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| <b>Contents:</b>   |   |   |
| <b>General Articles</b><br>M. Paciello, R. Fida, L. Cerniglia, C. Tramontano and E. Cole<br>D.L. Neumann, G.J. Boyle and R.C.K. Chan<br>K.A. Barchard, S. Hensley and E. Anderson<br>A.Z. Shaw<br>J.R. Peters, T.A. Eisenlohr-Moul, B.T. Upton and R.A. Baer<br>K.M. Beaver, M. DeLisi, J.P. Wright, B.B. Boutwell, J.C. Barnes and M.G. Vaughn<br>C.J. Lutz-Zois, L.J. Dixon, A.M. Smidt, J.A. Goodnight, C.L. Gordon and L.E. Ridings<br>A.B. Shafer | 1 The International Society for the Study of Individual Differences (ISSID)<br>3 High cost helping scenario: The role of empathy, prosocial reasoning and moral disengagement on helping behavior<br>8 Empathy towards individuals of the same and different ethnicity when depicted in negative and positive contexts<br>14 When proportion consensus scoring works<br>19 The effect of prenatal androgen exposure on the development of neural reactivity systems: A study of the HEXACO Personality Inventory<br>24 Nonjudgment as a moderator of the relationship between present-centered awareness and borderline features: Synergistic interactions in mindfulness assessment<br>29 No evidence of racial discrimination in criminal justice processing: Results from the National Longitudinal Study of Adolescent Health<br>35 An examination of gender differences in the construct validity of the silencing the self scale<br>41 Factor structure of the Brief Psychiatric Rating Scale for Children (BPRS-C) among Hospital Patients and Community Clients |   |
| <i>[Continued on outside back cover]</i>   |   |   |
| <small>Person. Individ. Diff. is indexed/abstracted in:<br/>ASSIA, Curr. Cont. Soc. &amp; Behav. Sci., PASCAL-CNRS Data,<br/>Psychol. Abstr., PsycINFO, PsycLIT, Res. Alert, Soc. Sci. Cit. Indx.<br/>Also covered in the abstract and citation database SciVerse SCOPUS®.<br/>Full text available on SciVerse ScienceDirect®.</small>   |   |   |
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# Personality and Individual Differences

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## Walking the thin line between efficiency and accuracy: Validity and structural properties of the Dirty Dozen<sup>☆</sup>

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### ABSTRACT

In this study ( $N = 210$ ), participants were sampled through the Mechanical Turk system to assess the validity and structural properties of the Dark Triad Dirty Dozen (i.e., narcissism, psychopathy, and Machiavellianism). First, the correlations of the Dirty Dozen and long-form Dark Triad measures with sociosexual behaviors, attitudes, and desires, were generally consistent. Second, the scales of the Dirty Dozen measure modestly correlated with other measures of the same constructs as would be expected given the reduction in content-breadth. Third, the scales tap different dimensions (e.g., primary psychopathy, entitlement) of the older measures despite the loss of content. Fourth, a series of factor analyses revealed that the three dimensional structure replicates, but the data were best explained by a bifactor model. Despite traditional objections to short measures, if the short measure is up to the task of measuring its constructs and has good structural properties, it is a useful tool. Whereas the Dirty Dozen appears to provide conservative estimates of correlations it does appear to be a valid and psychometrically sound measure of the Dark Triad.

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Narcissism, psychopathy, and Machiavellianism collectively compose the *Dark Triad* (Jonason, Li, Webster, & Schmitt, 2009; Paulhus & Williams, 2002), and are linked by a core of disagreeableness and dishonesty (Jakobwitz & Egan, 2006; Jonason & McCain, 2012; Lee & Ashton, 2005). Narcissism is associated with traits like vanity and arrogance (Morf & Rhodewalt, 2001). Machiavellianism is associated with limited interpersonal warmth and pragmatism (Christie & Geis, 1970). Psychopathy, describes a complex of antagonism and antisocial behavior (Hare, 2003). Although traditionally considered maladaptive (Kowalski, 2001), these traits might be adaptive in short-term contexts and towards agentic or antagonistic goals (Jonason, Valentine, Li, & Harbeson, 2011; Jonason & Webster, 2012). To facilitate this research a concise measure of the Dark Triad was fashioned and validated in the Dirty Dozen (Jonason & Webster, 2010). Initial testing showed this measure to have good construct, convergent, discriminant validity, a replicable factor structure, and test–retest reliability. Despite this, more work is warranted on the validity of the Dirty Dozen.

The primary problem facing this measure is its brevity (Burisch, 1997; Smith, McCarthy, & Anderson, 2000). Recent work suggests

<sup>☆</sup> Authors' note: The participants and the data for the SRP III, MACH IV, and NPI were used in Jonason, Luévano, and Adams (2012).

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that the Dirty Dozen measure of psychopathy has similar, but somewhat weaker, correlations with other measures of general personality, like the Big Five and the HEXACO, as longer measures of psychopathy (Jonason & McCain, 2012; Jonason & Webster, 2010; Miller et al., 2012). However, research has yet to compare the Dirty Dozen measure to longer measures with regard to short-term mating strategies, which have an important and well-established association with the Dark Triad traits (Jonason et al., 2009, 2011, 2012; McHoskey, 2001). In order to further test the validity of the Dirty Dozen, we compare its correlations with a multidimensional measure of sociosexuality (Penke & Asendorpf, 2008) and the long-form Dark Triad measures.

Although comparative validity tests are a standard approach to testing validity (Campbell & Fiske, 1959; Miller, Price, & Campbell, 2012), they ignore the question of construct validity. That is, to what degree and in what way do the Dirty Dozen subscales correlate with long-form measures of the Dark Triad? Prior research suggests the Dirty Dozen moderately correlates with longer one-dimensional measures of the Dark Triad given the drastic reduction in items (Jonason & Webster, 2010). It remains unclear whether the Dirty Dozen, despite the loss in content, taps the various aspects of each Dark Triad trait. Although Machiavellianism (as measured by the MACH IV; Christie & Geis, 1970) appears to be one-dimensional (Hunter, Gerbing, & Boster, 1982), both narcissism (as measured with the NPI; Raskin & Terry, 1988) and psychopathy (as measured with the SRP III; Paulhus, Neumann, & Hare, in press) are

multidimensional (Ackerman et al., 2011; Falkenbach, Poythress, Falki, & Manchak, 2007; see Table 3). For instance, the Dirty Dozen measure of narcissism does not include items reflective of vanity; a component that has traditionally been considered part of narcissism (Raskin & Hall, 1979; Raskin & Terry, 1988). Therefore, the second task of this paper is to examine the Dirty Dozen's links to 7-factor<sup>1</sup> (Raskin & Terry, 1988) and 2-factor (Falkenbach et al., 2007; Hicks, Markon, Patrick, Krueger, & Newman, 2004) conceptualizations of narcissism and psychopathy, respectively.

In order to assess construct validity, we make some basic predictions. If the Dirty Dozen measure of narcissism is valid, it should be correlated with all factors of the NPI, but given the content of the Dirty Dozen, it should correlate best with entitlement and superiority. In contrast, if the Dirty Dozen measure of psychopathy is valid, it should be correlated with both primary (instrumental) and secondary (hostile) psychopathy. However, psychopathy and Machiavellianism have considerable overlap (McHoskey, Worzel, & Szyarto, 1998). We contend that by examining primary and secondary psychopathy, we can provide discriminant evidence of the Dirty Dozen measures of psychopathy and Machiavellianism, despite their high correlations reported in previous work (e.g., Jonason et al., 2011; Jonason & Webster, 2012).

Primary psychopathy contains the shallow affect, low empathy, and interpersonal coldness facets of psychopathy which may actually be part of the Machiavellianism construct (Christie & Geis, 1970; Rauthmann, 2012). Conversely, secondary psychopathy is composed of the socially deviant facets of psychopathy, which might be tapped by the Dirty Dozen's items regarding concern for moral conventions. Therefore, we predict that the Dirty Dozen measure of Machiavellianism should be more strongly correlated with primary psychopathy than the Dirty Dozen measure of psychopathy but the Dirty Dozen measure of psychopathy should be more strongly correlated with secondary psychopathy than the Dirty Dozen measure of Machiavellianism.

We also took this opportunity to replicate and extend what we know about the factor structure of the Dirty Dozen. We test 1-factor and 3-factor models, as has been done (Jonason & Webster, 2010), along with a bifactor model (Reise, Morizot, & Hays, 2007). A bifactor model might account for the data better than prior models and be a superior test of the hypothesis that the Dark Triad can be used as a 3-factor and 1-factor model of personality (Jonason et al., 2009). This model treats the shared variance among the items as reflective of a global factor like the general *g* factor in IQ research. In this model, the 12 Dirty Dozen items load on two types of latent factors: (a) the three latent factors associated with the Dirty Dozen's three subscales (i.e., Machiavellianism, psychopathy, and narcissism) and (b) a latent factor of the global Dark Triad. In bifactor models, the latent factors are left uncorrelated. Because of the bifactor nature of this model, the latent global Dark Triad factor is, in a sense, a measure of the residual Dark Triad after the variance attributable to the three subscale-based latent factors are removed. Similarly, the three subscale-based latent factors reflect their respective measures after removing the variance attributed to the latent global Dark Triad factor.

Recent evidence has called into question the validity of the Dirty Dozen measure of the Dark Triad (Miller et al., 2012). In order to address concerns regarding the validity of the measure, we assess its validity with multidimensional measures of sociosexuality and long-form measures of the Dark Triad. Such a multidimensional assessment may provide insight into the depth and breadth of the Dirty Dozen, which is a fundamental concern for those set on designing and validating brief measures (Burisch, 1997; Smith

et al., 2000). In addition, we provide new details about the structural properties of this measure through the use of a bifactor model.

## 1. Method

### 1.1. Participants and procedures

Participants were 210 Americans (57% women) aged 18–68 years old ( $M = 33.57$ ,  $SD = 11.37$ ) who participated on Amazon's Mechanical Turk (Mturk; see Buhrmester, Kwang, & Gosling, 2011)<sup>2</sup> system in exchange for 50¢ (U.S.). Participants completed a Web-based survey where they were informed of the nature of the study, gave their responses, and were debriefed. The system prohibits individuals from participating in the same study twice. Eighty-two percent were European American while all other racial groups each composed no more than 4.1% of the sample.

### 1.2. Measures

Narcissism was assessed with the 40-item Narcissistic Personality Inventory (NPI-40; Raskin & Terry, 1988). For each item, participants chose one of two statements they felt most applied to them. One of the two statements reflected a narcissistic attitude (e.g., "I have a natural talent for influencing people"), whereas the other statement did not (e.g., "I am not good at influencing people"). We summed the total number of endorsed narcissistic statements as an index of narcissism and for each of the seven factors (Raskin & Terry, 1988).

The 31-item Self-Report Psychopathy Scale-III (Paulhus et al., in press) was used to assess sub-clinical psychopathy. Participants rated how much they agreed (1 = *strongly disagree*; 5 = *strongly agree*) with statements such as, "I enjoy driving at high speeds" and "I think I could beat a lie detector." Items were averaged to create indices of general psychopathy, primary psychopathy, and secondary psychopathy.

Machiavellianism was measured with the 20-item MACH-IV (Christie & Geis, 1970). Participants indicated how much they agreed (1 = *strongly disagree*; 5 = *strongly agree*) with statements such as, "It is hard to get ahead without cutting corners here and there" and "People suffering from incurable diseases should have the choice of being put painlessly to death." The items were averaged to create a Machiavellianism index.

Participants completed the Dirty Dozen (Jonason & Webster, 2010) by indicating how much they agreed (1 = *not at all*; 7 = *very much*) with statements listed in Table 1. The corresponding items were averaged into measures of narcissism (DTDD-N;  $\alpha = .79$ ), Machiavellianism (DTDD-M;  $\alpha = .83$ ), and psychopathy (DTDD-P;  $\alpha = .75$ ). The subscales of both the Dirty Dozen ( $r_s = .44$ – $.53$ ,  $p_s < .01$ ) and the long-form Dark Triad measures ( $r_s = .15$ – $.39$ ,  $p_s < .05$ ) were positively intercorrelated.

To measure sociosexuality, we used the SOI-R which is composed of nine items (Penke & Asendorpf, 2008). It measures, sociosexual behavior (SOI-B; e.g., With how many partners have you had sex with in the past 12 months?), sociosexual attitudes (SOI-A; e.g., I could easily imagine myself enjoying "casual" sex with different partners), and sociosexual desires (SOI-D; e.g., How often do you have sexual fantasies about having sex with someone with whom you do not have a committed romantic relationship?). The items on each scale were averaged to create indexes of SOI-B ( $\alpha = .78$ ), SOI-A ( $\alpha = .83$ ), and SOI-D ( $\alpha = .87$ ). Participants were asked to respond to each question on a nine-point scale, which

<sup>1</sup> Although there are a variety of solutions to the NPI, we used this one to get the greatest breadth of understanding of the validity of the Dirty Dozen in relation to the NPI.

<sup>2</sup> Mechanical Turk is an online marketplace where "requesters" post jobs and "workers" choose which jobs to perform in exchange for payment.

**Table 1**  
Dark Triad Dirty Dozen items, their respective factors, and their loading on each component of the principal component analysis.

| Factor or item   | Component   |             |             |
|--|-------------|-------------|-------------|
|  | 1           | 2           | 3           |
| <i>Machiavellianism</i>                                      |             |             |             |
| (1) I tend to manipulate others to get my way                | <b>.860</b> | .332        | .423        |
| (2) I have used deceit or lied to get my way                 | <b>.830</b> | .274        | .356        |
| (3) I have used flattery to get my way                       | <b>.706</b> | .454        | .247        |
| (4) I tend to exploit others towards my own end              | <b>.842</b> | .260        | .599        |
| <i>Psychopathy</i>   |             |             |             |
| (5) I tend to lack remorse                                   | .568        | .180        | <b>.807</b> |
| (6) I tend to be unconcerned with the morality of my actions | .344        | .205        | <b>.813</b> |
| (7) I tend to be callous or insensitive                      | .378        | .128        | <b>.876</b> |
| (8) I tend to be cynical                                     | .258        | .122        | <b>.557</b> |
| <i>Narcissism</i>  |             |             |             |
| (9) I tend to want others to admire me                       | .392        | <b>.861</b> | .128        |
| (10) I tend to want others to pay attention to me            | .300        | <b>.877</b> | .141        |
| (11) I tend to seek prestige or status                       | .433        | <b>.809</b> | .307        |
| (12) I tend to expect special favors from others             | .598        | <b>.466</b> | .302        |

depending on the question, gave count options (i.e., 0–20+) or ranged from strongly disagree to strongly agree. The three dimensions were correlated with one another ( $r_s = .20-.52, p_s < .01$ ).

**2. Results**

In Table 2, we report the correlations between two measures of the Dark Triad and sociosexuality. We compared these correlations to assess validity using Steiger's  $z$  which compares dependent correlations and is similar to Fisher's  $z$ , which compares independent correlations (Meng, Rosenthal, & Rubin, 1992). On average ( $M_{\text{Steiger's } z} = 0.48, SD_{\text{Steiger's } z} = 1.97$ ) the Dirty Dozen does not correlate with sociosexuality differently than the long-form Dirty Dozen. However, upon closer examination, there were some subtle differences. The Dirty Dozen measure of Machiavellianism was more strongly correlated with sociosexual behaviors than the MACH IV but the inverse was true for sociosexual attitudes. The SRP III and the NPI were correlated more strongly with sociosexual behaviors and desires than the Dirty Dozen measure of psychopathy. This suggests that the Dirty Dozen may return conservative estimates of the correlations with sociosexuality but generally can still detect the relationships.

In Table 3 we correlated the different measures of the Dark Triad. The Dirty Dozen measures were moderately correlated with their longer forms. The Dirty Dozen may tap the MACH-IV and NPI better than the SRP. While, the Dirty Dozen measure of Machiavellianism had a stronger correlation with the long-form measures of psychopathy than it did with Machiavellianism, the difference was not significant ( $z = -1.41$ ). We also controlled for the shared variance among the traits by entering all three of the Dirty Dozen traits into a multiple regression to predict each of the longer measures of the Dark Triad. There was a correspondence between traits where the strongest correlations were shared by similar traits. Psychopathy and Machiavellianism, as measured by the Dirty Dozen, had

similar associations with Machiavellianism as measured by the MACH-IV.

The psychopathy scale of the Dirty Dozen correlated with both factors of the SRP, but more so with secondary than primary psychopathy ( $z = -4.30, p < .01$ ). In contrast, the Dirty Dozen measure of Machiavellianism was better correlated with primary than secondary psychopathy ( $z = 1.97, p < .05$ ). The narcissism aspect of the Dirty Dozen had no unique correlations with primary and secondary psychopathy.

The Dirty Dozen measure of Machiavellianism was associated with six aspects of the NPI, narcissism was associated with all aspects of the NPI, and the psychopathy scale of the Dirty Dozen was only associated with exploitativeness and entitlement. Controlling for shared variance, however, revealed more detail. First, the narcissism aspect of the Dirty Dozen was no longer correlated with the exploitativeness factor of the NPI; this correlation was localized to the Machiavellianism scale of the Dirty Dozen. Second, vanity was only associated with the narcissism scale of the Dirty Dozen despite the measure not directly assessing vanity. Third, the narcissism scale of the Dirty Dozen related to six aspects of the NPI even when controlling for psychopathy and Machiavellianism, suggesting this measure correlates with narcissism better than the other measures. The psychopathy scale of the Dirty Dozen was negatively correlated with the authority and positively correlated with the entitlement aspects of the NPI.

We attempted to replicate the factor structure of the Dirty Dozen through the use of Principal Components Analysis (PCA) and a series of Confirmatory Factor Analyses (CFA). In the PCA, an oblique rotation was used and revealed a clear, 3-dimensional structure. Factor 1 accounted for 40.85% of the variance and had an Eigen value of 4.90 and reflected Machiavellianism. Factor 2 accounted for 15.33% of the variance, had an Eigen value of 1.84, and reflected Narcissism. Factor 3 accounted for 9.01% of the variance, had an Eigen value of 1.08, and reflected Psychopathy (see Table 1). Next, we

**Table 2**  
Comparative zero-order correlations for two measures of the Dark Triad with measures of sociosexuality.

|                       | MACH IV | DTDD-M | $z$     | SRP III | DTDD-P | $z$    | NPI-40 | DTDD-N | $z$    |
|-----------------------|---------|--------|---------|---------|--------|--------|--------|--------|--------|
| Sociosexual Behaviors | .11     | .15*   | -0.60   | .30**   | .11    | 2.42** | .22*   | .09    | 1.96*  |
| Sociosexual Attitudes | .26**   | .13    | 2.00*   | .25**   | .26**  | -0.13  | .17*   | .13    | 0.60   |
| Sociosexual Desire    | .19*    | .33**  | -2.17** | .62**   | .15*   | 6.61** | .49**  | .29**  | 3.30** |

Note:  $z$  is Steiger's  $z$  to compare dependent correlations; DTDD = Dark Triad Dirty Dozen.

\*  $p < .05$ .

\*\*  $p < .01$ .

**Table 3**

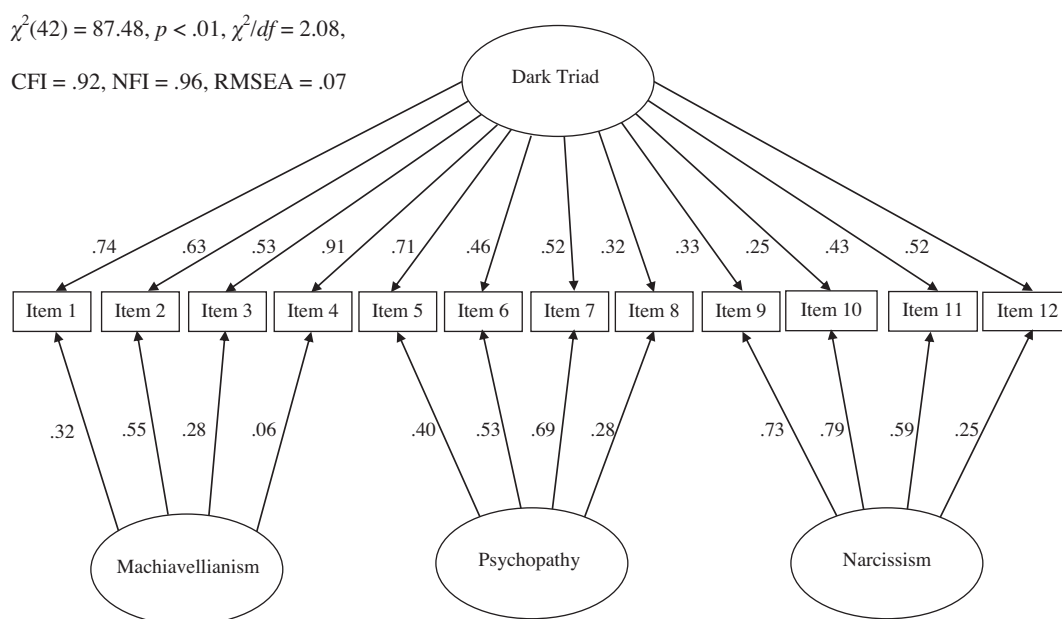
Correlations among the Dark Triad Dirty Dozen and the long-form versions of the Dark Triad traits and their respective subscales, with standardized regression coefficients when all three subscales of the Dark Triad Dirty Dozen were included in the model in parentheses.

| Long-form Dark Triad       | $\alpha$ | Dark Triad Dirty Dozen |                          |               |
|----------------------------|----------|------------------------|--------------------------|---------------|
|                            |          | Machiavellianism       | Psychopathy              | Narcissism    |
| Machiavellianism (MACH IV) | .76      | .53** (.37**)          | .54** (.35**)            | .24** (-.05)  |
| Psychopathy (SRP III)      | .76      | .44** (.12)            | .32** (.31**)            | .33** (.13)   |
| Primary Psychopathy        | .72      | .47** (.31**)          | .38** (.18**)            | .33** (.11)   |
| Secondary Psychopathy      | .82      | .45** (.21**)          | .56** (.40**)            | .36** (.09)   |
| Narcissism (NPI-40)        | .79      | .43** (-.10)           | .17* (-.27**)            | .53** (.42**) |
| Authority                  | .79      | .30** (.23**)          | .05 (-.17 <sup>†</sup> ) | .38** (.31**) |
| Self-Sufficiency           | .45      | .20** (.10)            | .12 (.02)                | .22** (.16*)  |
| Superiority                | .53      | .39** (.22**)          | .01 (-.14)               | .50** (.42v)  |
| Exhibitionism              | .73      | .39** (.22**)          | .14* (.10)               | .50** (.42**) |
| Exploitativeness           | .66      | .51** (.53**)          | .22** (-.07)             | .29** (.03)   |
| Vanity                     | .72      | .09 (.01)              | -.05 (-.14)              | .27** (.31**) |
| Entitlement                | .55      | .34** (.07)            | .30** (.15*)             | .45** (.37**) |

Note:  $\alpha$ 's are Cronbach's  $\alpha$  for internal consistency.

\*  $p < .05$ .

\*\*  $p < .01$ .



**Fig. 1.** A bifactor model of the Dirty Dozen measure of the Dark Triad.

ran three different CFAs. The one-dimensional model fit the data poorly ( $\chi^2(54) = 399.23, p < .01, \chi^2/df = 7.39, CFI = .68, NFI = .85, RMSEA = .17, 90\% CI [.16, .18]$ ). The three-factor solution fit the data acceptably well ( $\chi^2(51) = 158.01, p < .01, \chi^2/df = 3.10, CFI = .86, NFI = .90, RMSEA = .10, 90\% CI [.08, .12]$ ), and better than the one-dimensional model ( $\Delta\chi^2(3) = 241.22, p < .01$ ). However, the bifactor model ( $\chi^2(42) = 87.48, p < .01, \chi^2/df = 2.08, CFI = .92, NFI = .96, RMSEA = .07, 90\% CI [.05, .09]$ ) fit the data significantly better than the three-factor model ( $\Delta\chi^2(9) = 70.53, p < .01$ ). We present the bifactor model in Fig. 1.<sup>3</sup>

<sup>3</sup> We do not present the 1-factor or the 3-factor models from above because (1) they returned worse fits than the bifactor model did and (2) prior research has reported these models. This is the first time a bifactor model/analysis has been reported.

### 3. Discussion

The fine line between efficiency and accuracy must be negotiated by psychometricians who seek to design brief measures (Burisch, 1997; Smith et al., 2000). Here we examined the links between the Dirty Dozen and long-form measures of the Dark Triad with sociosexuality. In addition, we evaluated construct validity through a detailed examination of the relationship between the Dirty Dozen and long-form, multidimensional measures of the Dark Triad.

This study provided greater depth in regards to the construct validity of the Dark Triad Dirty Dozen. First, although we found minimal overall differences in the correlations between measures of the Dark Triad and sociosexuality the associations with the Dirty Dozen were generally weaker. This is a cost one must consider

when deciding whether to use this measure. The weight given this concern would depend on the purpose for using the Dirty Dozen. For example, such concerns may be minimal for large scale descriptive projects, or when using the measure as a control, as done with the Ten Item Personality Inventory (Jonason et al., 2011). Additionally, despite this limitation, the Dirty Dozen has proven useful in confirming theoretical predictions (Jonason, Koenig, & Tost, 2010; Jonason & Webster, 2012). As such, more work is warranted on where and how the Dirty Dozen falls short or meets expectations.

The danger is present that the Dirty Dozen measures of psychopathy and Machiavellianism are redundant to one another (McHoskey et al., 1998). To address this, we (1) examined the correlations that each have with longer measures of the Dark Triad and (2) examined the associations when controlling for the other parts of the Dirty Dozen. This analysis revealed that despite the overlap, each measure of the Dirty Dozen assesses some unique aspects of each the Dark Triad traits. For instance, The Dirty Dozen measure of psychopathy was more strongly linked to secondary than primary psychopathy, and the Dirty Dozen measure of Machiavellianism was more strongly correlated with primary than secondary psychopathy. Alternatively, the exploitativeness aspect of narcissism appears to only be correlated with the Dirty Dozen measure of narcissism at the zero-order level. When we control for shared variance among the traits, we find that this association is localized to Machiavellianism. Past research that has asserted that this aspect is a core part of the dark nature of narcissism (Watson & Morris, 1991) has generally failed to control for overlap with Machiavellianism like we have here. Relatedly, our reliance on the NPI (see Brown, Budzek, & Tamborski, 2009) along with the SRP and the MACH IV might be problematic because alternative measures of each construct exist. Future work will need to cast a wider net to examine the validity of the Dirty Dozen.

Furthermore, the Dirty Dozen measure of narcissism tapped each dimension of the NPI, with one notable exception: The Dirty Dozen measure of narcissism was not associated with the exploitativeness dimension when controlling for the other Dark Triad traits. The exploitativeness dimension of the NPI might better fit with the Machiavellian aspect of the Dark Triad, and indeed, the Dirty Dozen measure of Machiavellianism was associated with exploitativeness even when controlling for the other Dark Triad traits. Additionally, the item that best captures exploitativeness is narcissism (i.e., “I tend to expect special favors from others”) had a relatively high loading on the Machiavellian factor in the principal components analysis. This exception aside, the Dirty Dozen measure of narcissism tapped aspects of narcissism that were not even included in the content of the measure (e.g., vanity; Raskin & Terry, 1988), suggesting (a) prior measures may have been unnecessarily bloated and (b) that the Dirty Dozen measure of narcissism has a greater range of utility than its items suggest. Despite a reduction in items and content, the Dirty Dozen covers the breadth of content covered in the NPI, SRP, and MACH-IV.

For the first time, we present a bifactor model (Reise et al., 2007) of the Dirty Dozen measure of the Dark Triad. This model fit the Dirty Dozen better than a 1- or 3-dimensional model. The superiority of the bifactor model is consistent with the idea that the Dark Triad can be treated as individual, mid-level personality traits and a higher-order, life history dimension (Jonason et al., 2009, 2010, 2011; Jonason & Webster, 2012). Two points are worth noting about this model. First, it only provided a satisfactory fit. This may be the result of the scale being composed of so few items or could suggest some modification(s) to the items. For instance, the item inquiring about cynicism tends to have the worst factor loading and this might be the result of differential understanding of the meaning of the word “cynical”. Second, some of the factor loadings on the actual traits were meaningfully low. It appears

the variance associated with a few items – in particular, item 4 (i.e., I tend to exploit others towards my own end) – was better accounted for by the global factor than the individual traits of the Dark Triad. However, future work will need to examine what the general factor represents and if it is an artifact of social desirability.

The Dirty Dozen is not without its weaknesses. First, it likely only returns conservative estimates of correlations as a research tool given its abbreviated form (Miller et al., 2012). Second, the construct validity has not been assessed with measures of a more clinical nature (Pincus et al., 2009). Third, it is a self-report measure of these traits in sub-clinical samples, which might be cause for concern (Pincus, 2011). Although more work is needed on this brief measure, the Dirty Dozen appears to have reasonable construct validity and sound structural properties. The measure could be said to walk the fine line between efficiency and accuracy.

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