, however, that this approach tests the circular and not the circumplex model (Rogoza, Cieciuch, & Strus, 2021). The difference between the circular and not the circumplex model is that the latter assumes equal spacing and communalities, while the circular model assumes only a pattern

of relations between circumplex variables. Thus, assessment of the circumplex structure in structural equation modeling approach appears preferable over testing the pattern of zero-order correlations (Browne, 1992). Future research, however, might employ simulations to assess more thoroughly under what conditions RMSEA performs in the assessment of circumplex models and what are the most optimal cut-off scores.

Conclusion

We aimed to understand the structure of narcissistic personality using network psychometrics and to assess their personality underpinnings from the perspective of the CPM. Analyses replicated the three-factor model of narcissism in a Polish sample. To overcome a limitation on generality, a second sample collected by Crowe et al. (2019) was used to successfully replicate findings. Network-based community scores were used to assess narcissism's network structure and results supported the hypotheses that antagonism is a core component of the construct, as suggested by recent proposals (e.g., Krizan & Herlache, 2018; Miller et al., 2016, 2021). Finally, using Polish sample, we assessed the degree to which empirically derived factors of narcissism (as well as specific scales) fall within the theoretically predicted locations within the CPM. Our work attempts to synthesize existing knowledge on narcissism within one comprehensive proposition.

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