INTERPERSONA
An International Journal on Personal Relationships

PsychOpen GOLD

Research Articles

Cross-Cultural Examination of the Bifactor Structure and Network Invariance of Dark Triad Items Across Four Countries

Cristian Ramos-Vera [1], Dennis Calle [1], Angel García O'Diana [1], José Vallejos-Saldarriaga [1], Yul Carrasco Ramírez [1], Giancarlos Chapoñan Cubas [1]

[1] *School of Psychology, Universidad César Vallejo, Lima, Peru.*

Interpersona, 2024, Vol. 18(2), 265–286, https://doi.org/10.5964/ijpr.10911

Received: 2022-12-26 • **Accepted:** 2024-03-24 • **Published (VoR):** 2024-12-20

Corresponding Author: Dennis Calle, Av. del Parque 640, San Juan de Lurigancho 15434, Lima, Perú. E-mail: dcalleh@ucvvirtual.edu.pe

Supplementary Materials: Data [see Index of Supplementary Materials]

Abstract

Several investigations have addressed the study of dark triad traits only as specific factors and without taking into account countries where these tendencies can be expressed in culturally diverse ways. The present study aimed to analyze and compare quantitative models of the general tendency of dark personality traits using the bifactor model and a network comparison network across four countries: United States, Peru, Serbia and Germany. A total of n = 2715 adults (59% female, M = 31.04) participated considering open-access data and Peruvian data collection. The well-known dark triad instruments such as the Short Dark Triad and Dirty Dozen scales were used. The results revealed that a bifactor model of the Dark Triad exhibited satisfactory fit indices, and the estimated networks reflected a unique and stable structure of positive correlations of aversive traits in general and in specific clusters. The Machiavellianism domain of the Dirty Dozen scale was the most consistent measure of centrality (expected influence and bridge-expected influence) and predictability that favored interconnectedness with the other traits in the overall multicultural network. Finally, structural differences in dark trait connections were identified in all countries except among European countries.

Keywords

Dark Triad personality, cross-cultural, bifactor model, network analysis, network invariance

In recent decades, the dark triad of personality has captured the attention of both researchers and the general public. Since the conception of the construct by Paulhus and Williams (2002), it has been intensively studied in thousands of academic publications (Dinić & Jevremov, 2021). The Dark Triad of personality is composed of a pattern of traits that have been categorized as socially aversive: subclinical psychopathy, subclinical narcissism, and Machiavellianism. These traits tend to occur together as they are characterized by a disregard for social norms and an interpersonal orientation to take advantage of others, albeit with differentiated motivations and strategies (Vize et al., 2018). Likewise, people with these traits report less agreeableness and emotional closeness towards others' needs, and have even been associated with aggressive behaviors (Muris et al., 2017), which represents a set of detrimental behaviors in human relationships (Moraga, 2015).

Machiavellianism is related to a strategic interpersonal behavior that disregards ethical norms and adapt to the demands of the context in order to exploit others and achieve personal gain (Koehn et al., 2019). It consists of two components: manipulating others and having a cynical view of human nature. Those with this trait tend to be analytical and calculating in social relationships and may use deception to achieve their goals (Muris et al., 2017).

Narcissism is characterized by arrogance, grandiosity, entitlement and an idealized self-perception of superior abilities (Krizan & Herlache, 2018). Generally, it can be described by three perspectives: a self-description of uniqueness, the imposition of one's needs on others, and preserving one's image (Campbell & Miller, 2011). Narcissistic individuals may be sensitive to criticism and feel the need to validate their desires and ways of seeing the world to strengthen their beliefs of being special or superior to others (Krizan & Herlache, 2018).

Psychopathy is a set of interpersonal, affective and behavioral components including insincerity, lack of empathy, and impulsivity (Jones & Paulhus, 2014). In secondary psychopathy, this is also associated with risky, emotionally unstable and criminal behavior (Yildirim & Derksen, 2015). In contrast, subclinical psychopathy involves superficial relationships for personal advantage and a lack of empathy when harming others in various contexts of domestic, academic, or work life (LeBreton et al., 2006). These individuals often use their understanding of interpersonal relationships to control and act selfishly due to their lack of emotional understanding, and may be charming and skilled at manipulating others, especially seeking out the weaknesses of others (Wai & Tiliopoulos, 2012).

Subclinical aversive behavior, characterized by maximizing self-interest at the expense of others, is estimated to be highly prevalent globally (LeBreton et al., 2018; Sanz-García et al., 2021) in different age groups, especially in young people (Barlett & Barlett, 2015; Zettler et al., 2021), and is manifested in everyday life contexts such as the pursuit of multiple partners, academic dishonesty, and unethical work behaviors

(Moraga, 2015; Muris et al., 2017). These traits are likely to be common even in socioeconomic environments of stability or uncertainty, favoring competitiveness for power and hoarding available resources (Jonason et al., 2019; 2020). In this way, they may manifest in particular ways as they identify a context of perceived interpersonal benefit or utility (Moshagen et al., 2018).

Although they have been extensively studied, it is important to examine the precision of the measurement of dark personality traits in diverse societies and cultures. From the conception of this model, there is a greater predominance of studies in contexts such as the United States and European countries (Jonason & Webster, 2010; Jones & Figueredo, 2013; Maneiro et al., 2019; Pechorro et al., 2019), societies that stand out for a higher level of individualism, which may favor certain selfish or aversive behaviors (Jonason et al., 2020). However, it is possible that dark traits are also particularly manifest in collectivistic societies, and are even perceived as acceptable behaviors in the face of the group demands of these environments (Jonason et al., 2019; Robertson et al., 2016). Therefore, although there are recent studies in this regard in societies culturally different from the West such as South America or Asia (Bonfá-Araujo et al., 2021; Kawamoto et al., 2020; Özsoy et al., 2017), there is still a need to continue this direction of research in order to validate instruments and detect similarities or differences in measuring the aforementioned attributes. Furthermore, this cross-cultural examination is relevant in the context of the recent pandemic, where behaviors prioritizing personal benefit at the expense of others have had negative impacts on public, mental, and socio-political health across different continents, revealing that these patterns are broad and emerge in different situations (Farzanegan & Hofmann, 2021; Zettler et al., 2022; Zirenko et al., 2021).

Several combined measures of the dark triad (e.g. Dirty Dozen, Short Dark Triad) have been examined worldwide, which evidence a dimensional structure that can be summarized as a positive covariance between subclinical Machiavellianism, psychopathy and narcissism, according to two meta-analytic papers (Muris et al., 2017; Vize et al., 2018). However, a basic requirement for comparing instrument scores according to attributes such as gender or cultural context is to analyze measurement invariance. Invariance is relevant, as it ensures the comparability of measurements across different groups or contexts, which is essential for making valid and generalizable inferences (Milfont & Fischer, 2010). In contrast, the lack of evidence of invariance suggests that the observed differences could be attributed to variations in instrument characteristics rather than actual divergences in the psychological constructs measured. These variables are often inherently complex and are not always equivalent in people of different cultures and ages (Dong & Dumas, 2020). In the analysis of differences in complex variables such as personality, a more detailed and beneficial invariance methodology, at the item level, is network analysis. Network invariance has several advantages, including the examination of the distribution of items in the overall structural network, differences between specific

associations of items, and the importance of the items that interconnect and sustain the entire network (van Borkulo et al., 2023). Therefore, these analyses seem more appropriate when assessing dark personality traits, whose best-known scales represent indicators of very similar traits and others that are more differentiated, even across cultures (Maples et al., 2014; Luo et al., 2023; Vize et al., 2018).

While previous studies have examined the psychometric analysis of dark triad instruments at the multicultural level (Aluja et al., 2022; Jonason et al., 2020), few works have combined multiple measures to verify the feasibility of alternative models and provide reliable interpretation for comparative precision in this type of work. In previous studies, different models were estimated to analyze whether the variety of dark personality traits cluster into a single aversive personality factor (e.g., Factor D, Moshagen et al., 2018). For this purpose, the two best-known dark triad measures (e.g., Dirty Dozen and Short Dark Triad; Jonason & Webster, 2010; Jones & Paulhus, 2014) were considered. Among the antecedents referring to general factor models, Moshagen et al. (2020) examined at least 12 combined measures of aversive traits such as psychopathy, Machiavellianism, narcissism, sadism, psychological arrogance and others, where all items loaded on a common core factor, which appeared to represent the core features of the dark personality. Similarly, Volmer et al. (2019) evaluated correlated factor models and an overall factor, using items from a set of dark triad instruments, including the two best-known scales (e.g. Short Dark Triad., Dirty Dozen). The results suggested that it is possible to obtain a better fit of the data using a general dark factor representation underlying other more specific traits. Also, other previous research using exploratory graph network analysis (EGA) methodology demonstrated that it is possible to model dark triad trait clusters to obtain dimensions as well as a higher order factor using long and short triad measures (Truhan et al., 2021).

Thus, the literature suggests that the conceptualization of a general dark factor is feasible through quantitative modeling that captures the common attributes of socially aversive traits, beyond their unique or particular characteristics (Moshagen et al., 2018; Zettler et al., 2021). Following these findings, it is important to examine whether the integration of available measures of dark triad can provide support for the conceptualization of a dark general personality factor also in cultural contexts as differentiated as South America or Europe. Therefore, the present research aimed to evaluate the proposed model of a general dark trait tendency based on the bifactor model and to analyze the structure and network difference of the most representative measures of dark triad at the multicultural level. This is important as the alternative models need to be replicated further to test their extension to diversified international contexts, which have not yet been adequately represented.

Method

Participants

The present study employed both secondary and primary data collection methods. Specifically, in the first case we analyzed data that belong to open access databases regarding the dark triad from three countries as United States (https://osf.io/xey8h), Germany (https://osf.io/sn2wj) and Serbia (https://doi.org/10.1016/j.paid.2018.06.018), while primary data was obtained by the authors in Peru. All studies used recollection methods, employing online surveys with dark triad scales administered to adults over 18 years of age. Respective communication was maintained with the authors of each research. We considered these studies, firstly, as these studies recruited more than 250 participants, which is appropriate for research exploring personality traits (Schönbrodt & Perugini, 2013) and secondly, to compare countries with different cultural and socioeconomic features across the Americas and Europe.

The initial data consisted of 3110 people, this number was reduced after checking for missing data in the German and U.S. studies. Thus, the final sample consisted of 2715 adults (59% female, M = 31.04, SD = 11.5), distributed between U.S.: 1176 (Vize et al., 2020), Germany: 783 (Wehner et al., 2021), Peru: 313 (the present study) and Serbia: 443 participants (Dinić et al., 2018). Data and supplementary results of the current study can be found in the Supplementary Materials (see O'Diana et al., 2023).

The data collection of each research was performed following the respective approval of the study, the use of language and ethical standards according to each cultural context and in accordance with the guidelines of the Declaration of Helsinki (World Medical Association, 2017) about informed consent, confidentiality of information and dignified treatment of participants.

Instruments

Initially, we pooled data from previous studies with uniform characteristics such as the simultaneous measurement of dark triad traits in adults with both the Dirty Dozen (DD; Jonason & Webster, 2010) and Short Dark Triad (SDT; Jones & Paulhus, 2014) instruments. The first scale presents 12 items and is divided into 4 items for each trait, where participants responded in a range from Strongly Disagree (1) to Strongly Agree (5). On the other hand, the Short Dark Triad scale consists of 27 items, grouped into 3 dimensions and the same response style in Likert format. Each measure was validated in the context and language of the respective countries, where all the studies reported adequate values of internal consistency in the instruments mentioned. The overall reliability of the Short Dark Triad scale was ω = 0.83 for Machiavellianism, subclinical psychopathy: ω = 0.80, subclinical narcissism: ω = 0.78; while in the Dirty Dozen instrument it was ω = 0.82 for Machiavellianism, ω = 0.75, nonclinical psychopathy, and ω = 0.79, subclinical narcissism.

Data Analysis

All data was processed in R with lavaan, Bifactor Indices Calculator, bootnet, qgraph, Network Comparison Test, igraph and network tools packages.

It's important to note that latent variable and network models are two different approaches to modeling psychological data, while the first are based on the idea that a set of observed variables can be explained by a smaller number of underlying latent variables, or factors, the second (network models) focuses on the dynamic relationships between the observed variables, treating them as nodes in a network and modeling the connections between them (Kan et al., 2020). In that sense, factorial models, like the bifactorial model used hereby, are better suited for identifying dimensions of observed variables, while network models are particularly better for understanding the internal interactions of all variables as a complex system; in consequence, at statistically point of view both perspectives are substantially different and explain different perspectives of a phenomenon (van Bork et al., 2021). This means that if both approaches find similar results at its grouping structure, all reactives follow the same logic to explain its general concept.

Firstly, the bifactor models were calculated with the maximum likelihood estimation with robust standard errors and a mean and variance adjusted (MLMVS) estimator with Satterthwaite adjustment (Satterthwaite, 1941) included in the 'cfa' function on lavaan package Version 0.6-12 (Rosseel, 2012). The bifactor fit indices included were x^2/df; CFI; TLI; RMSEA and SRMR. Aditionally, omega reliabilities were calculated with Bifactor Indices Calculator package Version 0.2.2 (Dueber, 2017). Other relevant indicators were the proportion of explained common variance (ECV), whose values must be greater than 0.70 (Ferrando & Lorenzo-Seva, 2018), also we reported the percentage of uncontaminated correlations (PUC), which are useful to evaluate unidimensionality (Ríos & Wells, 2014).

On the other hand, the specification of the SDT scale was based on a grouping process, which combines (sum or average) indicators to use them as observed variables of a latent factor. Therefore, we proceeded to divide the set of items into nine dimensions made up of three items each (e.g., for Machiavellianism: Dimension 1 = Sum of SD1 to SD3, Dimension 2= Sum of SD4 to SD6, Dimension 3 = Sum of SD7 to SD9 and so on for each trait). The advantage of this procedure is that it forms a smaller subset of aggregate measures of the same construct and maintains the shared and true variance by combining the same number of items (Little et al., 2002).

Then, the network models were calculated with bootnet package Version 1.5 (Epskamp et al., 2018), with the huge estimator (Jiang et al., 2019; Zhao et al., 2020), a nonparanormal transformation of the data (Liu et al., 2009), and the rotation information criterion (ric) for model selection (Lysen, 2009); all contained in the 'estimateNetwork' function. The stability was calculated using a person-dropping bootstrap (CS-coefficient), values upper than > 0.5 indicate strong stability and interpretability (Epskamp et al., 2018).

The clusters were identified with the Spinglass algorithm (Newman & Girvan, 2004; Reichardt & Bornholdt, 2006; Traag & Bruggeman, 2009) this was calculated with 'spinglass.community' function in igraph package Version 1.3.4 (Csardi & Nepusz, 2005), through the undirected adjacency matrix with 500 spins.

Then, the strength of centrality indices one-step Expected Influence (EI1) and two-step Expected Influence (EI2) were estimated with the 'expectedInf' function on networktools package, the first provides information on the direct relationships between each node and the rest by summing the weights of the edges, considering the absolute values or the sign of the value; and the second sums the weights of indirectly related edges (Robinaugh et al., 2016). Likewise, the bridge EI1, bridge EI2 were estimated with 'bridge' function, the first indicates the total connectivity of each node with nodes of other communities with which it is directly related, by summing the weights of the edges that connect the node with nodes of other communities considering absolute values or its sings, while the second considers indirect relationships with nodes in other communities (Jones et al., 2021).

Finally, the comparison between networks of countries was conducted with the 'NCT' function Network Comparison Test package Version 2.2.1 (van Borkulo et al., 2023), was calculated with Bonferroni correction and 100 permutations.

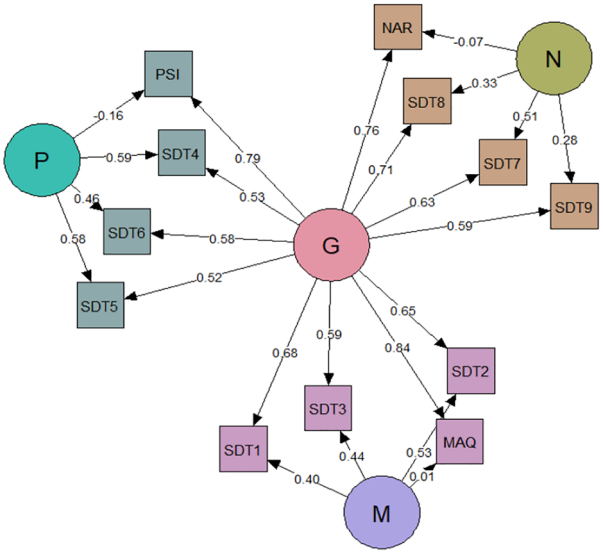
Results

Regarding descriptive data by country, the USA consisted of participants from the general population (58% women, n = 682, mean age = 39.1, SD = 11.9); Germany examined university students and workers (61% women, n = 477, mean age: 23.1, SD = 5.9); in Serbia, university students and general population (50% female, n = 221, mean age: 28.1, SD = 6.6) and in Peru university participants were recruited (61% female, n = 190, mean age: 24.5, SD = 4.8).

On the other hand, the Short Dark Triad (SDT) questionnaire was parceled to 9 variables for better fit in models' estimation. The bifactor structural equation model (Bifactor SEM) of the dark triad in both questionnaires was evaluated (Figure 1, Table 1). All models had factorial solutions. The general model fit indices (with all countries) showed good values (CFI = 0.959; RMSEA = 0.071); while in its reliability the general hierarchical omega was (G = 0.862), and the omega indices of the dimensions, Machiavellianism (M = 0.868); Psychopathy (P = 0.836), and Narcissism (N = 0.828).

Figure 1

Bifactor SEM of Dark Triad Scales



Note. G = general factor of dark personality traits; P = psychopathy; N = narcissism; M = Machiavellianism.

Table 1

Fit Indices of Bifactor SEM Models

Model	x^2/df	CFI	TLI	RMSEA	SRMR	ECV	PUC	G ω	M ω	P ω	N ω
General	1.284	0.959	0.937	0.071	0.030	0.725	0.727	0.862	0.868	0.836	0.828
USA	1.468	0.964	0.948	0.070	0.034	0.695	0.727	0.857	0.881	0.864	0.867
Germany	1.303	0.947	0.922	0.077	0.043	0.576	0.727	0.832	0.891	0.796	0.917
Serbia	1.410	0.928	0.898	0.083	0.045	0.709	0.727	0.849	0.810	0.787	0.800
Perú	1.855	0.914	0.875	0.078	0.054	0.657	0.727	0.800	0.780	0.560	0.806

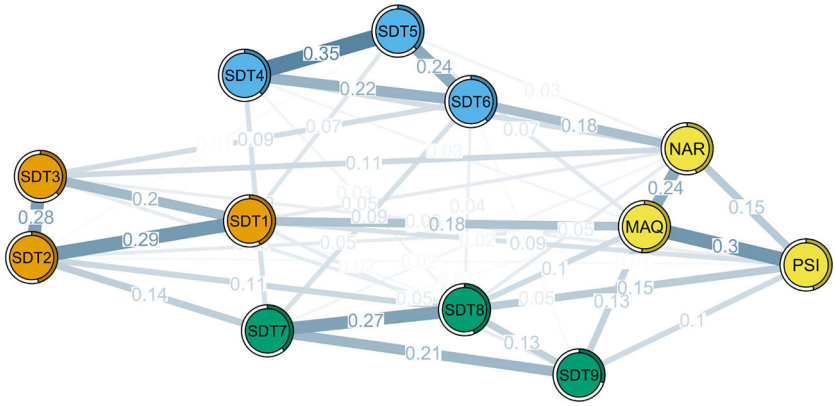
Note. ECV = explained common variance; PUC = percentage of uncontaminated correlations; ω = ordinal omega.

In models by countries, US (CFI = 0.964; RMSEA = 0.070; G = 0.857); Germany (CFI = 0.947; RMSEA = 0.077; G = 0.832), and Serbia (CFI = 0.928; RMSEA = 0.083; G = 0.849) obtained good fit indices and reliability indices, while Peru model showed good fit indices but low omega indices in the Psychopathy dimension (CFI = 0.914; RMSEA = 0.078; G = 0.800), all detailed results can be found at Table 1.

Then, we performed a network analysis (Figure 2), where SDT1 and SDT2 (r = 0.291); SDT4 and SDT5 (r = 0.354); and Machiavellianism (MAQ) and Psychopathy (PSI; r = 0.299) showed the highest relationships. The clusters were explored with the Spinglass algorithm. In addition, the nodes with highest predictability were Machiavellianism (MAQ; r^2 = 0.52), SDT2 (0.46), and Psychopathy (PSI; r^2 = 0.45), while SDT3 (r^2 = 0.38), SDT5 (r^2 = 0.37), and SDT9 (r^2 = 0.30) were the lowest. In the network accuracy and stability through 5000 bootstraps the most of estimated edge were greater than zero and not overlap with other edges; the edges are maintained even after removing large proportions from the sample, the Coefficient of Stability (CS = 0.75) demonstrates an adequate stability of the edges in the network.

Figure 2

Network Plot of Dark Triad Measures

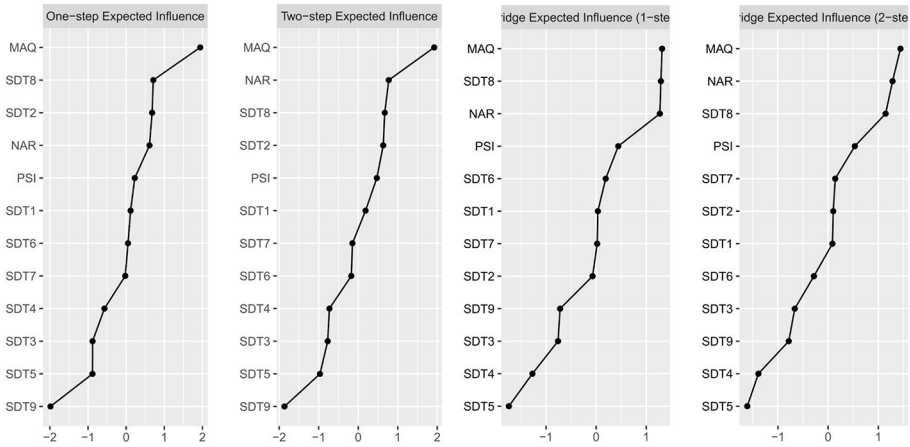


Note. Blue paths are positive relationships, Green Cluster = Narcissism SDT; Turquoise Cluster = Psychopathy SDT; Orange Cluster = Machiavellianism SDT; Yellow Cluster = Dirty Dozen Scale.

In the centrality indices of the Dark Triad network analyzed (Figure 3), the Bridge-expected centrality (i.e., a variant of centrality that takes communities of nodes into account), and expected influence (i.e., the sum of raw values of edge weights connected to each node) for each node showed that Machiavellianism (MAQ) had the highest bridge expected influence in the network, while SDT5 was the lowest.

Figure 3

Centrality Plots (z-scores) of Dark Triad Network



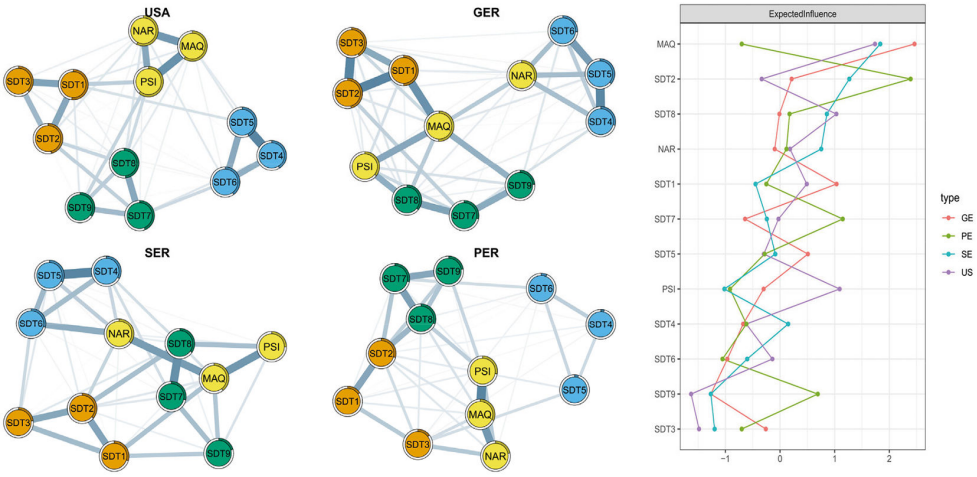
Note. The first two graphs refer to the centrality of expected influence, while the last two refer to the centrality of bridge-expected influence. Values greater than 1 indicate higher centrality.

In the network analysis by country (Figure 4), all networks presented positive relationships, Peru, Serbia and Germany had the highest predictability (r^2) in Machiavellianism (Peru = 0.316; Serbia = 0.397; Germany = 0.505), while the USA showed Psychopathy (PSI) as highest (r^2 = 0.612). In addition, the centrality indices of USA, Germany and Serbia shows a consensus in Machiavellianism (MAQ) as the highest value (US = 1.738; GE = 2.461; SE = 1.834), and SDT9 (US = -1.628; GE = -1.267; SE = -1.267) as the lowest; while in Peru, SDT2 has the highest value (EI = 2.390) and SDT6 the lowest (EI = -1.053).

Finally, a network invariance between countries was conducted (Table 2), this confirms that there are significant differences in the edges of all networks, except for Germany and Serbia (p = 0.85) that showed an insignificant value. While in the centrality indices compared by the Expected Influence, can observe that all networks have significant differences, except for USA and Serbia (p = 0.08), and Germany and Serbia (p = 0.63).

Figure 4

The Dark Triad Network by Country and Centralities



Note. Blue paths are positive relationships. Green Cluster = Narcissism SDT; Turquoise Cluster = Psychopathy SDT; Orange Cluster = Machiavellianism SDT; Yellow Cluster = Dirty Dozen Scale. Values greater than 1 indicate higher centrality. In the centrality plot Germany = red line; Peru = Green line; Serbia = Blue line; USA = Purple line.

Table 2

Network Invariance Between Countries

Country	Network.p	Centrality.p
US-GE	< .001	< .001
US-SE	.01	.08
US-PE	.04	< .001
GE-SE	.85	.63
GE-PE	< .001	.01
SE-PE	< .001	< .001

Note. US = United States; GE = Germany; SE = Serbia; PE = Peru; Network.p = structure network differences; Centrality.p = centrality network differences.

Discussion

Previous research has often examined the Short Dark Triad (SDT) and the Dirty Dozen (DD) scales using a three-factor model, but this model has not always been supported in different contexts (McLarnon & Tarraf, 2017; Vize et al., 2018). This may be because

the traits being measured share both common and specific variances, highlighting the need for a greater focus on the complexity of these traits and their methodological analyses (Bonfá-Araujo et al., 2021; Rogoza et al., 2021). By separating the common and specific variance, it may be possible to better understand the individual traits and the more universal attributes that have not been adequately considered in previous models. This study aimed to address this limitation and assess the feasibility of this approach as shown by previous studies (Jones & Figueredo, 2013; Moshagen et al., 2018).

To evaluate both the general and specific factors, in the present study we used a bi-factor model which provided an optimal fit to the data, similar to other studies that used a variety of measures of dark traits (Gamache et al., 2018; Moshagen et al., 2020) with the difference that this study tested a model across general and specific countries. This generalized factor model explained part of the variance of all items and captures unique variance within subdomain-specific groups of items. This allows for interpretation of two conjoint measures and comparison of differences at the general or factor level (Chen et al., 2006; Reise et al., 2010). In this way, our results found that it is possible to use two measures to adopt the model of a single aversive disposition that can give rise to other specific traits, even when these traits have often been expressed in complex ways across different cultures and contexts (Moshagen et al., 2018).

By transferring this concept to statistic modeling, Moshagen et al. (2020) and Volmer et al. (2019) found that a set of items from different measures of dark traits were strongly correlated and could be combined to form a single aversive personality factor (e.g., Factor D, Moshagen et al., 2020). Moreover, there is evidence that this approach can be used to measure dark triad traits in both Western (Gamache et al., 2018; Jonason & Luévano, 2013) and South American samples (Bonfá-Araujo et al., 2021; Copez Lonzoy et al., 2020). We therefore build on these findings to test the generalization and subsequent comparison of that model in diverse contexts, including underrepresented regions, such as South America (Vitriol et al., 2020).

Additionally, we examined the conceptualization of dark traits in four countries using a network model, that allowed us to identify strongly connected traits and specific subgroups (Epskamp et al., 2018). We used partial correlations to examine these associations because they are best suited for variables with similar interpersonal orientation characteristics, such as the dark triad. This methodology also allows us to verify the contribution and independent conditional relationships between variables (Waldorp & Marsman, 2021).

The overall network structure evidenced a stable and unique organization of medium and high positive partial correlations between the two dark triad measures, suggesting dense interconnections of the same socially aversive nature. Likewise, the Machiavellianism domain of the Dirty Dozen scale was found to be the highest centrality measure, with the highest predictability and the most consistent across all estimated network indices (e.g. expected influence and bridge-expected influence). This may indicate that

it is the core interconnection in the systematic representation of the dark factor with the measures used. In addition, this finding may imply a broad nature of manipulative behavior that is common among several traits that maximize personal benefit (Jones & Figueredo, 2013; Vize et al., 2020).

Another research found that a very similar trait such as interpersonal manipulation was highly correlated with Machiavellian dominance on the Dirty Dozen scale (Truhan et al., 2021), and at the same time was a central measure in other network studies in different countries, suggesting an important "dark core" emerging from the dark triad (Marcus et al., 2018; Wehner et al., 2021). Previous studies have noted that strategic and personal benefit-oriented interpersonal tendencies tend to occur across a wide number of countries, in nonclinical populations, university, and organizational settings (Hussain et al., 2021; Jonason et al., 2020). Thus, these social patterns can manifest opportunistically and adaptively to take advantage of others, even in differentiated individualistic contexts such as North America and Europe; or collectivistic such as South America (Robertson et al., 2016).

That is, an important manipulative feature of individuals with high levels of dark triad may involve a base of behaviors focused on violating established norms in an environment and the will of others to achieve personal desires relatively easily. However, their strategies may vary depending on the specific motivations of each dark trait (Vize et al., 2018). For example, it is necessary to distinguish between impulsivity leading to violence in psychopathy (Paulhus, 2014), Machiavellianism using less aggressive and more calculative strategies for power (Koehn et al., 2019), while narcissists are often motivated by obtaining attention and special treatment from others so they could use flattery and temporary affection to maintain superiority over potential victims (Chatterjee & Pollock, 2017).

On the other hand, to understand how cultural environments may influence the use of malevolent behavior, we conducted a cross-cultural network comparison to examine differences in the structure and centrality of connections between dark traits. Although other studies addressed the model of a general dark factor (Moshagen et al., 2020; Zettler et al., 2021), no multicultural-level invariance analyses were performed, which hinders a reliable assessment of the representativeness and stability of a construct's measurement in heterogeneous contexts (Milfont & Fischer, 2010), as proposed in the generalizable concept of dark traits.

In the present study we found differences in dark triad network structures between the North American and European sample (US-GE; US-SE); also, between Peruvian and European participants (GE-PE; SE-PE), while the characteristics of the German and Serbian sample (GE-SE) resulted in similar patterns of connections. These findings suggest that the expression and reinforcement of aversive dispositions may vary based on the proximity of countries and their cultural contexts (e.g. continents).

In Germany and Serbia, cultural patterns promote conformity and restrictive behaviors (Hofstede, 2022). The Machiavellian trait of the Dirty Dozen scale was the most central in these countries, reinforced by some psychopathic characteristics of the SDT scale. A previous study in 49 countries also suggests manipulative behaviors are more likely to thrive in advanced or restrained societies (Jonason et al., 2020). In Germany, such behaviors may be used to achieve professional success and increase social status and self-esteem (Schmitt et al., 2020; Spurk et al., 2016). In Serbia, social tactics focused on obedience and work responsibility may be promoted to achieve prestige and better resources, and some people may have traditional and rigid views of partner roles, leading others to accept greater control (Lavrič et al., 2019). Normative restrictions may also lead some individuals with selfish motivations to engage in calculated behaviors with the intention of harming others or rebelling against authority.

By contrast, in the American continent, many students and adults in general report a greater tendency toward instantaneous satisfaction of affective-interpersonal needs, attachment to established traditions, and resistance to social change (Hofstede, 2022). In both networks in this continent, there were differences related to a greater number of connections to the Machiavellian components of the Dirty Dozen scale in the US, and the SDT scale in the Peruvian environment. This may indicate that most dark triad traits were associated with broader manipulation characteristics in the North American context. In this environment, there is a greater emphasis on individual freedoms, short-term goals, and competitiveness (Hofstede, 2022), which can lead to manipulative behaviors in a wide variety of everyday life contexts, such as a greater need for non-monogamous relationships that require less effort and commitment (Muris et al., 2017). On the other hand, in the workplace, some managers may be authoritarian and unconcerned with the well-being of employees, while some employees may resort to unethical practices to stand out and gain benefits (Kisamore et al., 2010).

On the other hand, in the Peruvian network, strategic and calculating interpersonal exchange characteristics were more relevant in activating other dark traits. This is coherent in a context characterized by power inequality, collectivism, and low compliance with rules (Hofstede, 2022). In this way, many individuals find these patterns appealing to gain advantages in various situations. Even during the recent pandemic, manipulative tactics were observed, where some people in Peru demonstrated little empathy by resorting to bribery to access scarce resources and violate health rules (Muñoz, 2021). In addition, considering the sample of students, during this period, academic dishonesty may have been normalized as a way to succeed in university (Valdivia et al., 2020).

Limitations and Future Directions

The present study had limitations, as the samples may not be representative of the cultural context as a whole so the comparisons made should be taken with caution. Also, low psychopathy reliability in Peruvian sample warrants attention and improvement in

future research. Despite this, the results suggest that it is possible to identify connections between dark triad traits at a dimensional and general level, and beyond exceptional periods such as the Covid-19 pandemic. Furthermore, a strength of the study is the use of two methods (SEM and network analysis) to identify shared social aversive patterns in different cultural environments.

In line with the study findings, we argue that measuring and examining dark personality traits is a complex task, as they reflect both general common aspects and trait-specific features. In this context, we recommend that future studies explore these aspects using alternative models that assess beyond the three correlated traits, either through methods such as Exploratory Structural Equation Modeling (ESEM) or network models, which provide more detailed information and can enhance the understanding of the role of each indicator of the dark triad in cross-country comparisons. Additionally, we recommend that these comparisons not be limited solely to the country level but also be conducted considering demographic factors such as gender, age, and sample type, whether students or the general population.

Conclusion

In summary, it is concluded that the bifactor specification using the well-known short dark triad measures resulted in satisfactory indices in the four countries examined. Likewise, the network analyses indicated similar results in the positive connections that formed a stable general structure, while the measures of centrality (expected and bridge-expected influence) and predictability reflected that the Machiavellianism of the Dirty Dozen scale was the most consistent domain that favored the interconnection between all the traits with the measures used. On the other hand, after analyzing each country's networks separately, structural differences in dark triad traits connections were evident except among European countries, which is assumed to be specific "dark" features that stand out in each sociocultural setting. Therefore, these findings demonstrate that the conceptualization of a "dark" disposition may be feasible at both the general and country-specific trait levels in the Americas and Europe.

Funding: The authors have no funding to report.

Acknowledgments: The authors have no additional (i.e., non-financial) support to report.

Competing Interests: The authors have declared that no competing interests exist.

Ethics Statement: All procedures involving human participants were performed according to ethical guidelines of the Helsinki Declaration. Data obtained in the present study was approved in every country respectively.

Data Availability: Data and supplementary results of the current study can be found in the Supplementary Materials (see O'Diana et al., 2023).

Supplementary Materials

Data and supplementary results of the current study can be found in the Supplementary Materials (see O'Diana et al., 2023).

Index of Supplementary Materials

O'Diana, A. G., Calle, D., & Ramos-Vera, C. (2023). *Cross-cultural invariance of the Short Dark Triad and Dirty Dozen scales across four countries* [Data, supplementary results]. OSF. https://osf.io/ys64x

References

Aluja, A., Garcia, L. F., Rossier, J., Ostendorf, F., Glicksohn, J., Oumar, B., Bellaj, T., Ruch, W., Wang, W., Suranyi, Z., Ścigała, D., Čekrlija, Đ., Stivers, A. W., Blas, L. D., Valdivia, M., Ben Jemaa, S., Atitsogbe, K. A., & Hansenne, M. (2022). Dark triad traits, social position, and personality: A cross-cultural study. *Journal of Cross-Cultural Psychology, 53*(3-4), 380–402. https://doi.org/10.1177/00220221211072816

Barlett, C. P., & Barlett, N. D. (2015). The young and the restless: Examining the relationships between age, emerging adulthood variables, and the Dark Triad. *Personality and Individual Differences, 86*, 20–24. https://doi.org/10.1016/j.paid.2015.05.024

Bonfá-Araujo, B., Simões, N. C., Zuchetto, S. R., & Hauck-Filho, N. (2021). The unidimensionality of evil: A rating scale analysis of the short dark triad. *Personality and Individual Differences, 168*, Article 110376. https://doi.org/10.1016/j.paid.2020.110376

Campbell, W. K., & Miller, J. D. (2011). *The handbook of narcissism and narcissistic personality disorder: Theoretical approaches, empirical findings, and treatments*. John Wiley & Sons.

Chatterjee, A., & Pollock, T. G. (2017). Master of puppets: How narcissistic CEOs construct their professional worlds. *Academy of Management Review, 42*(4), 703–725. https://doi.org/10.5465/amr.2015.0224

Chen, F. F., West, S. G., & Sousa, K. H. (2006). A comparison of bifactor and second-order models of quality of life. *Multivariate Behavioral Research, 41*(2), 189–225. https://doi.org/10.1207/s15327906mbr4102_5

Copez Lonzoy, A., Dominguez-Lara, S., & Merino-Soto, C. (2020). ¿Inestabilidad en el lado oscuro? Estructura factorial, invarianza de medición y fiabilidad de la Dirty Dozen Dark Triad en población general de Lima. *Revista de Psicopatología y Psicología Clínica, 24*(3), 153–162. https://doi.org/10.5944/rppc.24335

Csardi, G., & Nepusz, T. (2005). The Igraph Software Package for Complex Network Research. *InterJournal.Complex Systems, 1659*, 1–9.

Dinić, B. M., & Jevremov, T. (2021). Trends in research related to the Dark Triad: A bibliometric analysis. *Current Psychology, 40*(7), 3206–3215. https://doi.org/10.1007/s12144-019-00250-9

Dinić, B. M., Petrović, B., & Jonason, P. K. (2018). Serbian adaptations of the Dark Triad Dirty Dozen (DTDD) and Short Dark Triad (SD3). *Personality and Individual Differences, 134*, 321–328. https://doi.org/10.1016/j.paid.2018.06.018

Dong, Y., & Dumas, D. (2020). Are personality measures valid for different populations? A systematic review of measurement invariance across cultures, gender, and age. *Personality and Individual Differences, 160*, Article 109956. https://doi.org/10.1016/j.paid.2020.109956

Dueber, D. (2017). Bifactor Indices Calculator: A Microsoft Excel-Based Tool to Calculate Various Indices Relevant to Bifactor CFA Models. *Educational, School, and Counseling Psychology Research Tools*. https://doi.org/10.13023/edp.tool.01

Epskamp, S., Borsboom, D., & Fried, E. I. (2018). Estimating psychological networks and their accuracy: A tutorial paper. *Behavior Research Methods, 50*(1), 195–212. https://doi.org/10.3758/s13428-017-0862-1

Farzanegan, M. R., & Hofmann, H. P. (2021). Effect of public corruption on the COVID-19 immunization progress. *Scientific Reports, 11*(1), Article 23423. https://doi.org/10.1038/s41598-021-02802-1

Ferrando, P. J., & Lorenzo-Seva, U. (2018). Assessing the quality and appropriateness of factor solutions and factor score estimates in exploratory item factor analysis. *Educational and Psychological Measurement, 78*(5), 762–780. https://doi.org/10.1177/0013164417719308

Gamache, D., Savard, C., & Maheux-Caron, V. (2018). French adaptation of the Short Dark Triad: Psychometric properties and a head-to-head comparison with the Dirty Dozen. *Personality and Individual Differences, 122*, 164–170. https://doi.org/10.1016/j.paid.2017.10.027

Hofstede. (2022). Country comparison. *Hofstede Insights*. https://www.hofstede-insights.com/country-comparison/germany,peru,serbia,the-usa/ [Accessed 1 Oct 2022]

Hussain, Z., Wegmann, E., & Griffiths, M. D. (2021). The association between problematic social networking site use, dark triad traits, and emotion dysregulation. *BMC Psychology, 9*(1), 160. https://doi.org/10.1186/s40359-021-00668-6

Jiang, H., Fei, X., Liu, H., Roeder, K., Lafferty, J., Wasserman, L., Li, X., & Zhao, T. (2019). *huge: High-dimensional undirected graph estimation* (Version 1.3.5). R-CRAN. https://cran.r-project.org/package=huge

Jonason, P. K., & Luévano, V. X. (2013). Walking the thin line between efficiency and accuracy: Validity and structural properties of the Dirty Dozen. *Personality and Individual Differences, 55*(1), 76–81. https://doi.org/10.1016/j.paid.2013.02.010

Jonason, P. K., Okan, C., & Özsoy, E. (2019). The Dark Triad traits in Australia and Turkey. *Personality and Individual Differences, 149*, 123–127. https://doi.org/10.1016/j.paid.2019.05.058

Jonason, P. K., & Webster, G. D. (2010). The dirty dozen: A concise measure of the dark triad. *Psychological Assessment, 22*(2), 420–432. https://doi.org/10.1037/a0019265

Jonason, P. K., Żemojtel-Piotrowska, M., Piotrowski, J., Sedikides, C., Campbell, W. K., Gebauer, J. E., Maltby, J., Adamovic, M., Adams, B. G., Kadiyono, A. L., Atitsogbe, K. A., Bundhoo, H. Y., Bălțătescu, S., Bilić, S., Brulin, J. G., Chobthamkit, P., Del Carmen Dominguez, A., Dragova-

Koleva, S., El-Astal, S., . . .Yahiiaev, I. (2020). Country-level correlates of the Dark Triad traits in 49 countries. *Journal of Personality, 88*(6), 1252–1267. https://doi.org/10.1111/jopy.12569

Jones, D. N., & Figueredo, A. J. (2013). The core of darkness: Uncovering the heart of the Dark Triad. *European Journal of Personality, 27*(6), 521–531. https://doi.org/10.1002/per.1893

Jones, D. N., & Paulhus, D. L. (2014). Introducing the Short Dark Triad (SD3): A brief measure of dark personality traits. *Assessment, 21*(1), 28–41. https://doi.org/10.1177/1073191113514105

Jones, P. J., Ma, R., & McNally, R. J. (2021). Bridge centrality: A network approach to understanding comorbidity. *Multivariate Behavioral Research, 56*(2), 353–367. https://doi.org/10.1080/00273171.2019.1614898

Kan, K.-J., de Jonge, H., van der Maas, H. L. J., Levine, S. Z., & Epskamp, S. (2020). How to compare psychometric factor and network models. *Journal of Intelligence, 8*(4), Article 35. https://doi.org/10.3390/jintelligence8040035

Kawamoto, T., Shimotsukasa, T., & Oshio, A. (2020). Cross-sectional age differences in the Dark Triad traits in two Japanese samples. *Psychology and Aging, 35*(1), 91–96. https://doi.org/10.1037/pag0000399

Kisamore, J. L., Jawahar, I. M., Liguori, E. W., Mharapara, T. L., & Stone, T. H. (2010). Conflict and abusive workplace behaviors: The moderating effects of social competencies. *Career Development International, 15*(6), 583–600. https://doi.org/10.1108/13620431011084420

Koehn, M. A., Okan, C., & Jonason, P. K. (2019). A primer on the Dark Triad traits. *Australian Journal of Psychology, 71*(1), 7–15. https://doi.org/10.1111/ajpy.12198

Krizan, Z., & Herlache, A. D. (2018). The narcissism spectrum model: A synthetic view of narcissistic personality. *Personality and Social Psychology Review, 22*(1), 3–31. https://doi.org/10.1177/1088868316685018

Lavrič, M., Gavrilović, D., Puzek, I., & Klanjšek, R. (2019). Values and value shifts in four countries of south-east europe: retraditionalization, erosion of trust and the decline in public morality. *Facta Universitatis, Series: Philosophy, Sociology, Psychology and History, 18*(2), 55–66. https://doi.org/10.22190/FUPSPH1902055L

LeBreton, J. M., Binning, J. F., & Adorno, A. J. (2006). Subclinical psychopaths. In J. C. Thomas, D. L. Segal, & M. Hersen (Eds.), *Comprehensive handbook of personality and psychopathology, Vol. 1: Personality and everyday functioning* (pp. 388–411). John Wiley & Sons.

LeBreton, J. M., Shiverdecker, L. K., & Grimaldi, E. M. (2018). The Dark Triad and workplace behavior. *Annual Review of Organizational Psychology and Organizational Behavior, 5*(1), 387–414. https://doi.org/10.1146/annurev-orgpsych-032117-104451

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling, 9*(2), 151–173. https://doi.org/10.1207/S15328007SEM0902_1

Liu, H., Lafferty, J., & Wasserman, L. (2009). The nonparanormal: Semiparametric estimation of high dimensional undirected graphs. *Journal of Machine Learning Research, 10*(80), 2295–2328.

Luo, Y. L., Kovas, Y., Wang, L., Stalikas, A., Kyriazos, T. A., Gianniou, F. M., Likhanov, M.V., & Papageorgiou, K. A. (2023). Sex differences in the Dark Triad are sensitive to socioeconomic

conditions: The adaptive value of narcissism in the UK, Greece, and China. *Current Psychology, 42*(26), 22436–22448. https://doi.org/10.1007/s12144-022-03302-9

Lysen, S. (2009). *Permuted inclusion criterion: A variable selection technique* [Publicly accessible Penn Dissertations]. https://repository.upenn.edu/server/api/core/bitstreams/3add3786-22c0-4b80-a5fc-725e66087276/content

Maneiro, L., López-Romero, L., Gómez-Fraguela, J. A., Cutrín, O., & Romero, E. (2019). Pursuing the dark triad. *Journal of Individual Differences, 40*(1), 36–44. https://doi.org/10.1027/1614-0001/a000274

Maples, J. L., Lamkin, J., & Miller, J. D. (2014). A test of two brief measures of the dark triad: The dirty dozen and short dark triad. *Psychological Assessment, 26*(1), 326–331. https://doi.org/10.1037/a0035084

Marcus, D. K., Preszler, J., & Zeigler-Hill, V. (2018). A network of dark personality traits: What lies at the heart of darkness? *Journal of Research in Personality, 73*, 56–62. https://doi.org/10.1016/j.jrp.2017.11.003

McLarnon, M. J. W., & Tarraf, R. C. (2017). The Dark Triad: Specific or general sources of variance? A bifactor exploratory structural equation modeling approach. *Personality and Individual Differences, 112*, 67–73. https://doi.org/10.1016/j.paid.2017.02.049

Milfont, T. L., & Fischer, R. (2010). Testing measurement invariance across groups: Applications in cross-cultural research. *International Journal of Psychological Research, 3*(1), 111–130. https://doi.org/10.21500/20112084.857

Moraga, F. R. G. (2015). La tríada oscura de la personalidad: Maquiavelismo, narcisismo y psicopatía. Una mirada evolutiva. *Revista Criminalidad, 57*(2), 253–265.

Moshagen, M., Hilbig, B. E., & Zettler, I. (2018). The dark core of personality. *Psychological Review, 125*(5), 656–688. https://doi.org/10.1037/rev0000111

Moshagen, M., Zettler, I., & Hilbig, B. E. (2020). Measuring the dark core of personality. *Psychological Assessment, 32*(2), 182–196. https://doi.org/10.1037/pas0000778

Muñoz, P. (2021). Latin America erupts: Peru goes populist. *Journal of Democracy, 32*(3), 48–62. https://doi.org/10.1353/jod.2021.0033

Muris, P., Merckelbach, H., Otgaar, H., & Meijer, E. (2017). The malevolent side of human nature: A meta-analysis and critical review of the literature on the Dark Triad (Narcissism, Machiavellianism, and Psychopathy). *Perspectives on Psychological Science, 12*(2), 183–204. https://doi.org/10.1177/1745691616666070

Newman, M. E. J., & Girvan, M. (2004). Finding and evaluating community structure in networks. *Physical Review. E, 69*(2), Article 026113. https://doi.org/10.1103/PhysRevE.69.026113

Özsoy, E., Rauthmann, J. F., Jonason, P. K., & Ardıç, K. (2017). Reliability and validity of the Turkish versions of dark triad dirty dozen (DTDD-T), short dark triad (SD3-T), and single item narcissism scale (SINS-T). *Personality and Individual Differences, 117*, 11–14. https://doi.org/10.1016/j.paid.2017.05.019

Paulhus, D. L. (2014). Toward a taxonomy of dark personalities. *Current Directions in Psychological Science, 23*(6), 421–426. https://doi.org/10.1177/0963721414547737

Paulhus, D. L., & Williams, K. M. (2002). The Dark Triad of personality: Narcissism, Machiavellianism, and psychopathy. *Journal of Research in Personality, 36*(6), 556–563. https://doi.org/10.1016/S0092-6566(02)00505-6

Pechorro, P., Caramelo, V., Oliveira, J. P., Nunes, C., Curtis, S. R., & Jones, D. N. (2019). The Short Dark Triad (SD3): Adaptation and psychometrics among at-risk male and female youths. *Deviant Behavior, 40*(3), 273–286. https://doi.org/10.1080/01639625.2017.1421120

Reichardt, J., & Bornholdt, S. (2006). Statistical mechanics of community detection. *Physical Review. E, 74*(1), Article 016110. https://doi.org/10.1103/PhysRevE.74.016110

Reise, S. P., Moore, T. M., & Haviland, M. G. (2010). Bifactor models and rotations: Exploring the extent to which multidimensional data yield univocal scale scores. *Journal of Personality Assessment, 92*(6), 544–559. https://doi.org/10.1080/00223891.2010.496477

Ríos, J., & Wells, C. (2014). Evidencia de validez basada en la estructura interna. *Psicothema, 26*(1), 108–117.

Robertson, S. A., Datu, J. A. D., Brawley, A. M., Pury, C. L. S., & Mateo, N. J. (2016). The Dark Triad and social behavior: The influence of self-construal and power distance. *Personality and Individual Differences, 98*, 69–74. https://doi.org/10.1016/j.paid.2016.03.090

Robinaugh, D. J., Millner, A. J., & McNally, R. J. (2016). Identifying highly influential nodes in the complicated grief network. *Journal of Abnormal Psychology, 125*(6), 747–757. https://doi.org/10.1037/abn0000181

Rogoza, R., Żemojtel-Piotrowska, M., Jonason, P. K., Piotrowski, J., Campbell, K. W., Gebauer, J. E., Maltby, J., Sedikides, C., Adamovic, M., Adams, B. G., Ang, R. P., Ardi, R., Atitsogbe, K. A., Baltatescu, S., Bilić, S., Bodroža, B., Gruneau Brulin, J., Bundhoo Poonoosamy, H. Y., Chaleeraktrakoon, T., . . .Włodarczyk, A. (2021). Structure of Dark Triad Dirty Dozen across eight world regions. *Assessment, 28*(4), 1125–1135. https://doi.org/10.1177/1073191120922611

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software, 48*(2), 1–36. https://doi.org/10.18637/jss.v048.i02

Sanz-García, A., Gesteira, C., Sanz, J., & García-Vera, M. P. (2021). Prevalence of psychopathy in the general adult population: A systematic review and meta-analysis. *Frontiers in Psychology, 12*, Article 661044. https://doi.org/10.3389/fpsyg.2021.661044

Satterthwaite, F. E. (1941). Synthesis of variance. *Psychometrika, 6*(5), 309–316. https://doi.org/10.1007/BF02288586

Schmitt, H. S., Sindermann, C., Li, M., Ma, Y., Kendrick, K. M., Becker, B., & Montag, C. (2020). The Dark Side of emotion recognition – Evidence from cross-cultural research in Germany and China. *Frontiers in Psychology, 11*, Article 1132. https://doi.org/10.3389/fpsyg.2020.01132

Schönbrodt, F. D., & Perugini, M. (2013). At what sample size do correlations stabilize? *Journal of Research in Personality, 47*(5), 609–612. https://doi.org/10.1016/j.jrp.2013.05.009

Spurk, D., Keller, A. C., & Hirschi, A. (2016). Do bad guys get ahead or fall behind? Relationships of the Dark Triad of personality with objective and subjective career success. *Social Psychological & Personality Science, 7*(2), 113–121. https://doi.org/10.1177/1948550615609735

Traag, V. A., & Bruggeman, J. (2009). Community detection in networks with positive and negative links. *Physical Review. E, 80*(3), Article 036115. https://doi.org/10.1103/PhysRevE.80.036115

Truhan, T. E., Wilson, P., Mõttus, R., & Papageorgiou, K. A. (2021). The many faces of dark personalities: An examination of the Dark Triad structure using psychometric network analysis. *Personality and Individual Differences, 171*, Article 110502. https://doi.org/10.1016/j.paid.2020.110502

Valdivia, V. E. R., Goycochea, H. A. B., & Dávila, F. A. D. (2020, November). Factors associated with academic dishonesty in Peruvian engineering students. *2020 IEEE International Symposium on Accreditation of Engineering and Computing Education (ICACIT)* (pp. 1–5). IEEE. https://doi.org/10.1109/ICACIT50253.2020.9277689

van Bork, R., Rhemtulla, M., Waldorp, L., Kruis, J., Rezvanifar, S., & Borsboom, D. (2021). Latent variable models and networks: Statistical equivalence and testability. *Multivariate Behavioral Research, 56*(2), 175–198. https://doi.org/10.1080/00273171.2019.1672515

van Borkulo, C. D., van Bork, R., Boschloo, L., Kossakowski, J. J., Tio, P., Schoevers, R. A., Borsboom, D., & Waldorp, L. J. (2023). Comparing network structures on three aspects: A permutation test. *Psychological Methods, 28*(6), 1273–1285. https://doi.org/10.1037/met0000476

Vitriol, J. A., Larsen, E. G., & Ludeke, S. G. (2020). Just as WEIRD? Personality traits and political attitudes among immigrant minorities. *Journal of Research in Personality, 85*, Article 103931. https://doi.org/10.1016/j.jrp.2020.103931

Vize, C. E., Collison, K. L., Miller, J. D., & Lynam, D. R. (2020). The "core" of the dark triad: A test of competing hypotheses. *Personality Disorders, 11*(2), 91–99. https://doi.org/10.1037/per0000386

Vize, C. E., Lynam, D. R., Collison, K. L., & Miller, J. D. (2018). Differences among dark triad components: A meta-analytic investigation. *Personality Disorders, 9*(2), 101–111. https://doi.org/10.1037/per0000222

Volmer, J., Koch, I. K., & Wolff, C. (2019). Illuminating the 'dark core': Mapping global versus specific sources of variance across multiple measures of the dark triad. *Personality and Individual Differences, 145*, 97–102. https://doi.org/10.1016/j.paid.2019.03.024

Wai, M., & Tiliopoulos, N. (2012). The affective and cognitive empathic nature of the dark triad of personality. *Personality and Individual Differences, 52*(7), 794–799. https://doi.org/10.1016/j.paid.2012.01.008

Waldorp, L., & Marsman, M. (2021). Relations between networks, regression, partial correlation, and the latent variable model. *Multivariate Behavioral Research, 57*(6), 994–1006. https://doi.org/10.1080/00273171.2021.1938959

Wehner, C., Ziegler, M., Gödeke, W., & Lämmle, L. (2021). Further inflaming the discussion or cooling down feelings? A network analysis of the Dark Triad and the Five Factor Model of personality. *Personality and Individual Differences, 175*, Article 110717. https://doi.org/10.1016/j.paid.2021.110717

World Medical Association. (2017). *Declaración de Helsinki de la AMM – Principios éticos para las investigaciones médicas en seres humanos.* https://www.wma.net/es/policies-post/declaracion-de-helsinki-de-la-amm-principios-eticos-para-las-investigaciones-medicas-en-seres-humanos/

Yildirim, B. O., & Derksen, J. J. L. (2015). Clarifying the heterogeneity in psychopathic samples: Towards a new continuum of primary and secondary psychopathy. *Aggression and Violent Behavior, 24*, 9–41. https://doi.org/10.1016/j.avb.2015.05.001

Zettler, I., Schild, C., Lilleholt, L., Kroencke, L., Utesch, T., Moshagen, M., Böhm, R., Back, M. D., & Geukes, K. (2022). The role of personality in COVID-19-related perceptions, evaluations, and behaviors: Findings across five samples, nine traits, and 17 criteria. *Social Psychological & Personality Science, 13*(1), 299–310. https://doi.org/10.1177/19485506211001680

Zettler, I., Moshagen, M., & Hilbig, B. E. (2021). Stability and change: The dark factor of personality shapes dark traits. *Social Psychological & Personality Science, 12*(6), 974–983. https://doi.org/10.1177/1948550620953288

Zhao, T., Liu, H., Roeder, K., Lafferty, J., & Wasserman, L. (2020). *The huge package for high-dimensional undirected graph estimation in R.* arXiv. https://doi.org/10.48550/arXiv.2006.14781

Zirenko, M., Kornilova, T., Qiuqi, Z., & Izmailova, A. (2021). Personality regulation of decisions on physical distancing: Cross-cultural comparison (Russia, Azerbaijan, China). *Personality and Individual Differences, 170*, Article 110418. https://doi.org/10.1016/j.paid.2020.110418