Psychometric properties of an Arabic Version of the Dark Triad Dirty Dozen Scale

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ABSTRACT

Objective: Few studies have investigated the Dark Triad and its impact on behaviour in Saudi Arabia, mostly due to the lack of validated instruments. The aim of this study was to investigate the psychometric properties of the Dark Triad Dirty Dozen, in the context of Saudi Arabia.

Method: A sample of 1,329 respondents (59.8% female, mean age = 26.79, SD = 8.47) completed a survey containing the Dark Triad Dirty Dozen (DD), the Corruption Propensity Scale and the Propensity to Morally Disengage scale, as well as a demographics questionnaire. Confirmatory factor analysis, measurement invariance across gender, internal consistency reliability analysis, test–retest reliability analysis, and concurrent and convergent validity analyses were performed to validate the DD.

Results: The CFA supported a three-factor model with adequate factor loadings ranging between 0.29 and 0.83 and sufficient fit indices. The scale was gender invariant. The internal consistency reliability and test–retest reliability were adequate (0.70–0.86 and 0.58–0.75, respectively). Moderate-to-high Pearson correlations supported the convergent and concurrent validity of the scale.

Conclusion: The Dark Triad Dirty Dozen is a reliable and valid measure that can be used in Saudi Arabia.

KEY POINTS

What is already known about this topic:

(1) In the past two decades, there has been considerable attention in the psychological literature to the Dark Triad personality traits in explaining malicious behaviours.

(2) Scales to measure the Dark Triad personality traits in individuals have been developed, among them the Dark Triad Dirty Dozen scale.

(3) The Dark Triad Dirty Dozen scale is widely used and has been validated in many countries, but not in Saudi Arabia.

What this topic adds:

(1) This study presents the results of the first validation of the Dark Triad Dirty Dozen scale in the context of Saudi Arabia.

(2) Results of this study confirmed the psychometric properties of the Dark Triad Dirty Dozen scale in Saudi Arabia, joining previous research in other countries.

(3) The study results indicate that this scale is a valid and reliable tool for practitioners and researchers to assess the Dark Triad personality traits in Saudis.

Introduction

In the fields of social psychology and personality psychology, many researchers have investigated negatively connoted aspects of personality and the Dark Triad model of such “dark” personality traits has been widely discussed (Jonason et al., 2012; Paulhus & Williams, 2002). The Dark Triad is a cluster term that encompasses a trio of undesirable personality traits: narcissism, Machiavellianism and psychopathy (Paulhus & Williams, 2002). Individuals who exhibit the trait of Machiavellianism tend to manipulate others in order to achieve their personal goals, and they lack internalised morality (Pechorro et al., 2021). Psychopathy is characterised by affective problems such as lack of remorse, behavioural problems including impulsivity, manipulativeness and lack of responsibility, and interpersonal problems such as abusive charming (Hare & Neumann, 2008). Narcissism is characterised by excessive vanity and obsession with one’s own qualities, which have a deleterious effect on relationships with others (Pineda et al., 2018). Individuals with Dark Triad personalities exhibit a constellation of disagreeable characteristics, including deceit and lack of empathy. The trio of
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MACH (Lilienfeld and Gamache, 2013) is a broad construct, and the three have in common the core trait of callous manipulation (Furnham et al., 2013).

The early work on assessing the Dark Triad in individuals used separate scales for each of the three personality traits. Narcissism was investigated using the Narcissistic Personality Inventory (Raskin & Terry, 1988). These scales were developed by Christie and Geis (1970). Several scales are used to assess Machiavellianism and the Self-Report Psychopathy Scale (Hare, 1980; Neal & Sellbom, 2012), the Psychopathy Checklist-Revised (Hare et al., 1990) and the Psychopathy Personality Inventory-Revised (Lilienfeld & Widows, 2005). The Arabic versions of the MACH IV, the Psychopathic Personality Inventory-Revised, the Self-Report Psychopathy Scale and the Narcissistic Personality Inventory were also used in previous research (Latzman et al., 2015; Schwartz et al., 2017; Starr, 1975; Thomas et al., 2013). However, these scales had limitations of length, having too many items, which hampered usability. Therefore, single, shorter instruments were developed to assess the three dark traits, including the Dark Triad Dirty Dozen (Jonason & Webster, 2010) and the Short Dark Triad (Jones & Paulhus, 2014).

The Dirty Dozen (DD) (Jonason & Webster, 2010) is the shortest measure, which can be efficient when time and resources are scarce, and has been validated and used in many cultures (despite its name, the Short Dark Triad (Jones & Paulhus, 2014) contains 27 items, whereas the Dirty Dozen contains only 12). The DD has been validated in Canada (Savard et al., 2017), Germany (Küfner et al., 2015), Poland (Czarna et al., 2016), Spain (Pineda et al., 2018), Serbia (Dinić et al., 2018), Turkey (Özsoy et al., 2017), Sweden (Garcia et al., 2018), Portugal (Macedo et al., 2017), Iran (Yousef & Piri, 2016), France (Gamache et al., 2018) and Bangladesh (Ahmed et al., 2020), but not yet in Saudi Arabia.

There have been noteworthy criticisms of the Dark Triad concept and the scales that have been used to assess Dark Triad personality traits. A review by Miller et al. (2019) concluded that it is evident that the Dark Triad is multidimensional, but existing research largely considers each construct independently. Similarly, the Dark Triad scales assess each construct as an independent unidimensional construct. Miller et al. (2019) claimed that the existing measures and research concerning the Dark Triad assess narcissism and two different versions of psychopathy. They also argued that research on the Dark Triad has relied on the use of multivariate analyses that pose statistical and interpretation difficulties, and has been conducted with methodological concerns such as convenience sampling. Miller et al. (2017) argued that existing measures of Machiavellianism do not match expert ratings. As mentioned earlier, the three Dark Triad traits can overlap and Vize et al. (2018) questioned whether the Dark Triad components are sufficiently distinct from one another. They asserted, for example, that psychopathy and Machiavellianism overlap substantially. And Glenn and Sellbom (2015) state that narcissism and Machiavellianism may be parts of a single psychopathy construct. Other concerns have been raised concerning the conceptualisation of narcissism, Machiavellianism and psychopathy under a single construct termed the “Dark Triad” (Kajonius et al., 2016).

Empirical evidence has supported the commonalities and overlap among the Dark Triad traits. In a meta-analysis carried out by Muris et al. (2017), the overlap between the Dark Triad traits was observed as follows: the correlation between Machiavellianism and narcissism was $r = 0.34$, between Machiavellianism and psychopathy, $r = 0.58$, and between narcissism and psychopathy, $r = 0.34$. Similarly, O’Boyle et al. (2012) reported commonalities between the Dark Triad traits, where correlations between traits ranged from $r = 0.23$ to $r = 0.46$ in their meta-analysis. Emphasising the overlap between Dark Triad traits, a study by Rogoza and Cienciu (2019) supported the differentiation of the Dark Triad traits into only two constructs, narcissism and a “Dark Dyad” of Machiavellianism and psychopathy. Other researchers (Book et al., 2016; Buckels et al., 2013) have suggested adding a fourth trait, sadism, to the Dark Triad, making it the “dark tetrad”. Studies by Moshagen et al. (2018) considered a large number of dark personality characteristics simultaneously and led the researchers to specify an un categorised core set of negative ethical, moral and social traits that they labelled the “Dark Factor of Personality” or the “D-factor”.

Despite the critics, these researchers acknowledged the theoretical distinction between the dark triad constructs. It is on empirical grounds that the distinction between Machiavellianism and psychopathy seems nearly unclear (Miller et al., 2017; Vize et al., 2018). Other studies also reported high correlations between Machiavellianism and psychopathy (Pabian et al., 2015). Nonetheless, there are other studies that have found quite moderate correlations between the two constructs (Malesza et al., 2019). Therefore, there is a need for further investigation, with other samples, of the factorial structure of the dark triad dirty dozen, a short scale consisting of only 12 items that allows facility of research.
In addition, most of the studies on the Dark Triad have been conducted in Western countries with individualistic cultures. There is little research from collectivistic cultures such as Saudi Arabia, where people value most group identity and social harmony (Markus & Kitayama, 1991). For example, in the meta-analysis by O’Boyle et al. (2012), only 4 of 186 studies were based on samples from collectivistic cultures. Dark Triad characteristics such as manipulativeness, self-importance and lack of empathy are incompatible with the characteristics of social harmony in collectivistic cultures. Further, despite the vast utility of the DD, this scale has not yet been validated in Saudi Arabia. This may have contributed to the lack of research in this population. Only two studies could be identified that have investigated the Dark Triad in the context of Saudi Arabia. Wright et al. (2017) investigated malevolent behaviours in Saudi youth using the DD and reported that the Dark Triad was predictive of violent delinquency. Pietenpol et al. (2018) reported that a potential factor influencing Mutaween (Saudi religious police) stops was individuals with Dark Triad traits. With the purpose of facilitating cross-cultural comparison and to encourage more research on the Dark Triad in the Kingdom, this study aimed to contribute to the literature by investigating the psychometric properties of the DD in Saudi Arabia.

Methods

Participants

This study used a convenience sample of students in order to reach as many and diverse participants as possible. A link to the survey was sent to universities who, in turn, sent the link via emails, Facebook, WhatsApp and Twitter to their students. A university was selected from each of the main region of the Kingdom of Saudi Arabia. Those regions are Mecca region, Riyadh region, Eastern region, Asir region, Jazan region, Medina region, Al-Qassim region, Tabuk region, Ha’il region, Najran region, Al-Jawf region, Northern Borders region and Al-Bahah region. In total, 13 universities were contacted. Respondents were informed about the aim and the intended outcome of the study, and they provided informed consent. Around 1850 students returned the survey, but a total of 1,329 respondents returned the completed survey with no missing data. The sample included 795 females (59.8%) and 534 males (40.2%). The sample had a mean age of 26.79 (SD = 8.47), ranging between 17 and 39. The socio-demographic characteristics of the sample are displayed in Table 1. Respondents were asked if they wished to be contacted to complete the survey a second time; 79 accepted and were contacted again 3 weeks later. However, only 55 of these returned the completed survey and these data were used to conduct a test–retest reliability analysis.

Measures

The survey contained three main scales as well as demographic questions. The scales were the Dark Triad Dirty Dozen (DD) scale (Jonason & Webster, 2010), The Corruption Propensity Scale (Agbo & Iwundu, 2015) and the Propensity to Morally Disengage scale (Moore et al., 2012). The Corruption Propensity Scale and the Propensity to Morally Disengage scale were used to check the convergent and concurrent validity of the Dark Triad Dirty Dozen (DD) scale. These scales were chosen because of their small number of items compared to scales that were previously used consisting of too many items. The literature recommends the use of scales with low number of items in order to avoid fatigue and disengagement in respondents (Steyn, 2017).

The Dark Triad Dirty Dozen (DD) scale (Jonason & Webster, 2010) is a short 12-item instrument designed

| Variable | n | % | Mean (SD) Mach. | Mean (SD) Psych. | Mean (SD) Narc. |
|----------|---|---|----------------|-----------------|---------------|
| Gender   |   |   | p < 0.001      | p < 0.001       | p < 0.001     |
| Female   | 795| 59.8| 8.38 (5.67)    | 9.30 (5.43)     | 19.61 (8.92)  |
| Male     | 534| 40.2| 10.7 (6.70)    | 11.83 (5.93)    | 17.25 (8.42)  |
| Marital Status | | | p < 0.001 | p < 0.001 | p < 0.001 |
| Single   | 768| 57.8| 9.01 (6.07)    | 9.93 (5.57)     | 19.99 (9.05)  |
| Married  | 322| 24.2| 6.77 (4.57)    | 8.35 (4.77)     | 16.00 (8.21)  |
| Divorced | 159| 12  | 12.85 (6.42)   | 13.38 (5.70)    | 18.43 (8.51)  |
| Widowed  | 80 | 6   | 15.47 (5.62)   | 15.85 (5.84)    | 17.15 (6.15)  |
| Monthly Income | | | p = 0.840 | p = 0.148 | p < 0.001 |
| Less than 5000 SR | 405| 30.5| 9.16 (6.57)    | 10.75 (6.55)    | 16.14 (8.93)  |
| 5000 - less than 10,000 SR | 323| 24.3| 9.50 (6.26)    | 10.28 (5.40)    | 19.48 (8.43)  |
| 10000 - less than 15,000 SR | 221| 16.6| 9.51 (6.16)    | 10.45 (5.53)    | 18.76 (8.88)  |
| 15000 SR and greater | 380| 28.6| 9.22 (5.82)    | 9.81 (5.32)     | 20.53 (8.27)  |

Notes: Mach. = Machiavellianism, Psych. = psychopathy, Narc. = Narcissism, SD = standard deviation.

Table 1. Sample characteristics and ANOVA tests.
to measure the Dark Triad personality traits in individuals. It contains four items for each of the Dark Triad traits: Machiavellianism, with items such as “I tend to manipulate others to get my way”; psychopathy, with items such as “I tend to lack remorse”; and narcissism, with items like “I tend to want others to admire me”. The scale is scored on 9-point Likert scale ranging from 1 (strongly disagree) to 9 (strongly agree) for each item; thus, the total score for each trait ranges from 4 to 36. The scale has demonstrated adequate psychometric properties (Jonason & Webster, 2010).

The Corruption Propensity Scale (Agbo & Iwundu, 2015) was used to assess the convergent validity of DD. This is an 18-item measure designed to assess corruption tendency. Each item in the scale is scored on a 7-point Likert scale ranging from 1 (disagree strongly) to 7 (agree strongly). Higher scores indicate greater intentions to engage in corruption. The scale exhibited an adequate internal consistency reliability (Cronbach’s alpha = 0.91). In the present study, the Cronbach’s alpha was 0.90.

The Propensity to Morally Disengage scale (Moore et al., 2012) was used in this study to evaluate the concurrent validity of DD. This is a 24-item measure to assess eight domains of moral disengagement, with three items for each. For example, “It is alright to lie to keep your friends out of trouble”. Each item is scored on a 7-point Likert scale from 1 (strongly disagree) to 7 (strongly agree). The reported internal consistency reliability was good (Cronbach’s alpha = 0.90). In this study, the Cronbach’s alphas for each of the eight domains were as follows: 0.77 for moral justification, 0.78 for euphemism labelling, 0.71 for advantageous comparison, 0.75 for displacement of responsibility, 0.79 for diffusion of responsibility, 0.73 for distortion of consequences, 0.74 for dehumanisation and 0.70 for attribution of blame.

**Data analysis**

All the data analyses were conducted using the RStudio statistical software (Rstudio Team, Rs, 2022). Prior to analysis, a data check and cross-check were done to verify the correct tabulation of the data. Inspection of outliers was also performed. The Dirty Dozen scale and the scales to be used for convergent and concurrent validity of Dirty Dozen were subjected to internal consistency reliability analysis. The descriptive statistics for the sample characteristics were computed first, followed by ANOVA tests. Second, Pearson correlations and Cronbach’s alphas were computed with the use of the “psych” software package (Revelle, 2017). The exploratory factor analysis was done using the maximum likelihood extraction method and the varimax rotation method. The confirmatory factor analysis was done using the “lavaan” software package (Rosseel, 2012). The paths were plotted using the “lavaanPlot” package (Lishinski, 2020). The model fit of the DD was checked using several fit indices, including the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA) and Standardised Root Square Mean Residual (SRMR) (Hu & Bentler, 1999). Values <.08 for RMSEA and SRMR and values >.90 for CFI and TLI were used to indicate a good model fit (Hu & Bentler, 1999). Further, we assessed the measurement invariance across gender following (Van de Schoot et al., 2012) checklist using multi-group CFA.

**Translation process and pilot study**

The translation of the DD into Arabic was performed following the World Health Organization’s recommendations (WHO, 2011). Two independent experts experienced in instrument translation, adaptation and validation performed the translation using forward and backward translation methods. The results of the initial translation processes were discussed in multiple steps until consensus was achieved. The final version of the translated DD resembled the original. In a pilot study, this final version was sent to experts in the field for content validity. The experts gave their feedback concerning the content and adequacy of the items. This version was also sent to 55 students, and the data obtained were subjected to internal consistency reliability analysis. The Cronbach’s alphas of the items were adequate, ranging between 0.76 and 0.89. The content validity and internal consistency results provided evidence of suitability of the items to be used in the main study.
Results

Sample socio-demographics and differences

The descriptive characteristics of the sample as well as ANOVA tests are summarised in Table 1. Slightly less than 60% of the respondents were female, 57.8% were single, 24.2% were married, 12% were divorced and 6% were widowed. Slightly over 30% had income of less than 5000 RS per month, 24.3% had monthly income between 5000 and 10,000 RS, 16.6% between 10,000 and 15,000 RS and 28.6% had income of at least 15,000 RS.

In terms of differences, males had significantly higher scores on Machiavellianism and psychopathy, whereas females had significantly higher scores on narcissism. Concerning marital status, there were differences in Machiavellianism, psychopathy and narcissism scores, where those respondents who were widowed scored significantly higher on Machiavellianism and psychopathy, and those who were single had significantly higher scores on narcissism.

Exploratory factor analysis

The exploratory factor analysis (EFA) used the maximum likelihood extraction method and the varimax rotation method. The Kaiser-Meyer-Olkin (KMO) test showed the measure of sampling adequacy (MSA) to be 0.87 and the Bartlett’s test of sphericity was significant (Bartlett’s K-squared = 938.74, df = 11, p-value <0.01). The factor loadings for each item ranged between 0.32 and 0.86 (Table 2). The EFA had a good model fit (χ² = 242.74, df = 33, p < 0.001, RMSA = 0.03, TLI = 0.937, RMSEA = 0.06). The scree plot indicated a three-factor model – Machiavellianism, psychopathy and narcissism – as in the original DD study (Jonason & Webster, 2010) (see Figure 1). The results of the EFA showed a structure of the three factors explaining 49.3% of the variance.

Confirmatory factor analysis (CFA) of DD

The CFA model allowed all DD items to load on their respective factors. The model exhibited adequate model fit (χ² = 552.22, df = 51, p < 0.001, CFI = 0.925, TLI = 0.904, RMSEA = 0.08, SRMR = 0.06). The CFA factor loadings for each item ranged between 0.29 and 0.83 (Table 2). This model is plotted in Figure 2.

We also investigated the measurement invariance across gender of DD using the steps recommended by Van de Schoot’s et al. (2012). The configural invariance

Table 2. Mean, SD, reliability, and EFA and CFA factor loadings.

| Item  | mean | SD   | std alpha | Test-retest | EFA Loadings | CFA Loadings |
|-------|------|------|-----------|-------------|--------------|--------------|
| Item 1 | 9.31 | 6.21 | 0.83      | 0.85        | 0.69         | 0.75         |
| Item 2 | 2.40 | 2.00 |           |             | 0.72         | 0.75         |
| Item 3 | 2.20 | 1.70 |           |             | 0.80         | 0.72         |
| Item 4 | 2.50 | 2.00 |           |             | 0.34         | 0.76         |
| Item 5 | 2.10 | 1.90 |           |             | 0.77         | 0.76         |
| Item 6 | 10.32| 5.77 | 0.70      | 0.89        |              |              |
| Item 7 | 3.20 | 2.30 |           |             | 0.34         | 0.29         |
| Item 8 | 2.00 | 1.80 |           |             | 0.84         | 0.74         |
| Item 9 | 3.00 | 2.40 |           |             | 0.80         | 0.72         |
| Item 10| 2.00 | 1.60 |           |             | 0.32         | 0.59         |
| Item 11| 3.70 | 2.50 |           |             | 0.65         | 0.73         |
| Item 12| 5.40 | 2.70 |           |             | 0.86         | 0.82         |

Notes: std alpha = standardised Cronbach’s alpha, EFA = exploratory factor analysis, CFA = confirmatory factor analysis.

Figure 1. Scree plot of the exploratory factor analysis.
exhibited adequate model fit ($\chi^2 = 422.06, df = 102, p < 0.001$, $CFI = 0.89, TLI = 0.88, RMSEA = 0.06, SRMR = 0.05$). For the metric invariance analysis, we set the factor loadings to be equal across gender and adequate fit indices were obtained ($\chi^2 = 513.77, df = 111, p < 0.001$, $CFI = 0.90, TLI = 0.89, RMSEA = 0.07, SRMR = 0.06$). The differences in $CFI, TLI, SRMR$ and $RMSEA$ between the configural and metric model were less than 0.01, which indicates metric invariance. To test the scalar invariance, we added the intercepts to the previous model and the model had adequate model fit as well ($\chi^2 = 606.44, df = 120, p < 0.001$, $CFI = 0.89, TLI = 0.89, RMSEA = 0.06, SRMR = 0.06$). The differences in $CFI, TLI, SRMR$ and $RMSEA$ between the metric invariance model and scalar invariance model were less than 0.01, which indicates scalar invariance. Finally, to test the strict invariance model, along with the factor loadings and intercepts, we allowed residuals to be equal across gender and the model showed good model fit ($\chi^2 = 608.65, df = 120, p < 0.001$, $CFI = 0.90, TLI = 0.89, RMSEA = 0.07, SRMR = 0.06$). The differences in $CFI, TLI, SRMR$ and $RMSEA$ between the scalar and strict invariances were less than 0.01, which indicates full uniqueness of measurement invariance.

**Convergent validity of DD**

The convergent validity of the Dark Triad Dirty Dozen scale was established by correlating DD with the Corruption Propensity Scale. All the correlations were positive and significant at $p < 0.001$ and the correlations ranged between $r = 0.53$ and $r = 0.78$, which provides evidence of the convergent validity of DD. The results of the Pearson correlations are displayed in Table 3.

**Concurrent validity of DD**

Pearson correlations between the Dark Triad Dirty Dozen scale and the Moral Disengagement Scale were used to determine the concurrent validity of DD, and all the correlations were positive and significant at $p < 0.001$. The correlations ranged between $r = 0.40$ and $r = 0.81$, which provides evidence of the concurrent validity of DD. The results of the Pearson correlations for each of the eight Moral Disengagement Scale domains are displayed in Table 3.

**Table 3.** Concurrent and convergent validity.

|                        | Machiavellianism | Psychopathy | Narcissism |
|------------------------|------------------|-------------|------------|
| **Corruption propensity** | 0.78***          | 0.76***     | 0.53***    |
| **Moral disengagement**      |                  |             |            |
| Moral justification  | 0.61***          | 0.59***     | 0.48***    |
| Euphemistic labelling | 0.73***          | 0.68***     | 0.48***    |
| Advantageous comparison | 0.81***          | 0.67***     | 0.44***    |
| Displacement of responsibility | 0.62***        | 0.64***     | 0.45***    |
| Diffusion of responsibility | 0.71***        | 0.70***     | 0.45***    |
| Distortion of consequences | 0.67***        | 0.65***     | 0.40***    |
| Dehumanisation          | 0.47***          | 0.52***     | 0.43***    |
| Attribution of blame    | 0.47***          | 0.52***     | 0.45***    |

Notes: ***$p < 0.001$. 

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**Figure 2.** Path diagram of the CFA model. The numbers on the arrows represent the CFA factor loadings and the covariance between the factors.
Reliability of DD

The mean scores, standard deviations and standardised Cronbach’s alphas for the three constructs and each of the items in the DD as well as the test–retest reliability coefficients for each construct are displayed in Table 2. The mean score for Machiavellianism was 9.31 (SD = 6.31, range = 4–36), the average score for psychopathy was 10.32 (SD = 5.77, range = 4–36) and the mean score for narcissism was 18.67 (SD = 8.80, range = 4–36). The Cronbach’s alpha was 0.83 for Machiavellianism, 0.70 for psychopathy and 0.86 for narcissism. The test–retest reliability coefficients were 0.85 for Machiavellianism, 0.89 for psychopathy and 0.85 for narcissism.

Discussion

The small number of studies examining the consequences and impact of the Dark Triad on society in Saudi Arabia is attributable to the lack of validated measures. This clearly implies a need for a validated scale that can be used in this population. The aim of the present study was to investigate the psychometric properties of the Dark Triad Dirty Dozen in Saudi Arabia. The results of the EFA and CFA supported the three-factor model of the original DD study of Jonason and Webster (2010). The items exhibited adequate factor loading for both the EFA and CFA. The scale had good internal consistency reliability, good test–retest reliability and good concurrent and convergent validity. Furthermore, the scale seemed to be gender invariant.

The results of the confirmatory factor analysis corroborate those of Jonason and Webster (2010) and other validation studies. This is also in line with the Arabic versions of the separate measures of the dark triad constructs. A study investigated the construct validity of the Self-Report Psychopathy scale (PPI-R) and reported similar properties of the scale among American and Saudi students (Latzman et al., 2015). Using an Arabic version of the Mack IV scale, there were no differences noted in a study comparing American and Arab respondents on the construct of Machiavellianism (Starr, 1975). Comparing UK samples and UAE samples on narcissism, Thomas et al. (2013) reported no major differences between the two samples on the scores of Narcissistic Personality Inventory. The three-factor model showed adequate fit indices and factor loadings. The factor loadings ranged between 0.29 and 0.83, which is similar to those reported by Savard et al. (2017) (ranging between 0.28 and 0.86), Pineda et al. (2018) (ranging between 0.22 and 0.77), Jonason and Webster (2010) (ranging between 0.39 and 0.84) and Jonason and Luévano (2013) (ranging between 0.28 and 0.79). Although the EFA and CFA supported the three-factor model, Machiavellianism and psychopathy were very highly correlated, which corroborates the finding that these two dimensions might not be sufficiently differentiated (Rogoza & Cieciuch, 2019; Vize et al., 2018) and may be two sides of the same coin (O’Boyle et al., 2015). Pabian et al. (2015) also found in their SEM model a high correlation between Machiavellianism and psychopathy. The multigroup CFA indicated that DD was gender invariant. This is in line with previous studies that reported measurement invariance of DD (Ahmed et al., 2020; Chiorri et al., 2019; Pechorro et al., 2021).

The results of the reliability analysis indicated adequate internal consistency analysis, with Cronbach’s alpha of 0.83 for Machiavellianism, 0.70 for Psychopathy and 0.86 for Narcissism. These Cronbach’s alphas are similar to those found in Bangladesh, 0.85 for Machiavellianism, 0.70 for psychopathy and 0.86 for narcissism (Ahmed et al., 2020). Overall, the results suggested good internal consistency reliability of DD. This was also found in previous studies (Chiorri et al., 2019; Jonason & Webster, 2010; Savard et al., 2017; Özsoy et al., 2017). The test–retest reliability ranged between 0.85 and 0.89. These results are higher than those reported in previous research. Yousefi and Piri (2016) examined the psychometric properties of the DD in Iran and reported test–retest reliability coefficients ranging between 0.66 and 0.80. Our study’s correlations were also higher than those reported in a DD validation study in Poland (Czarna et al., 2016). These findings support the temporal stability of DD.

The results of the Pearson correlations between the DD and the Moral Disengagement Scale and the Corruption Propensity Scale, respectively, supported the concurrent and convergent validity of DD. The correlations were moderate to high, ranging between 0.40 and 0.81. These results are in line with those of prior research (Chiorri et al., 2019; Jonason & Webster, 2010; Milošević et al., 2022; Pechorro et al., 2021). These findings indicate that DD is related to other measures that assess the dark side of the human nature.

Although there may be cultural differences in terms of expression, it seems that the Dark Triad personality traits exist in both individualistic and collectivist cultures. For example, in individualistic cultures, people with high levels of the Dark Triad traits tend to manipulate others in order to achieve their goals (Furnham et al., 2013; Pechorro et al., 2021). On the other hand, in collectivistic
cultures, people with Dark Triad traits manipulate others by provoking their sense of responsibility because it is more efficient and acceptable (Robertson et al., 2016). In terms of differences, this study found that men had higher scores on Machiavellianism and psychopathy, whereas women had higher scores on narcissism. These findings are similar to those found in Poland, where men had higher scores on Machiavellianism and psychopathy, but similar scores to women on narcissism (Czarna et al., 2016). The literature has also established gender differences in narcissism and psychopathy, where males were found to score higher than females (Cale & Lilienfeld, 2002; Grijalva et al., 2015), but the results regarding gender differences in Machiavellianism have not been consistent (Furnham et al., 2013). The differences where men score higher on all the three traits were also reported by Chionni et al. (2019). Another study investigating DD in eight regions of the world reported gender differences in the three constructs in those regions, where men had higher scores on the three traits, except in Asia where differences in psychopathy were not conclusive (Rogoza et al., 2021).

Research on gender differences in narcissism is less consistent than for the other constructs. Our findings revealed that females scored higher than males on narcissism, aligning with previous studies that reported higher scores in females on vulnerable narcissism (Green et al., 2020; Pincus et al., 2009; Wright et al., 2010). However, others reported no gender difference for narcissism (Besser & Priel, 2010; Bizumic & Duckitt, 2008; Bleske-Rechek et al., 2008; Miller et al., 2010) and others found higher levels in males than in females (Grijalva et al., 2015; Tschanz et al., 1998). Given the inconsistencies, further research is needed, especially in collectivistic societies.

Some limitations of this study have to be acknowledged. First, the design of the study was cross-sectional. Second, the study relied on subjective measures for which respondents could exaggerate or understate their responses. Future research should include objective measures, such as tracking real-world behaviours. Third, we lacked a cross-cultural sample for cross-cultural comparison; future research should investigate cross-cultural measurement invariance.

**Conclusion**

There is little research on the Dark Triad of personality in Saudi Arabia mainly due to the lack of validated measures. This study contributed to the literature by establishing in the Saudi context the psychometric properties of the Dark Triad Dirty Dozen, a short scale that measures the Dark Triad traits of personality: Machiavellianism, psychopathy and narcissism. The confirmatory factor analysis supported the three-factor structure reported by Jonason and Webster (2010). Nonetheless, the high correlation found between Machiavellianism and psychopathy supports the current critics about the little distinction between the two constructs. The internal consistency reliability and test–retest reliability were adequate and in line with prior research. Concurrent and convergent validity was also supported by moderate-to-high Pearson correlations with the Corruption Propensity Scale and the Propensity to Morally Disengage scale. In sum, the Dark Triad Dirty Dozen scale is a reliable and valid measure that can be used in Saudi Arabia to investigate the Dark Triad and assess individuals’ Dark Triad personality traits.

**Acknowledgments**

The author, therefore, acknowledges with thanks to DSR for their technical and financial support.

**Disclosure statement**

No potential conflict of interest was reported by the author(s).

**Funding**

The Deanship of Scientific Research (DSR) at King Abdulaziz University (KAU), Jeddah, Saudi Arabia, has funded this project under grant no. Ph008-246-1443.

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**Data availability statement**

The data that support the findings of this study are available from the corresponding author, upon reasonable request.

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