







# Structure of Dark Triad Dirty Dozen Across Eight World Regions

Assessment  
2021, Vol. 28(4) 1125–1135  
© The Author(s) 2020  
Article reuse guidelines:  
sagepub.com/journals-permissions  
DOI: 10.1177/1073191120922611  
journals.sagepub.com/home/asm



Radosław Rogoza<sup>1</sup> , Magdalena Żemojtel-Piotrowska<sup>1</sup> ,  
Peter K. Jonason<sup>1,2,3</sup>, Jarosław Piotrowski<sup>1</sup>, Keith W. Campbell<sup>4</sup>,  
Jochen E. Gebauer<sup>5,6</sup>, John Maltby<sup>7</sup> , Constantine Sedikides<sup>8</sup>, Mladen Adamovic<sup>9</sup>,  
Byron G. Adams<sup>10</sup>, Rebecca P. Ang<sup>11</sup>, Rahkman Ardi<sup>12</sup>, Kokou A. Atitsogbe<sup>13</sup>,  
Sergiu Baltatescu<sup>14</sup>, Snežana Bilić<sup>15</sup>, Bojana Bodroža<sup>16</sup>, Joel Gruneau Brulin<sup>17</sup>,  
Harshalini Yashita Bundhoo Poonosamy<sup>18</sup>,  
Trawin Chaleeraktragoon<sup>19</sup> , Alejandra Del Carmen Dominguez<sup>20</sup>,  
Sonya Dragova-Koleva<sup>21</sup>, Sofián El-Astal<sup>22</sup>, Walaa Labib M. Eldesoki<sup>23</sup>,  
Valdiney V. Gouveia<sup>24</sup>, Katherine Gundolf<sup>25</sup>, Dzintra Ilisko<sup>26</sup>, Tomislav Jukić<sup>27</sup>,  
Shanmukh V. Kamble<sup>28</sup>, Narine Khachatryan<sup>29</sup>, Martina Klicperova-Baker<sup>30</sup>,  
Monika Kovacs<sup>31</sup>, Inna Kozytska<sup>32</sup>, Aitor Larzabal Fernandez<sup>33</sup> ,  
Konrad Lehmann<sup>34</sup> , Xuejun Lei<sup>35</sup>, Kadi Liik<sup>36</sup>, Jessica McCain<sup>4</sup>,  
Taciano L. Milfont<sup>37</sup>, Andreas Nehrlich<sup>4</sup>, Evgeny Osin<sup>38</sup>, Emrah Özsoy<sup>39</sup>,  
Joonha Park<sup>40</sup>, Jano Ramos-Diaz<sup>41</sup>, Ognjen Riđić<sup>42</sup>, Abdul Qadir<sup>43</sup>, Adil Samekin<sup>44</sup>,  
Habib Tiliouine<sup>45</sup>, Robert Tomsik<sup>46</sup>, Charles S. Umeh<sup>47</sup>, Kees van den Bos<sup>48</sup>,  
Alain Van Hiel<sup>49</sup>, Christin-Melanie Vauclair<sup>50</sup>, and Anna Włodarczyk<sup>51</sup>

## Abstract

The Dark Triad (i.e., narcissism, psychopathy, Machiavellianism) has garnered intense attention over the past 15 years. We examined the structure of these traits' measure—the Dark Triad Dirty Dozen (DTDD)—in a sample of 11,488 participants from three W.E.I.R.D. (i.e., North America, Oceania, Western Europe) and five non-W.E.I.R.D. (i.e., Asia, Middle East, non-Western Europe, South America, sub-Saharan Africa) world regions. The results confirmed the measurement invariance of the DTDD across participants' sex in all world regions, with men scoring higher than women on all traits (except for psychopathy in Asia, where the difference was not significant). We found evidence for metric (and partial scalar) measurement invariance within and between W.E.I.R.D. and non-W.E.I.R.D. world regions. The results generally support the structure of the DTDD.

## Keywords

Narcissism, psychopathy, Machiavellianism, Dark Triad, culture, measurement

Interest in the Dark Triad traits has been growing for over 15 years (Furnham et al., 2013). The Dark Triad (Paulhus & Williams, 2002) comprises the three correlated traits of narcissism (i.e., entitlement and self-aggrandizement),<sup>1</sup> psychopathy (i.e., callous social attitudes and impulsivity), and Machiavellianism (i.e., manipulation and cynicism). These traits, especially psychopathy, are more prevalent in men than in women (Muris et al., 2017). Although a common theme in the Dark Triad is callousness and manipulation (Jones & Figueredo, 2013), distinct traits relate differently to various outcomes and behaviors, such as intelligence and cheating (Jones & Paulhus, 2017; Kowalski et al., 2018).

Narcissism is the most independent trait within the Dark Triad, as seen in its relatively weaker correlations with the

other two traits and in its somewhat different personality profile and downstream outcomes (Kowalski et al., 2019; Rogoza et al., 2019). In contrast, the correlation between Machiavellianism and psychopathy occasionally exceeds .80 (Berry & Feldman, 1985; Klimstra et al., 2014; Pineda et al., 2018). Regardless, the veracity and utility of treating the traits as three correlated factors model has come into question (Rogoza & Cieciuch, 2018). To address this potential multicollinearity problem, researchers studying samples that originated in different countries have adopted a bifactorial modeling approach, which is hypothesized to disentangle common (i.e., general factor) and specific (i.e., orthogonal group factor[s]) sources of variance (Czarna et al., 2016; Jonason & Luévano, 2013; Maneiro et al.,

2019). For example, in the context of Dark Triad, the general factor represents the common dark core, whereas group factors represents the traits of narcissism, psychopathy, and Machiavellianism (Moshagen et al., 2018).

Although bifactor modelling is a promising statistical method of evaluating structure, it has several limitations. Such a model may not accurately represent psychological

functioning as a general factor. That is, a general factor from the bifactor model does not imply a general causal structure (i.e., the Dark Triad is not caused by a single antecedent; Bonifay et al., 2017). Furthermore, a general factor extracts some of the group factors' variance, leaving them in the form of residualized estimates, which might pose substantial interpretational difficulties (Sleep et al., 2017).

<sup>1</sup>Cardinal Stefan Wyszyński University, Warsaw, Poland

<sup>2</sup>University of Padua, Padua, Italy

<sup>3</sup>Western Sydney University, Sydney, New South Wales, Australia

<sup>4</sup>University of Georgia, Athens, GA, USA

<sup>5</sup>University of Mannheim, Mannheim, Baden-Württemberg, Germany

<sup>6</sup>University of Copenhagen, Copenhagen, Denmark

<sup>7</sup>University of Leicester, Leicester, UK

<sup>8</sup>University of Southampton, Southampton, Hampshire, UK

<sup>9</sup>University of Melbourne, Melbourne, Victoria, Australia

<sup>10</sup>Tilburg University, Tilburg, the Netherlands, Ghent University, Ghent, Belgium, and University of Johannesburg, Johannesburg, South Africa

<sup>11</sup>National Institute of Education, Nanyang Technological University, Singapore

<sup>12</sup>Airlangga University, Surabaya, Jawa Timur, Indonesia

<sup>13</sup>University of Lausanne, Lausanne, Switzerland

<sup>14</sup>University of Oradea, Oradea, Romania

<sup>15</sup>International Balkan University, Skopje, North Macedonia

<sup>16</sup>University of Novi Sad, Novi Sad, Vojvodina, Serbia

<sup>17</sup>Stockholm University, Stockholm, Sweden

<sup>18</sup>University of Mauritius, Reduit, Moka, Mauritius

<sup>19</sup>Thammasat University, Pathumthani, Thailand

<sup>20</sup>Universidad Iberoamericana Ciudad de Mexico, Mexico, Mexico

<sup>21</sup>New Bulgarian University, Sofia, Bulgaria

<sup>22</sup>Al-Azhar University-Gaza, Gaza, Palestine

<sup>23</sup>Minoufiya University, Shebin El-Kom, Egypt

<sup>24</sup>Federal University of Paraíba, Joao Pessoa, Paraíba, Brazil

<sup>25</sup>Montpellier Business School, Montpellier, Occitanie, France

<sup>26</sup>Daugavpils University, Daugavpils, Latvia

<sup>27</sup>Josip Juraj Strossmayer University, Osijek, Republic of Croatia

<sup>28</sup>Karnatak University, Dharwad, Karnataka, India

<sup>29</sup>Yerevan State University, Yerevan, Armenia

<sup>30</sup>Czech Academy of Sciences, Praha, Czech Republic

<sup>31</sup>ELTE Eötvös Loránd University, Budapest, Hungary

<sup>32</sup>Taras Shevchenko National University of Kyiv, Kyiv, Ukraine

<sup>33</sup>Pontificia Universidad Católica del Ecuador, Ambato, Ecuador

<sup>34</sup>Technische Universität Dresden, Dresden, Sachsen, Germany

<sup>35</sup>Zhanjiang Normal University, Zhanjiang, Guangdong, China

<sup>36</sup>Tallinn University, Tallinn, Harjumaa, Estonia

<sup>37</sup>Victoria University of Wellington, Wellington, New Zealand

<sup>38</sup>National Research University Higher School of Economics, Moscow, Russia

<sup>39</sup>Sakarya University, Sakarya, Turkey

<sup>40</sup>NUCB Business School, Nagoya, Japan

<sup>41</sup>Universidad de Ciencias y Humanidades, Lima, Peru

<sup>42</sup>International University of Sarajevo (IUS), Sarajevo, Bosnia and Herzegovina (BiH)

<sup>43</sup>Independent researcher, Islamabad, Pakistan

<sup>44</sup>S. Toraihyrov Pavlodar State University, Pavlodar, Kazakhstan

<sup>45</sup>University of Oran, Oran, Algeria

<sup>46</sup>Research Institute for Child Psychology and Pathopsychology, Nitra, Slovakia

<sup>47</sup>University of Lagos, Lagos, Nigeria

<sup>48</sup>Utrecht University, Utrecht, Netherlands

<sup>49</sup>Ghent University, Gent, Belgium

<sup>50</sup>Instituto Universitário de Lisboa, (ISCTE-IUL), CIS-IUL, Lisboa, Portugal

<sup>51</sup>Universidad Católica del Norte, Antofagasta, Chile

#### Corresponding Author:

Radosław Rogoza, Institute of Psychology, Cardinal Stefan Wyszyński University, Wóycickiego 1/3 Street, Warsaw 01-938, Poland.

Email: r.rogaza@uksw.edu.pl

For example, what remains in narcissism, after the dark core variance is extracted? This is especially difficult in multigroup contexts, given that a general factor might capture different variance from one group to another, making group comparison meaningless.

Researchers, however, often use a bifactor modeling approach, as it usually results in a better fit to the data than traditional approaches (i.e., correlated factors models). This is so, because the general factor captures item “noise” or implausible response patterns (Reise et al., 2016). A situation where a bifactor model yields better fit, even with predetermined nonbifactor population-level structure (e.g., three correlated factors), is described as probifactor bias (Greene et al., 2019). In light of these arguments, applying a bifactor modelling approach to study the structure of the Dark Triad traits, although probably yielding better model fit, is not necessarily a good solution to solving the problems with the structure of the Dark Triad.

### *Measurement of the Dark Triad Traits*

As originally identified (Paulhus & Williams, 2002), the Dark Triad traits have been studied using three independent measures per construct (Vize et al., 2018). The traditional measures of individual differences in these constructs are the Narcissistic Personality Inventory (Raskin & Hall, 1979), the Self-Report of Psychopathy (Paulhus et al., 2016), and the MACH-IV (Christie & Geis, 1970) scales. Given that the application of these measures produces a pool of 124 items, two independent teams of researchers developed briefer scales to reduce participant fatigue and facilitate research in this area. These scales are the 27-item Short Dark Triad (SD3; Jones & Paulhus, 2014) and the 12-item Dark Triad Dirty Dozen (DTDD; Jonason & Webster, 2010).

The structure of the SD3 was hypothesized to comprise three correlated factors, but it seldom yields satisfactory results (Arseneault & Catano, 2019; Atari & Chegeni, 2016; Gamache et al., 2018; Onyedire et al., 2019; Persson et al., 2019; Rogoza & Ciecuch, 2019). In contrast, the factorial structure of DTDD is usually confirmed (Dinić et al., 2018; Klimstra et al., 2014; Küfner et al., 2014; Maneiro et al., 2019; Özsoy et al., 2017). There are other differences between these measures. Most importantly, the validity of the DTDD, presumably as a result of its brevity, is questionable (Rauthmann & Kolar, 2012). Its psychopathy subscale does not sufficiently assess psychopathy-related variance related to interpersonal antagonism and disinhibition (Miller et al., 2012). Moreover, the DTDD has substantial variance in item difficulty (Carter et al., 2015; Kajonius et al., 2016). Finally, the SD3 retains a nomological network more similar to the parent measures (i.e., Narcissistic Personality Inventory, MACH-IV, Self-Report Psychopathy Scale; Jones & Paulhus, 2014; Maples et al., 2014; Miller et al., 2017) than the DTDD.

Despite the aforementioned controversies with using the DTDD, especially in comparison with the parent scales, we decided to use the DTDD in the current study for three reasons. First, given the length of our complete set of measures (see OSF project site for methodology codebook), we considered it sensible to reduce participant fatigue where possible. Second, the structure of the DTDD appears to be more stable across different languages and cultural contexts, which is crucial in the testing of invariance. Finally, the DTDD remains popular for researchers because of its brevity, providing a reasonable tradeoff between efficiency and accuracy (Jonason & Luévano, 2013). Nevertheless, the validity of the DTDD may be compromised in comparison to the SD3, and thus our results should be interpreted with caution.

### *The Structure of the Dark Triad Dirty Dozen Across Cultures*

Although most people are not from W.E.I.R.D. (Western, Educated, Industrialized, Rich, Democratic) backgrounds, most behavioral sciences studies rely on W.E.I.R.D. samples (Henrich et al., 2010a, 2010b), and so does research on the DTDD, which was originally developed as a measure of three correlated factors and validated in a North American sample (Jonason & Webster, 2010). Follow-up work on W.E.I.R.D. samples found support for the three correlated factors measurement model (Klimstra et al., 2014; Küfner et al., 2014; Maneiro et al., 2019; Pineda et al., 2018; Savard et al., 2017). Some of this work (Maneiro et al., 2019; Savard et al., 2017) compared the three correlated factors model and a bifactor model. Although the three correlated factors model fit the data well, the bifactor model fit them even better. These findings led to the conclusion that the bifactor model represents the structure of DTDD best. However, in light of problems with the bifactor model noted above (e.g., probifactor bias; Greene et al., 2019), such a conclusion is questionable.

Moreover, only a few, generally underpowered, studies have examined the structural properties of the DTDD in non-W.E.I.R.D. samples. However, the results regarding the measurement model were similar to those of W.E.I.R.D. samples. That is, in Asia, the Middle East, non-Western Europe, and South America, the three correlated factors model fit the data well (Dinić et al., 2018; Gouveia et al., 2016; Özsoy et al., 2017; Tamura et al., 2015). Moreover, the probifactor bias was also observed in some studies examining DTDD, providing a better fit to data of the bifactor model than a three correlated factors model; in other studies, the bifactor model was considered as the best model without comparison with the three correlated factors model (Czarna et al., 2016; Gouveia et al., 2016; Tamura et al., 2015).

In an attempt to validate the DTDD structure across cultures, one needs not only to compare results from different studies but also, and, perhaps, more importantly, to assess measurement invariance (Meredith, 1993). There are three models of measurement invariance, representing progressively more stringent assumptions: (a) configural invariance (i.e., whether the same latent constructs are loaded by the same items across compared groups), (b) metric invariance (i.e., where factor loadings are equal across compared groups), and (c) scalar invariance (i.e., where, in addition to factor loadings, item intercepts are equal across compared groups). Establishing configural invariance confirms whether the compared structure is essentially the same, reaching metric invariance allows for comparing covariances and unstandardized regression coefficients, and establishing scalar invariance permits meaningful comparisons of latent means (Cieciuch et al., 2018; Davidov et al., 2014; Milfont & Fischer, 2010). We conducted a test of measurement invariance of the DTDD in 13 samples originating from three W.E.I.R.D. world regions (i.e., North America, Oceania, Western Europe) and 36 samples from non-W.E.I.R.D. world regions (i.e., Asia, Middle East, non-Western Europe, South America, sub-Saharan Africa).

## Overview

We aimed to test the structure and measurement invariance of the DTDD across cultures in eight world regions (i.e., Asia, Middle East, non-Western Europe, North America, Oceania, South America, sub-Saharan Africa, and Western Europe). We hypothesized that the three correlated factors model would represent adequate fit to the data (Hypothesis 1). We hypothesized this structure to be invariant across men and women, with the latter scoring higher on all Dark Triad traits (particularly psychopathy; Hypothesis 2). We also hypothesized for this structure to be invariant across W.E.I.R.D. and non-W.E.I.R.D. world regions (Hypothesis 3).

To test Hypothesis 1, we evaluated the independent cluster model of confirmatory factor analysis (ICM-CFA), and, to test Hypotheses 2 and 3, we evaluated the multigroup confirmatory analysis (MGCFA). In the testing of the ICM-CFA, we relied on standard recommendations. That is, the comparative fit index (CFI) should be  $\geq .90$ , and the root mean square error of approximation (RMSEA) should be  $\leq .08$  (Byrne, 1994). To find out if the tested model is invariant, we compared the differences in approximate fit statistics between subsequent models (e.g., between configural and metric or between metric and scalar), whose values should not exceed .015 in RMSEA and .01 in CFI (Chen, 2007). We carried out all the structural analyses using robust maximum likelihood estimation in *Mplus v. 7.2* (Muthén & Muthén, 2012). We made all the used scripts and data available at the OSF project site: <https://osf.io/8nsc3>.

## Method

### Participants and Procedure

We report how we determined our sample size, all data exclusions, all manipulations, and all measures. We collected the data ( $N = 11,723$ ) between April 2016 and October 2017 as part of the “Cross-Cultural Self-Enhancement Project,” which brought together over 70 academics from 56 countries. In each country, researchers set out to recruit at least 150 participants, based on a priori power analyses using the average effect in personality–social psychology over the past 100 years (i.e.,  $r \approx .20$ ; Richard et al., 2003), but ideally to recruit 250 participants so as to reduce estimation error in personality research (Schönbrodt & Perugini, 2013). In a minority of samples from the larger project (i.e., Hong Kong, Spain, Uganda, Uruguay), we failed to gather the minimal number of participants and consequently we excluded these samples from analyses. Participants from two countries (i.e., Philippines and Vietnam) did not complete the DTDD, and so we excluded their data from analyses. Finally, we excluded the Iranian sample due to serious violations of data quality that we were unable to resolve. Although some sites fell short of the ideal of 250 participants, we considered the inclusion of the full range of data important, because of the novelty of this project and the difficulty of obtaining (good) data from some of the regions to which we had access.

In all, we analyzed data from 49 countries (Table 1). The sample consisted of moderately affluent ( $M = 4.47$ ,  $SD = 1.10$ ; scale range: 1 = *much lower than average*, 7 = *much higher than average*) university students ( $M = 21.53$  years,  $SD = 3.17$  years), with 66% women, and 39% taking the study in a paper-and-pencil form and 18% in English (as native-tongue or official language of instruction). We followed informed consent and debriefing procedures in each country. The full list of the used measures is available at the OSF project site. The project was reviewed and approved by the ethical committee of the home institution of the second author (UG1/2016), and reciprocal approval was secured at the remaining locations.

### Measure

We assessed the Dark Triad traits using the Dirty Dozen measure (Jonason & Webster, 2010). We translated the measure (when relevant) by following the procedure recommended by International Test Commission guidelines for translating and adapting tests in cross-cultural research (Brislin, 1986; Hambleton, 2005). In particular, we translated the 12 items into each language with the help of two native speakers, and back translated the items with the help of a third one. We discussed the back-translated version with the author of the scale (Peter Jonason), and, in case of

**Table 1.** Sample and Procedure in 49 Countries.

Region	Country	<i>n</i>	Female%	<i>M</i> <sub>age</sub> ( <i>SD</i> )	Language	Procedure
<i>W.E.I.R.D.</i>						
North America	Canada	316	70.30	20.29 (4.02)	English	Online
	Mexico	168	53.00	22.00 (3.33)	Spanish	Paper-pencil
	USA	212	58.00	19.33 (1.44)	English	Online
Oceania	Australia	290	63.80	24.25 (5.18)	English	Online
	New Zealand	207	70.00	18.94 (2.34)	English	Online
Western Europe	Austria	269	77.70	24.35 (6.60)	German	Online
	Belgium	222	82.90	18.93 (3.23)	Flemish	Online
	France	202	45.50	22.56 (1.56)	French	Online
	Germany	221	83.70	21.53 (3.33)	German	Online
	Netherlands	255	79.20	19.39 (2.27)	Dutch	Paper-pencil
	Portugal	197	67.50	20.01 (2.92)	Portuguese	Online
	Sweden	211	72.50	22.80 (4.37)	Swedish	Online
	UK	185	69.70	19.57 (1.74)	English	Online
<i>Non-W.E.I.R.D.</i>						
Asia	Armenia	259	56.80	19.23 (1.32)	Armenian	Paper-pencil
	China	557	82.00	21.86 (1.14)	Chinese	Online
	India	214	58.90	22.69 (1.45)	English	Paper-pencil
	Indonesia	232	69.80	21.34 (2.22)	Indonesian	Online
	Japan	282	33.30	19.65 (1.44)	Japanese	Paper-pencil
	Kazakhstan	229	62.00	20.08 (2.22)	Russian	Online
	Korea South	199	61.30	22.26 (1.82)	Korean	Paper-pencil
	Singapore	219	65.80	22.26 (2.58)	English	Online
	Thailand	177	76.80	19.61 (1.37)	Thai	Online
Middle East	Algeria	210	65.70	20.02 (1.73)	Arabic	Paper-pencil
	Egypt	214	62.10	21.34 (2.35)	Arabic	Paper-pencil
	Pakistan	200	45.50	22.54 (2.81)	English	Paper-pencil
	Palestine	218	67.40	20.52 (1.82)	Arabic	Paper-pencil
	Turkey	200	62.50	20.93 (2.43)	Turkish	Paper-pencil
Non-Western Europe	Bosnia	226	73.00	25.72 (5.35)	Bosnian	Online
	Bulgaria	200	68.00	22.85 (5.37)	Bulgarian	Paper-pencil
	Croatia	200	61.50	23.13 (3.83)	Croatian	Online
	Czech Republic	231	66.20	22.96 (3.29)	Czech	Paper-pencil
	Estonia	357	75.40	24.44 (6.38)	Eesti	Online
	Hungary	152	79.60	22.83 (5.16)	Hungarian	Online
	Latvia	238	70.60	27.74 (7.92)	Russian	Online
	North Macedonia	203	51.70	23.10 (2.94)	Macedonian	Online
	Poland	341	78.30	20.56 (2.10)	Polish	Online
	Romania	218	65.60	20.66 (2.11)	Romanian	Paper-pencil
	Russia	198	84.80	20.30 (4.58)	Russian	Online
	Serbia	326	72.10	20.88 (1.75)	Serbian	Online
	Slovakia	202	74.80	21.66 (2.04)	Slovak	Paper-pencil
Ukraine	202	70.80	20.30 (3.86)	Russian	Online	
South America	Brazil	246	61.40	22.37 (6.32)	Portuguese	Paper-pencil
	Chile	318	57.20	19.96 (3.80)	Spanish	Online
	Ecuador	240	66.30	22.89 (4.79)	Spanish	Online
	Peru	208	76.00	21.43 (4.73)	Spanish	Online
Sub-Saharan Africa	Mauritius	178	75.30	20.38 (1.41)	French	Paper-pencil
	Nigeria	200	50.00	21.52 (3.33)	English	Paper-pencil
	South Africa	217	72.80	20.49 (2.16)	English	Paper-pencil
	Togo	222	41.40	20.56 (2.84)	French	Paper-pencil



**Table 2.** Model Fit Indices of the Three-Correlated Dark Triad Dirty Dozen Measurement Model in Eight World Regions.

	$\chi^2_{(df)}$	CFI	RMSEA	Scale intercorrelations		
				M-N	M-P	N-P
<i>W.E.I.R.D. regions</i>						
North America	184.31 <sub>(49)</sub>	.929	.076	.60(.70)	.53(.71)	.40(.47)
Oceania	187.27 <sub>(50)</sub>	.935	.074	.57(.67)	.61(.80)	.42(.44)
Western Europe	545.87 <sub>(50)</sub>	.921	.075	.52(.60)	.55(.73)	.38(.42)
<i>Non-W.E.I.R.D. regions</i>						
Asia	630.23 <sub>(50)</sub>	.923	.067	.42(.50)	.54(.72)	.30(.39)
Middle East	258.55 <sub>(51)</sub>	.947	.062	.42(.47)	.66(.83)	.36(.42)
Non-western Europe	1130.84 <sub>(51)</sub>	.921	.080	.53(.60)	.56(.68)	.43(.49)
South America	312.44 <sub>(51)</sub>	.933	.071	.58(.65)	.64(.80)	.45(.53)
Sub-Saharan Africa	266.27 <sub>(51)</sub>	.927	.072	.40(.45)	.52(.62)	.38(.43)

Note. Standardized correlations between latent factors are presented in brackets. *df* = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square error of approximation; M = Machiavellianism; P = Psychopathy; N = Narcissism. All correlations were significant ( $p < .001$ ).

comments or suggestions, a translator adjusted the scale until a final version was reached. We asked participants how much they agreed (1 = *not at all*, 7 = *very much*) with statements such as “I tend to want others to admire me” (i.e., narcissism), “I tend to lack remorse” (i.e., psychopathy), and “I have used deceit or lied to get my way” (i.e., Machiavellianism).

## Results

### *The Dark Triad Dirty Dozen Structure (Hypothesis 1)*

We present in Table 2 the model fit indices estimated through the ICM-CFA and intercorrelations between the Dark Triad traits in each world region separately. Results generally supported the hypothesized structure.<sup>2</sup> Nevertheless, to reach acceptable fit indices in all W.E.I.R.D. regions and in Asia, we entered correlations one at a time between residuals until the model fitted the data well. In Oceania and Western Europe, we added a correlation between two Machiavellianism items (i.e., 2 and 3). In Asia, we added a correlation between two psychopathy items (i.e., 9 and 10). In North America, we added correlations for the two pairs of items reported above (i.e., 2 and 3, 9 and 10). Hypothesis 1 was mostly confirmed around the world.

### *Measurement Invariance Across the Sexes (Hypothesis 2)*

We present in Table 3 the results of the MGCFA across men and women in each of the analyzed regions. We maintained the correlations between residuals identified in the assessment of the basic model. In all the analyzed world regions, we found support for full scalar invariance in men and

women. We present the comparisons of latent means in Table 4. Men scored significantly higher than women on all three traits in all world regions. The only exception was for the psychopathy difference in Asia, which was not significant. Hypothesis 2 was generally confirmed.

### *Measurement Invariance Across W.E.I.R.D. and Non-W.E.I.R.D. World Regions (Hypothesis 3)*

We present the results of the MGCFA across W.E.I.R.D. and non-W.E.I.R.D. samples in Table 5.<sup>3</sup> Overall, we found metric but not scalar invariance. To identify which parameters were noninvariant in the scalar model, we scrutinized modification indices and freed one intercept at a time. In W.E.I.R.D. regions, we freed the following intercepts: one in North America (i.e., psychopathy: Item 12), two in Oceania (i.e., narcissism: Item 5, psychopathy: Item 12), and four in Western Europe (i.e., Machiavellianism: Item 1, narcissism: Item 4, psychopathy: Items 10 and 12). In non-W.E.I.R.D. regions, we freed the following intercepts: two in Asia (i.e., Machiavellianism: Item 3, narcissism: Item 7), three in Middle East (i.e., narcissism: Items 5 and 8, psychopathy: Item 12), three in non-Western Europe (i.e., narcissism: Item 8, psychopathy: Items 9 and 12), and three in South America (i.e., narcissism: Items 7 and 8, psychopathy: Item 9). The results supported our hypothesis to a limited extent, especially in the context of the equivalence of narcissism and psychopathy.

## Discussion

The dark side of personality has attracted interest from researchers and laypersons alike (Zeigler-Hill & Marcus, 2016). Yet the existing studies have relied on Western samples, and evidence from non-W.E.I.R.D. countries has been

**Table 3.** Model Fit Indices of the Multigroup Confirmatory Factor Analyses Across the Sexes in Eight World Regions.

Region	Model	$\chi^2_{(df)}$	CFI	RMSEA
<i>W.E.I.R.D.</i>				
North America ( <i>n</i> = 470)	Configural	240.68 <sup>(98)</sup>	.925	.079
	Metric	251.74 <sup>(107)</sup>	.924	.076
	Scalar	273.69 <sup>(116)</sup>	.917	.076
	Configural vs. metric	11.06 <sup>(9)</sup>	.001	.003
	Metric vs. scalar	21.95 <sup>(9)</sup>	.007	.000
Oceania ( <i>n</i> = 496)	Configural	246.80 <sup>(100)</sup>	.933	.077
	Metric	261.61 <sup>(109)</sup>	.930	.075
	Scalar	281.80 <sup>(118)</sup>	.925	.075
	Configural vs. metric	14.81 <sup>(9)</sup>	.003	.002
	Metric vs. scalar	20.19 <sup>(9)</sup>	.005	.000
Western Europe ( <i>n</i> = 1,761)	Configural	590.41 <sup>(100)</sup>	.920	.075
	Metric	622.94 <sup>(109)</sup>	.916	.073
	Scalar	688.97 <sup>(118)</sup>	.907	.074
	Configural vs. metric	32.53 <sup>(9)</sup>	.004	.002
	Metric vs. scalar	66.03 <sup>(9)</sup>	.009	.001
<i>Non-W.E.I.R.D.</i>				
Asia ( <i>n</i> = 2,560)	Configural	674.88 <sup>(100)</sup>	.923	.067
	Metric	697.63 <sup>(109)</sup>	.921	.065
	Scalar	775.71 <sup>(118)</sup>	.912	.066
	Configural vs. metric	22.75 <sup>(9)</sup>	.002	.002
	Metric vs. scalar	78.08 <sup>(9)</sup>	.009	.001
Middle East ( <i>n</i> = 1,029)	Configural	296.82 <sup>(102)</sup>	.947	.061
	Metric	318.08 <sup>(111)</sup>	.944	.060
	Scalar	335.79 <sup>(120)</sup>	.942	.059
	Configural vs. metric	21.26 <sup>(9)</sup>	.003	.001
	Metric vs. scalar	17.71 <sup>(9)</sup>	.002	.001
Non-Western Europe ( <i>n</i> = 3,291)	Configural	1162.37 <sup>(102)</sup>	.919	.079
	Metric	1202.73 <sup>(111)</sup>	.917	.077
	Scalar	1266.19 <sup>(120)</sup>	.913	.076
	Configural vs. metric	40.36 <sup>(9)</sup>	.008	.002
	Metric vs. scalar	63.46 <sup>(9)</sup>	.004	.001
South America ( <i>n</i> = 981)	Configural	360.81 <sup>(102)</sup>	.930	.072
	Metric	381.20 <sup>(111)</sup>	.927	.070
	Scalar	407.43 <sup>(120)</sup>	.923	.070
	Configural vs. metric	20.39 <sup>(9)</sup>	.003	.002
	Metric vs. scalar	26.23 <sup>(9)</sup>	.004	.000
Sub-Saharan Africa ( <i>n</i> = 802)	Configural	309.08 <sup>(102)</sup>	.928	.071
	Metric	317.29 <sup>(111)</sup>	.929	.068
	Scalar	337.15 <sup>(120)</sup>	.925	.067
	Configural vs. metric	8.21 <sup>(9)</sup>	.001	.003
	Metric vs. scalar	19.86 <sup>(9)</sup>	.004	.001

Note. *df* = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square error of approximation.

equivocal and mostly underpowered (Gouveia et al., 2016; Özsoy et al., 2017; Tamura et al., 2015). To advance our understanding of the structural properties of the DTDD, we examined the DTDD across the eight world regions of Asia, Middle East, non-Western Europe, North America, Oceania, South America, sub-Saharan Africa, and Western Europe.

Our results provided support for the three correlated factors model of the Dark Triad traits in all the analyzed samples. Although the bifactor model yielded better fit in some

countries, in others it produced problems with model convergence. This illustrates that, alongside with the better model fit provided by the probifactor bias (Greene et al., 2019), the bifactor modeling approach can be problematic (Bonifay et al., 2017). Therefore, we encourage researchers to be more circumspect with the application of this statistical procedure, as it might yield only superficial improvements in approximate fit indices without necessarily aiding in the theoretical understanding of the construct in question.

**Table 4.** Latent Means Comparison Across the Sexes.

Region	Machiavellianism	Narcissism	Psychopathy
<i>W.E.I.R.D.</i>			
North America	-.69**	-.58**	-.74**
Oceania	-.42**	-.47**	-.41**
Western Europe	-.66**	-.62**	-.49**
<i>Non-W.E.I.R.D.</i>			
Asia	-.36**	-.43**	-.04
Middle East	-.56**	-.40**	-.25*
Non-Western Europe	-.56**	-.71**	-.33**
South America	-.47**	-.46**	-.59**
Sub-Saharan Africa	-.35**	-.28**	-.36**

Note. The latent means of men were fixed at 0.

\* $p < .05$ . \*\* $p < .01$ .

**Table 5.** Model Fit Indices of the Multigroup Confirmatory Factor Analyses Across W.E.I.R.D. and Non-W.E.I.R.D. World Regions ( $N = 11,488$ ).

Model	$\chi^2$ (df)	CFI	RMSEA
Configural	2551.86 <sub>(392)</sub>	.948	.062
Metric	2920.21 <sub>(455)</sub>	.941	.061
Scalar	5113.01 <sub>(518)</sub>	.889	.079
Partial scalar	3378.31 <sub>(500)</sub>	.931	.063
Configural vs. metric	520.65 <sub>(63)</sub>	.007	.001
Metric vs. scalar	2192.80 <sub>(63)</sub>	.052	.018
Metric vs. partial scalar	458.10 <sub>(45)</sub>	.010	.002

Note. We also assessed multigroup confirmatory analysis for W.E.I.R.D. and non-W.E.I.R.D. samples independently, also finding only metric invariance. We also assessed the measurement invariance in non-W.E.I.R.D. regions excluding non-Western European countries, however, the results did not change.  $df$  = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square error of approximation.

Additionally, the results were consistent with existing meta-analyses examining sex differences of Dark Triad traits (Muris et al., 2017). Men scored higher than women on all Dark Triad traits. However, in Asia, primarily Japan and Korea, we observed no statistically significant differences in psychopathy for men and women, which is consistent with previous findings (Jonason et al., 2017). An explanation lies in the nature of psychopathy, as the most socially aversive trait (Eisenbarth et al., 2018; Paulhus & Williams, 2002). Japan and Korea are face-saving cultures (Kim & Nam, 1998; Sedikides et al., 2015). As such, there may be strong normative pressure to refrain from manifesting (and admitting to having) such traits, which could harm other people; the potency of this normative pressure might stifle sex differences.

The three correlated factor structure of the DTDD was invariant at the metric level in W.E.I.R.D. and non-W.E.I.R.D. world regions. As such, researchers could compare covariances and unstandardized beta weights of the latent DTDD factors. Relevant studies found limited evidence on the DTDD factorial structure in non-W.E.I.R.D. countries

(Dinić et al., 2018; Gouveia et al., 2016; Özsoy et al., 2017; Tamura et al., 2015), but these studies neglected several world regions and were generally underpowered. After the removal of some model constraints, mostly associated with narcissism and psychopathy, we reached partial scalar invariance. These results are not surprising, given that the DTDD has been criticized for its limited measurement of these two traits (Kajonius et al., 2016; Maples et al., 2014; Miller et al., 2017). Reaching metric invariance allows testing for validity of the DTDD across world regions, although better (i.e., more valid) measures may exist (Jones & Paulhus, 2014; Miller et al., 2017)—problems with their internal structure notwithstanding.

Despite the multinational sample and the large number of participants, our study has several limitations. To begin, there are likely sampling biases present given our reliance on convenience samples of university students. Also, we did not consider validity tests in this article, except for testing invariance across sexes and region, which would further help us differentiate the optimal model. Finally, in some countries we did not use the national translations but the English versions, which potentially might (in India) or might not (in Nigeria) influence the obtained results depending on participants' linguistic skills. Nevertheless, we have provided evidence for the factor structure of the DTDD. This structure was invariant across the sexes and partially invariant across world regions. Although we advocate caution in the interpretation of the results and the judicious use of this scale, we hope the findings promote cross-cultural research on the Dark Triad traits.

### Author's Note

Taciano L. Milfont is now affiliated with The University of Waikato.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.



## Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: We thank Jeremy Frimer for providing data for Canada. The work of Radosław Rogoza, Magdalena Żemajtł-Piotrowska, and Jarosław Piotrowski was supported by grant number 2016/21/B/HS6/01069 financed by Polish National Science Centre. The work by Peter Jonason was partially funded by the Polish National Agency for Academic Exchange (PPN/ULM/2019/1/00019/U/00001). The contribution of Kokou A. Atitsogbe was supported by a Swiss Government Excellence PhD Scholarship no. 2015.0639/Togo/OP. The work of Valdiney V. Gouveia was supported by National Council of Technological and Scientific Development, Brazil. The work of Joel Gruneau Brulin was supported by Grant 51897 awarded by John Templeton Foundation. The work of Martina Klicperova-Baker was supported by a research grant by the Grant Agency of the Czech Republic #15-11062S and by the Czech Academy of Sciences (RVO 68081740). The work of Evgeny Osin was supported by Russian Academic Excellence Project 5-100.

## ORCID iDs

Radosław Rogoza  <https://orcid.org/0000-0002-4983-9320>

Magdalena Żemajtł-Piotrowska  <https://orcid.org/0000-0002-8017-8014>

John Maltby  <https://orcid.org/0000-0002-0621-9359>

Trawin Chaleeraktragoon  <https://orcid.org/0000-0001-7164-9307>

Aitor Larzabal Fernandez  <https://orcid.org/0000-0001-6756-5768>

Konrad Lehmann  <https://orcid.org/0000-0002-9375-2222>

## Notes

1. Narcissism in the Dark Triad typically refers to the grandiose form of this trait (Rogoza et al., 2018; Sedikides & Campbell, 2017).
2. We also tested the ICM-CFA for each country separately. Furthermore, we tested the ICM-CFA for three additional models: unidimensional, bidimensional with psychopathy and Machiavellianism merged as one factor, and bifactor model. The bifactor model fitted better the data in some countries, but it yielded lack of convergence in other countries. It is likely that this model reflects probifactor model bias. Results of these additional analyses are available at the OSF project site.
3. Because of the limitations of the DTDD described in the Introduction, we decided not to interpret latent mean differences across world regions. We uploaded these results on the OSF project page.

## References

- Arseneault, R., & Catano, V. (2019). An extension of the Dark Triad and five factor model to three Asian societies. *Asian Journal of Social Psychology, 22*(4), 358-368. <https://doi.org/10.1111/ajsp.12378>
- Atari, M., & Chegeni, R. (2016). Assessment of dark personalities in Iran: Psychometric evaluation of the Farsi translation of the Short Dark Triad (SD3-F). *Personality and Individual Differences, 102*(November), 111-117. <https://doi.org/10.1016/j.paid.2016.06.070>
- Berry, W. D., & Feldman, S. (1985). *Multiple regression in practice*. Sage.
- Bonifay, W., Lane, S. P., & Reise, S. P. (2017). Three concerns with applying a bifactor model as a structure of psychopathology. *Clinical Psychological Science, 5*(1), 184-186. <https://doi.org/10.1177/2167702616657069>
- Byrne, B. M. (1994). *Structural equation modeling with EQS and EQS/Windows*. Sage.
- Carter, G. L., Campbell, A. C., Muncer, S., & Carter, K. A. (2015). A Mokken analysis of the Dark Triad "Dirty Dozen": Sex and age differences in scale structures, and issues with individual items. *Personality and Individual Differences, 83*(September), 185-191. <https://doi.org/10.1016/j.paid.2015.04.012>
- Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling, 14*(3), 464-504. <https://doi.org/10.1080/10705510701301834>
- Christie, R., & Geis, F. L. (1970). *Studies in Machiavellianism*. Academic Press.
- Cieciuch, J., Davidov, E., & Schmidt, P. (2018). Alignment optimization: Estimation of the most trustworthy means in cross-cultural studies even in the presence of noninvariance. In E. Davidov, P. Schmidt, P. J. Billiet, & B. Meuleman (Eds.), *Cross-cultural analysis: Methods and applications* (2nd ed., pp. 571-592). Routledge.
- Czarna, A. Z., Jonason, P. K., Dufner, M., & Kossowska, M. (2016). The Dirty Dozen scale: Validation of a Polish version and extension of the nomological net. *Frontiers in Psychology, 7*, Article 445. <https://doi.org/10.3389/fpsyg.2016.00445>
- Davidov, E., Meuleman, B., Cieciuch, J., Schmidt, P., & Billiet, J. (2014). Measurement equivalence in cross-national research. *Annual Review of Sociology, 40*, 55-75. <https://doi.org/10.1146/annurev-soc-071913-043137>
- 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*(November), 321-328. <https://doi.org/10.1016/j.paid.2018.06.018>
- Eisenbarth, H., Hart, C. M., & Sedikides, C. (2018). Do psychopathic traits predict professional success? *Journal of Economic Psychology, 64*(February), 130-139. <https://doi.org/10.1016/j.joep.2018.01.002>
- Furnham, A., Richards, S. C., & Paulhus, D. L. (2013). The Dark Triad of personality: A 10-year review. *Social and Personality Compass, 7*(3), 199-216. <https://doi.org/10.1111/spc3.12018>
- 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*(February), 164-170. <https://doi.org/10.1016/j.paid.2017.10.027>
- Gouveia, V. V., Monteiro, R., Gouveia, R. S., Athayde, R. A., & Cavalcanti, T. (2016). Avaliando o lado sombrio da personalidade: Evidências psicométricas do Dark Triad Dirty Dozen [Endorsing or sombrio side of personality: Psychometric evidence do Dark Triad Dirty Dozen]. *Interamerican Journal of Psychology, 50*(3), 420-432. <https://www.redalyc.org/articulo.oa?id=28450492010>

- Greene, A. L., Eaton, N. R., Li, K., Forbes, M. K., Krueger, R. F., Markon, K. E., Waldman, I. D., Cicero, D. C., Conway, C. C., Docherty, A. R., Fried, E. I., Ivanova, M. Y., Jonas, K. G., Latzman, R. D., Patrick, C. J., Reininghaus, U., Tackett, J. L., Wright, A. G. C., & Kotov, R. (2019). Are fit indices used to test psychopathology structure biased? A simulation study. *Journal of Abnormal Psychology, 128*(7), 740-764. <https://doi.org/10.1037/abn0000434>
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010a). Most people are not WEIRD. *Nature, 466*, Article 29. <https://doi.org/10.1038/466029a>
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010b). The weirdest people in the world? *Behavioral and Brain Sciences, 33*(2-3), 61-83. <https://doi.org/10.1017/S0140525X0999152X>
- Jonason, P. K., Foster, J. D., Oshio, A., Sitnikova, M., Birkas, B., & Gouveia, V. V. (2017). Self-construals and the Dark Triad traits in six countries. *Personality and Individual Differences, 113*(July), 120-124. <https://doi.org/10.1016/j.paid.2017.02.053>
- Jonason, P. K., & Luévano, V. X. (2013). Walking the thin line between efficiency and accuracy: Validity and structure 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., & 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>
- Jones, D. N., & Figuerdo, A. J. (2013). The core of darkness: Uncovering the heart of the Dark Triad. *European Journal of Personality, 27*, 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, D. N., & Paulhus, D. L. (2017). Duplicity among the Dark Triad: Three faces of deceit. *Journal of Personality and Social Psychology, 113*(2), 329-342. <https://doi.org/10.1037/pspp0000139>
- Kajonius, P. J., Persson, B. N., Rosenberg, P., & Garcia, D. (2016). The (mis)measurement of the Dark Triad Dirty Dozen: Exploitation at the core of the scale. *PeerJ, 4*, Article 1748. <https://doi.org/10.7717/peerj.1748>
- Kim, J., & Nam, S. (1998). The concept and dynamics of face: Implications for organizational behavior in Asia. *Organization Science, 9*(4), 522-534. <https://doi.org/10.1287/orsc.9.4.522>
- Klimstra, T. A., Sijtsma, J. J., Henrichs, J., & Cima, M. (2014). The Dark Triad of personality in adolescence: Psychometric properties of a concise measure and associations with adolescent adjustment from a multi-informant perspective. *Journal of Research in Personality, 53*(December), 84-92. <https://doi.org/10.1016/j.jrp.2014.09.001>
- Kowalski, C. M., Kwiatkowska, K., Kwiatkowska, M. M., Ponikiewska, K., Rogoza, R., & Schermer, J. A. (2018). The Dark Triad traits and intelligence: Machiavellians are bright, and narcissists and psychopaths are ordinary. *Personality and Individual Differences, 135*(December), 1-6. <https://doi.org/10.1016/j.paid.2018.06.049>
- Kowalski, C. M., Vernon, P. A., & Schermer, J. A. (2019). The Dark Triad and facets of personality. *Current Psychology, 1-12*. <https://doi.org/10.1007/s12144-019-00518-0>
- Küfner, C. P., Dufner, M., & Back, M. D. (2014). Das Dreieckige Dutzend und die Niederträchtigen Neun-Kurzskalen zur Erfassung von Narzissmus, Machiavellismus und Psychopathie. [The Dirty Dozen and the Naughty Nine - short scales for the assessment of narcissism, Machiavellianism and psychopathy]. *Diagnostica, 1-16*. <https://doi.org/10.1026/0012-1924/a000124>
- Maneiro, L., López-Romero, L., Gómez-Fraguela, J. A., Cutrin, O., & Romero, E. (2019). Pursuing the Dark Triad: Psychometric properties of the Spanish version of the Dirty Dozen. *Journal of Individual Differences, 40*, 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>
- Meredith, W. (1993). Measurement invariance, factor-analysis and factorial invariance. *Psychometrika, 58*(4), 525-543. <https://doi.org/10.1007/bf02294825>
- Milfont, T. L., & Fischer, R. (2010). Testing measurement invariance across groups: Applications in cross-cultural research. *International Journal of Psychological Research, 3*(1), 112-131. <https://doi.org/10.21500/20112084.857>
- Miller, J. D., Few, L. R., Seibert, A., Watts, A., Zeichner, A., & Lynam, D. R. (2012). An examination of the Dirty Dozen measure of psychopathy: A cautionary tale about the costs of brief measures. *Psychological Assessment, 24*(4), 1048-1053. <https://doi.org/10.1037/a0028583>
- Miller, J. D., Hyatt, C. S., Maples-Keller, J. L., Carter, N. T., & Lynam, D. R. (2017). Psychopathy and Machiavellianism: A distinction without difference? *Journal of Personality, 85*(4), 439-453. <https://doi.org/10.1111/jopy.12251>
- 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>
- 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/10.1177/17456916166666070>
- Muthén, L., & Muthén, B. (2012). *Mplus user's guide* (6th ed.). Muthén & Muthén.
- Onyedire, N. G., Chukwuorji, J. C., Orijakor, T. C., Onu, D. U., Aneke, C. I., & Ifeagwazi, C. M. (2019). Associations of Dark Triad traits and problem gambling: Moderating role of age among university students. *Current Psychology, 1-12*. <https://doi.org/10.1007/s12144-018-0093-3>
- Özsoy, E., Rauthmann, J. F., Jonason, P. K., & Ardic, 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*(October), 11-14. <https://doi.org/10.1016/j.paid.2017.05.019>
- Paulhus, D. L., Neumann, C. S., & Hare, R. D. (2016). *Manual for the Self-Report Psychopathy Scale* (4th ed.). Multi-Health Systems.
- 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](https://doi.org/10.1016/S0092-6566(02)00505-6)
- Persson, B. N., Kajonius, P. J., & Garcia, D. (2019). Revisiting the structure of the short dark triad. *Assessment*, 26(1), 3-16. <https://doi.org/10.1177/1073191117701192>
- Pineda, D., Sandin, B., & Muris, P. (2018). Psychometric properties of the Spanish version of two Dark Triad scales: The Dirty Dozen and the Short Dark Triad. *Current Psychology*, 1-9. <https://doi.org/10.1007/s12144-018-9888-5>
- Raskin, R., & Hall, C. S. (1979). The Narcissistic Personality Inventory. *Psychological Reports*, 45(2), 590. <https://doi.org/10.2466/pr0.1979.45.2.590>
- Rauthmann, J. F., & Kolar, G. P. (2012). How “dark” are the Dark Triad traits?: Examining the perceived darkness of narcissism, Machiavellianism, and psychopathy. *Personality and Individual Differences*, 53(7), 884-889. <https://doi.org/10.1016/j.paid.2012.06.020>
- Reise, S. P., Kim, D. S., Mansolf, M., & Widaman, K. F. (2016). Is the bifactor model a better model or is it just better at modeling implausible responses? Application of iteratively reweighted least squares to the Rosenberg Self-Esteem Scale. *Multivariate Behavioral Research*, 51(6), 818-838. <https://doi.org/10.1080/00273171.2016.1243461>
- Richard, F. D., Bond, C. F., Jr., & Stokes-Zoota, J. J. (2003). One hundred years of social psychology quantitatively described. *Review of General Psychology*, 7(4), 331-363. <https://doi.org/10.1037/1089-2680.7.4.331>
- Rogoza, R., & Cieciuch, J. (2018). Dark Triad traits and their structure: An empirical approach. *Current Psychology*. Advance online publication. <https://doi.org/10.1007/s12144-018-9834-6>
- Rogoza, R., & Cieciuch, J. (2019). Structural investigation of the Short Dark Triad Questionnaire in Polish population. *Current Psychology*, 38(3), 756-763. <https://doi.org/10.1007/s12144-017-9653-1>
- Rogoza, R., Kowalski, C. M., & Schermer, J. A. (2019). The Dark Triad traits within the framework of the Circumplex Model of Personality Metatraits. *Journal of Individual Differences*, 40, 168-176. <https://doi.org/10.1027/1614-0001/a000289>
- Rogoza, R., Żemojtel-Piotrowska, M., & Campbell, W. K. (2018). Measurement of narcissism: From classical applications to modern approaches. *Studia Psychologica: Theoria et Praxis*, 18(1), 31-53. <https://doi.org/10.21697/sp.2018.18.1.02>
- Savard, C., Simard, C., & Jonason, P. K. (2017). Psychometric properties of the French-Canadian version of the Dark Triad Dirty Dozen. *Personality and Individual Differences*, 119(December), 122-128. <https://doi.org/10.1016/j.paid.2017.06.044>
- 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>
- Sedikides, C., & Campbell, W. K. (2017). Narcissistic force meets systemic resistance: The Energy Clash Model. *Perspectives on Psychological Science*, 12(3), 400-421. <https://doi.org/10.1177/1745691617692105>
- Sedikides, C., Gaertner, L., & Cai, H. (2015). On the panculturality of self-enhancement and self-protection motivation: The case for the universality of self-esteem. *Advances in Motivation Science*, 2, 185-241. <https://doi.org/10.1016/bs.adms.2015.04.002>
- Sleep, C. E., Lynam, D. R., Hyatt, C. S., & Miller, J. D. (2017). Perils of partialing redux: The case of the Dark Triad. *Journal of Abnormal Psychology*, 126(7), 939-950. <https://doi.org/10.1037/abn0000278>
- Tamura, A., Oshio, A., Tanaka, K., Masui, K., & Jonason, P. K. (2015). Development, reliability, and validity of the Japanese version of the Dark Triad Dirty Dozen (DTDD-J). *Japanese Journal of Personality*, 24(1), 26-37. <https://doi.org/10.2132/personality.24.26>
- Vize, C. E., Collison, K. L., Miller, J. D., & Lynam, D. R. (2018). Examining the effects of controlling for shared variance among the dark triad using meta-analytic structural equation modelling. *European Journal of Personality*, 32(1), 46-61. <https://doi.org/10.1002/per.2137>
- Zeigler-Hill, V., & Marcus, D. K. (2016). *The dark side of personality: Science and practice in social, personality, and clinical psychology*. American Psychological Association. <https://doi.org/10.1037/14854-000>