Article

The Spanish Short Dark Tetrad (SD4): Association With Personality and Psychological Problems

Jordi Ortet-Walker[1,2] 🆔, Carlo Garofalo[3] 🆔, Verónica Vidal-Arenas[1] 🆔, Stefan Bogaerts[4] 🆔, Laura Mezquita[1,5] 🆔, Generós Ortet[1,5] 🆔 and Manuel I. Ibáñez[1,5] 🆔

1 Universitat Jaume I (Spain)
2 Hogrefe TEA Ediciones (Spain)
3 Università degli Studi di Perugia (Italy)
4 Tilburg University (Netherlands)
5 CIBERSAM ISCIII (Spain)

ABSTRACT

Background: The Short Dark Tetrad (SD4) is a recently developed instrument for assessing the "dark" personality traits of psychopathy, narcissism, Machiavellianism, and sadism. We aimed to examine the SD4's psychometric properties, adapting it into Spanish and exploring its structure, gender invariance, reliability, concurrent validity, and nomological network. **Method:** A sample of 668 adults (M_{age} = 26.36, SD = 10.64, 69.2% females) completed the SD4 and other self-report questionnaires. **Results:** The results demonstrated sound indices of reliability and concurrent validity, an adequate four-factor structure, and support for gender invariance. Furthermore, most of the findings about the nomological network were in line with prior hypotheses: All four SD4 scales were associated with low levels of agreeableness and antagonism; psychopathy was also related to low conscientiousness, disinhibition and impulse-control problems; narcissism was positively associated with extraversion and negatively associated with internalizing symptoms; Machiavellianism was uncorrelated with impulsivity-related problems, which made it distinct from the psychopathy profile; finally, sadism showed a similar pattern of associations to psychopathy, albeit less strongly linked to impulsivity problems and externalizing behavior. **Conclusions:** Overall, the SD4 presents sound psychometric properties, although the overlap between psychopathy and sadism warrants some caution.

El Cuestionario Corto de la Tétrada Oscura (SD4) en Español: Asociación con la Personalidad y los Problemas Psicológicos

RESUMEN

Antecedentes: El Short Dark Tetrad (SD4) es un instrumento recientemente desarrollado para evaluar los rasgos "oscuros" de personalidad de psicopatía, narcisismo, maquiavelismo y sadismo. Nuestro objetivo fue profundizar en las propiedades psicométricas del SD4 adaptando el instrumento al español, y examinar su estructura, invariancia de género, fiabilidad, validez concurrente y red nomológica. **Método:** Una muestra de 668 adultos (M_{edad} = 26,36, SD = 10,64, 69,2% mujeres) completaron el SD4 y otros cuestionarios. **Resultados:** Encontramos índices apropiados de fiabilidad y validez concurrente, una estructura de cuatro factores, y apoyo a la invariancia de género. Además, los hallazgos sobre la red nomológica estuvieron mayoritariamente en línea con las hipótesis preregistradas: las cuatro escalas SD4 se asociaron con baja amabilidad y antagonismo; la psicopatía se relacionó con baja responsabilidad, desinhibición y problemas de impulsividad; el narcisismo se asoció con extraversión y negativamente con síntomas de interiorización; el maquiavelismo no correlacionó con problemas de impulsividad, por lo que mostró un perfil diferenciado al de psicopatía; el sadismo mostró un patrón de asociaciones similar a psicopatía, aunque menos vinculado a problemas de impulsividad y comportamientos externalizantes. **Conclusiones:** En general, el SD4 presenta buenas propiedades psicométricas, aunque el solapamiento entre psicopatía y sadismo justifica cierta precaución.

Since the introduction of the term Dark Triad two decades ago (Paulhus & Williams, 2002), one of the most fruitful topics of research in the field of personality has been the study of socially aversive personality characteristics (Dinic & Jevremov, 2021). The Dark Triad comprises the joint study of subclinical psychopathy (involving a callous lack of empathy, along with sensation-seeking and impulsive behavior; Hare & Neumann, 2008; Skeem et al., 2011), subclinical narcissism (entailing self-centeredness and admiration-seeking behavior; Back et al., 2013; Raskin & Hall, 1979), and Machiavellianism (characterized by a cynical worldview, strategic planning, interpersonal exploitation, and personal ambition; Christie & Geis, 1970; Jones & Paulhus, 2009). The combined study of these "dark" traits has allowed a more accurate link to be found between particular Triad members and external correlates, and has contributed to increasing our knowledge about these antagonistic traits (Furnham et al., 2013; Jonason, 2023; Muris et al., 2017). However, some controversies and criticism have also emerged, particularly the difficulties in properly distinguishing Machiavellianism from subclinical psychopathy (Miller et al., 2017) or establishing the number and nature of "dark traits" (e.g., Marcus & Ziegler-Hill, 2015; Moshagen et al., 2018).

Among the proposed additional traits, everyday sadism has achieved the broadest consensus (e.g., Buckels et al., 2013; Plouffe et al., 2017; Paulhus, 2014), thus a so-called Dark Tetrad has been proposed (Chabrol et al., 2009). *Everyday sadism* refers to non-sexual, non-criminal forms of sadistic behavior that occur in daily life and that involve intrinsic pleasure arising from the physical or psychological suffering of others (Paulhus, 2014). Initial attempts to jointly study Dark Tetrad traits usually employed the Dirty Dozen (DD; Jonason & Webster, 2010) or the Short Dark Triad (SD3; Jones & Paulhus, 2014) questionnaires, together with stand-alone scales assessing sadism, such as the Assessment of Sadistic Personality (ASP; Plouffe et al., 2017), the Short Sadistic Impulse Scale (SSIS; O'Meara et al., 2011), the Comprehensive Assessment of Sadistic Tendencies (CAST; Buckels et al., 2013), or the Varieties of Sadistic Tendencies (VAST; Paulhus & Jones, 2015). Recently, the Short Dark Tetrad (SD4; Paulhus et al., 2022) has been developed to improve the SD3 by: a) replacing items in the Machiavellianism scale, reflecting less aggressive content with a greater focus on controlled manipulation, thereby better differentiating it from the psychopathy scale; and b) adding sadism items that have been shown to be structurally distinctive from the other dark factors.

As a recently developed instrument, the SD4 requires multiple sources of reliability and validity evidence, and initial studies point to promising psychometric properties. Thus, different modeling approaches have supported an adequate four-factor structure subsuming the SD4 (Blötner et al., 2022; Neumann et al., 2022; Paulhus et al., 2022). The SD4 has also shown sound concurrent validity with homologous scales (Blötner et al., 2021). In addition, the SD4 has yielded distinctive links of each dark trait to particular outcomes, despite the apparent similarities between the profiles of subclinical psychopathy and everyday sadism (Blötner & Mokros, 2023; Bonfá-Araujo et al., 2022). Namely, these links include associations of narcissism with interpersonal adjustment (Paulhus et al., 2022) and transformational leadership (Schreyer et al., 2021); associations of Machiavellianism with cynicism and mistrust (Blötner et al., 2021); correlations of psychopathy with impulsivity-related behaviors (Blötner et al., 2021); and sadism

predicting behavioral and self-reported aggression (Paulhus et al., 2021) or cyberbullying behavior (Gajda et al., 2022). Last, a coherent association of SD4 scales with the personality domains of the Five-Factor Model (FFM) has also been reported (Paulhus et al., 2022; Blötner et al., 2022). Thus, all four features were linked to (low) agreeableness, mainly psychopathy and sadism, supporting the proposal of a shared "dark core" for dark traits (Moshagen et al., 2018) that would reflect the opposite pole of the normal personality dimension of agreeableness (i.e., "antagonism"; Vize et al., 2020). Furthermore, narcissism correlated with extraversion; psychopathy and sadism with low conscientiousness; whereas Machiavellianism presented inverse but small (Paulhus et al, 2021) or non-significant correlations (Blötner et al., 2022) with conscientiousness. Overall, SD4 narcissism, Machia-vellianism, and psychopathy reflect different personality and criteria profiles, although the distinctiveness between psychopathy and sadism requires further scrutiny (Blötner & Mokros, 2023; Bonfá-Araujo et al., 2022).

To date, the original SD4, developed in English, has been adapted to the German (Blötner et al., 2022; 2021), Portuguese (Pechorro et al., 2022), Polish (Gajda et al., 2022), Farsi (Qaderi Bagajan et al., 2024), and Chinese languages (Liu et al., 2023). To expand knowledge in this area, we aimed to adapt the SD4 into the Spanish language and test the psychometric properties of the scale in a community sample of adults living in Spain, bearing in mind the International Test Commission guidelines for translating and adapting tests (Muñiz et al., 2013). Specifically, we sought to replicate its factor structure and find evidence of multiple group invariance across gender. Furthermore, we aimed to examine internal consistency reliability and concurrent associations with corresponding scales. Finally, to provide incremental knowledge beyond the current state-of-the-art, we aimed to expand the evidence of the nomological network of the SD4 by investigating links to normal and maladaptive personality traits and to broad psychopathology domains. Thus, the present study can be useful to address some criticisms of the constructs of Machiavellianism (Miller et al., 2017) and sadism (Blötner & Mokros, 2023), therefore expanding upon the empirical structure and conceptual utility of these traits.

Our main hypotheses were that (see registration of present study): a) The four-factor structure of the SD4 would be adequately replicated in our Spanish adaptation; b) the SD4 would show evidence of strong measurement invariance across gender; c) mean scores on each of the Tetrad traits would be significantly higher in men than women, especially for psychopathy and sadism; d) reliability sources of evidence would show adequate indices; e) each of the SD4 traits would yield evidence of concurrent validity, showing highest correlations with corresponding measures; and f) the SD4 features would show evidence of criterion validity, in terms of correlations with normal and maladaptive personality traits, and psychological problems. Thus, we anticipated that all four traits would have significant associations with antagonism/low agreeableness and externalizing problems; differential correlations would include psychopathy being associated with disinhibition/impulsivity, whereas Machiavellianism would show non-significant or even positive associations with measures of impulse-control; narcissism would be associated positively with extraversion and negatively with detachment; finally, sadism would show a similar pattern of correlations to psychopathy, although less strongly related to impulse-control and externalizing problems.

Method

The preregistration for the present study, databases, analyses scripts, and supplementary material can be found in the Open Science Framework: https://osf.io/hqs9t/?view_only=c941a00bf8644ef992e2bda6cb553901

Participants

A core set of questionnaires was completed by all participants, whereas a subset of them (subsamples 1 and 2, see description in Supplementary Material-SM) completed additional measures. The full sample consisted of 668 adults (age range 18 to 76; M_{age} = 26.36, SD = 10.64; 69.2% women, 1 participant identified as non-binary, so this participant was excluded from gender invariance and difference in means analyses). Their maximum level of education was requested, where 14 had completed up to Primary School, 31 Compulsory High school, 300 Baccalaureate (post-16 stage of education), 105 Apprenticeships, 157 Bachelor's degree, 60 Master's degree, and 1 PhD. All participants resided in the Valencian region of eastern Spain and were fluent Spanish speakers.

Instruments

A detailed description of the questionnaires is included in SM Instruments, and an overview of descriptive statistics for all measures are shown in SM Table 1.

Dark Tetrad. The Short Dark Tetrad (SD4; Paulhus et al., 2022). This 28-item self-report measure assesses Machiavellianism, everyday sadism and the subclinical traits of psychopathy and narcissism, and its Spanish adaptation is the focus of the present study. The measure is responded on a 5-point scale, indicating the degree to which statements apply to the respondent (1 = *Not at all,* 5 = *Very much*). Original and translated items are available in Table 2 of the SM.

Dark Triad. A Spanish adaptation (Ortet-Walker et al., 2021) of the Five-Factor Model Antagonistic Triad Measure (FFM ATM; Rose et al., 2022). This questionnaire assesses psychopathy, narcissism, and Machiavellianism, along with specific subscales per trait. In present study, we used the grandiose narcissism subscale, as in the original validation of the FFM ATM (see Rose et al., 2022), and a composite measure of antagonism plus planfulness for

Machiavellianism, according to the theoretical core components of this dark trait (Miller et al., 2017; Jones & Paulhus, 2009). Alphas ranged from .41 to .63 (see Table 4), similar to those reported in the original validation (see Rose et al., 2022).

Psychopathy. Triarchic Model. A Spanish adaptation (Tomás-Portalés et al., 2021a) of the Triarchic Psychopathy Measure, 15-item version (TriPM-Short; Mededovic & Damjanovic, 2018). This is a short version of the TriPM (Patrick, 2010), assessing *boldness, meanness,* and *disinhibition*, along with a total composite psychopathy score. Alphas ranged from .71 to .74 (see Table 4).

Psychopathy. Four-Factor Model. A Spanish adaptation (Tomás-Portalés et al., 2021b) of the Self-Report Psychopathy Scale, Short Form (SRP SF; Paulhus et al., 2017). This 28-item questionnaire assesses the four factors (interpersonal, affective, lifestyle, and antisocial), along with a total composite score of psychopathy (Hare, 2003). For the present study, item 22 from the antisocial scale was removed given its contribution to an extremely low internal consistency (Alpha with item = .29; alpha without item = .56, see Table 4). This last Cronbach's Alpha value is in line with other studies in subclinical samples (Gordts et al., 2017), and the remaining alpha values were acceptable to good (see Table 4).

Sadism. Spanish adaptations (Ortet-Walker et al., 2019) of the Short Sadistic Impulse Scale (SSIS; O'Meara et al., 2011) and the Assessment of Sadistic Personality (ASP; Plouffe et al., 2017). Acceptable alphas for both scales were found (see Table 4).

Five-Factor Model Personality. The NEO-FFI, Spanish version is the short form of the NEO-PI-R (McCrae & Costa, 2008). This scale assesses the 5 broad domains of FFM personality: neuroticism, extraversion, openness, agreeableness, and conscientiousness. Alphas ranged from .70 to .87 (see Table 4).

Psychopathology. Personality Disorder Traits. The Personality Inventory for DSM-5-Brief Form, Spanish version (PID-5-BF; Romero & Alonso, 2019). The PID-5-BF assesses five personality disorder domains: negative affect, detachment, antagonism, disinhibition, and psychoticism. Alphas ranged from .66 to .76 (see Table 4).

Psychopathology. Internalizing, Externalizing, and Attention Problems. The authorized Spanish self-report version of the Brief Problem Monitor (BPM; Achenbach & Ivanova, 2018). The BPM is a self-report measure assessing problems in three domains: Internalizing, externalizing, and attention. Alphas ranged from .75 to .83 (see Table 4).

Table 1

Goodness-of-Fit Statistics From the Main Exploratory Structural Equation Model of the SD4 and Invariance Tests Across Gender

Model	χ² (df)	CFI	TLI	RMSEA	90% CI	SRMR	ΔCFI	ΔRMSEA
Model testing								
Main ESEM (*N* = 667)	696.776* (272)	.947	.926	.048	[.044, .053]	.037	—	—
ESEM model in men (*N* = 205)	405.865* (272)	.933	.906	.049	[.039, .059]	.049	—	—
ESEM model in women (*N* = 462)	542.368* (272)	.942	.920	.046	[.041, .052]	.042	—	—
Invariance testing								
Configural	1,046.216* (596)	.931	.912	.048	[.043, .052]	.045	—	—
Scalar	1,166.536* (721)	.931	.928	.043	[.038, .048]	.054	<.001	.005

Note. ESEM = exploratory structural equation modeling; χ² = chi square; df = degrees of freedom; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation; 90% CI = 90% confidence interval of the RMSEA; SRMR = standardized root mean square residual.
*p < .001.

Table 2
Standardized Factor Loadings From the Main Exploratory Structural Equation Model of the SD4 Items, Latent Factor Correlations, and Internal Consistency Indices

SD4 items	Machiavellianism (F1)		Narcissism (F2)		Psychopathy (F3)		Sadism (F4)	
	λ	99% CI	λ	99% CI	λ	99% CI	λ	99% CI
1	**.324*****	[.199, .450]	-.006	[-.126, .113]	-.033	[-.171, .104]	.080	[-.053, .213]
2	**.530*****	[.424, .636]	.001	[-.100, .099]	.143**	[.032, .253]	-.272***	[-.386, -.158]
3	**.656*****	[.558, .754]	-.044	[-.140, .052]	.054	[-.058, .166]	-.142**	[-.255, -.028]
4	**.556*****	[.460, .651]	-.273***	[-.369, -.177]	.100*	[-.012, .213]	.079	[-.030, .188]
5	**.543*****	[.442, .645]	.150***	[.055, .246]	-.110*	[-.225, .005]	.051	[-.054, .155]
6	**.466*****	[.368, .565]	.117**	[.015, .220]	-.032	[-.150, .086]	.145**	[.028, .262]
7	**.552*****	[.460, .644]	.206***	[.117, .295]	-.153***	[-.252, -.055]	.291***	[.195, .387]
8	-.030	[-.117, .057]	**.769*****	[.693, .844]	-.118**	[-.217, -.019]	.078*	[-.016, .173]
9	.082*	[-.003, .168]	**.733*****	[.658, .809]	-.107**	[-.207, -.008]	.095**	[.002, .189]
10	.053	[-.055, .168]	**.435*****	[.333, .537]	.281***	[.166, .396]	-.099*	[-.207, .009]
11	.056	[-.039, .150]	**.610*****	[.511, .709]	.202***	[.091, .312]	-.223***	[-.334, -.112]
12	-.016	[-.111, .078]	**.634*****	[.547, .721]	-.017	[-.135, .102]	-.013	[-.131, .106]
13	-.080*	[-.184, .024]	**.591*****	[.490, .692]	.105*	[-.013, .223]	.029	[-.085, .143]
14	.070	[-.043, .184]	**.332*****	[.221, .443]	.091	[-.039, .221]	-.001	[-.130, .128]
15	.151**	[.035, .266]	.047	[-.070, .164]	**.543*****	[.419, .667]	.032	[-.092, .156]
16	.174***	[.058, .290]	.020	[-.099, .138]	**.501*****	[.376, .625]	.149**	[.026, .271]
17	.001	[-.136, .135]	.016	[-.120, .151]	**.679*****	[.548, .810]	.115*	[-.020, .251]
18	.037	[-.079, .153]	.069	[-.039, .177]	**.484*****	[.354, .615]	-.055	[-.182, .072]
19	-.162***	[-.276, -.047]	.055	[-.063, .173]	**.751*****	[.640, .863]	.110*	[-.010, .231]
20	-.102**	[-.193, -.011]	.050	[-.033, .133]	**.657*****	[.564, .749]	.235***	[.139, .332]
21	.128**	[.018, .238]	.203***	[.101, .304]	**.385*****	[.268, .503]	.173***	[.060, .285]
22	-.084*	[-.191, .024]	-.035	[-.137, .067]	.368***	[.253, .483]	**.621*****	[.520, .723]
23	-.076*	[-.155, .003]	-.031	[-.108, .045]	-.081*	[-.187, .025]	**.901*****	[.810, .991]
24	.242***	[.148, .336]	-.061	[-.160, .038]	.011	[-.109, .131]	**.595*****	[.481, .709]
25	-.098**	[-.181, -.015]	.023	[-.056, .102]	.028	[-.069, .125]	**.875*****	[.791, .959]
26	.223***	[.128, .338]	-.070	[-.175, .035]	.180***	[.065, .294]	**.456*****	[.332, .580]
27	.042	[-.115, .199]	.018	[-.135, .172]	.365***	[.204, .525]	.252***	[.098, .406]
28	.178***	[.076, .279]	.248***	[.146, .349]	.075	[-.037, .187]	**.391*****	[.270, .511]
Latent correlations								
F1 (Mach)	α/ω = .69/.68		—		—		—	
F2 (Narc)	.363***		α/ω = .76/.75		—		—	
F3 (Psych)	.206***		.278***		α/ω = .74/.74		—	
F4 (Sadism)	.277***		.297***		.478***		α/ω = .78/.79	

Note. Shaded entries are the target loading items. Loadings > .30 are shown in bold, λ = factor loadings, 99% CI = 99% confidence interval. α = Cronbach's Alpha; ω = McDonald's Omega. Mach = Machiavellianism, Narc = Narcissism, Psych = Psychopathy. Internal consistency indices are shown in the diagonal over the latent factor correlations.
* *p* < 0.05. ** *p* < 0.01. *** *p* < 0.001.

Procedure

Two of the authors of the present study, both experts in psychological assessment and fluent in both Spanish and English languages, translated and adapted the original English SD4 items into Spanish. Afterwards, an experienced translator unfamiliar with the questionnaire back-translated them into English. One of the authors of the SD4 analyzed the back translation and ensured that the items were adjusted to their original meaning.

A convenience sample was recruited by five trained graduate students. A core set of questionnaires were completed by the full sample, and the remaining questionnaires were distributed among two subsamples (see SM Table 1 for specific questionnaires completed by each sample). Participants were community-dwelling adults who were friends, family members, or acquaintances of the recruiters, and were contacted via email or posting announcements on social media. All questionnaires were completed through the Google Forms platform and a forced response format, thus yielding no missing data. Participation was voluntary, there was no incentive to participate, and the data were ensured to be completely confidential. The present research was approved by the ethical review board of the first author's university and was conducted in accordance with the Declaration of Helsinki and the European Parliament Data Protection Regulation (GDPR; European Parliament, 2016/679) guidelines.

Data Analysis

Exploratory Structural Equation Modeling (ESEM) was conducted using the Weighted Least Square Mean and Variance adjusted estimator (WLSMV). The standard cut-off criteria for assessing model fit were considered (West et al., 2012). The χ^2 index was also inspected, although given its high sensitivity to sample size, its non-significance was not relied upon to establish adequate model fit (see a detailed description of the ESEM in SM Data analysis). Results of a Confirmatory Factor Analysis (CFA) can be found in SM Tables 4 and 5, which are provided to illustrate ESEM's improved fit to the data.

Using an ESEM framework, we performed a multiple-group invariance test between men and women (see a detailed description in SM Data Analysis). In line with Neumann et al. (2022) and Sass (2011), configural and scalar models were performed incrementally to test for invariance. Cheung and Rensvold's (2002) criteria of ≤ .01 CFI change (ΔCFI) and ≤ .015 ΔRMSEA were employed, where a decrease in CFI and an increase in RMSEA above these values for the nested model are indicative of non-invariance. SRMR value change was de-emphasized given its lack of sensitivity to detect non-invariance (Chen, 2007). The ESEM procedures were undertaken using Mplus software, v.8 (Muthén & Muthén, 2017).

We performed Student's t-tests and computed the effect sizes in order to study gender differences in SD4 scales. Alpha (α) and Omega (ω) coefficients were computed to evaluate internal consistency reliability. Last, Pearson correlations were computed to inspect concurrent and criterion validity indices, employing SPSS v29. Significance was established at $p < .01$ to control for family-wise Type I error rate (see preregistration of present study).

Results

Intercorrelations

Zero-order correlations between all variables employed in the present study are shown in SM Table 3.

Exploratory Structural Equation Modeling and Reliability

Adequate fit indices were found for the ESEM model (except for the significant χ^2 result). Furthermore, we found evidence of strong invariance across gender. The ESEM procedure retained adequate fit indices in the separate subsamples of men and women. In addition, in each invariance step, change in CFI and RMSEA fit indices were trivial and within the cut-off criteria (see Table 1).

The standardized loadings of the items were statistically significant and above .30 on their respective factors (except sadism item 27 "Just for kicks, I've said mean things on social media", with a higher cross-loading on the psychopathy factor). The only other cross-loading higher than .30 was sadism item 22 "Watching fist fights excites me" on the psychopathy factor, albeit with a much higher target loading.

Internal consistency indices ranged between α = .69 and .78 and between ω = .68 and .79, in line with Paulhus et al. (2022). Table 2 shows the latent factor correlations among the SD4 traits, which ranged between .21 and .48, highest between psychopathy

and sadism (Pearson correlations were between .25 and .54; see SM Table 3).

Table 3
Mean Differences in the SD4 Traits Across Gender

	Full sample (N = 667)	Men (N = 205)	Women (N = 462)	t-test	
	Mean *(SD)*	Mean *(SD)*	Mean *(SD)*	*p*	*d*
Machiavellianism	22.13 (5.14)	23.77 (4.72)	21.43 (5.16)	< .001	.47
Narcissism	17.87 (5.29)	19.32 (5.15)	17.24 (5.23)	< .001	.45
Psychopathy	11.74 (4.40)	13.20 (4.91)	11.09 (4.00)	< .001	.49
Sadism	13.49 (5.48)	16.52 (5.84)	12.13 (4.84)	< .001	.69

Note. SD = Standard Deviation. d = Cohen's d scores in absolute values. Scores of .20, .50 and .80 correspond to small, medium and large effect sizes respectively (Cohen, 1992).

Gender Differences

Having established strong measurement invariance across gender, mean differences among these groups could be inspected. Men scored significantly higher on all traits (with medium effect sizes), especially sadism, the difference of which was close to a large effect size.

Concurrent Validity

Table 4 shows the zero-order correlations between the SD4 traits and corresponding scales. Total scale scores of narcissism and sadism correlated highest with their respective SD4 trait and were large in magnitude. The FFM ATM Machiavellianism composite of antagonism plus planfulness had the highest, medium correlation with its respective SD4 scale. Regarding SD4 psychopathy, the FFM ATM psychopathy scale together with the TriPM total, meanness and disinhibition, and SRP lifestyle scales showed the highest concurrent associations, all large. However, the SRP interpersonal and affective subscales, along with the total scale score, were more strongly linked to sadism. TriPM boldness showed the highest correlation with SD4 narcissism.

Nomological Network

The SD4 factors' correlations with FFM and maladaptive personality and psychopathological problems can be found in SM Table 3. The four Tetrad factors had significant, negative correlations with FFM agreeableness, particularly psychopathy and sadism. Both of the latter traits were associated with (low) conscientiousness, especially psychopathy. Low neuroticism and especially high extraversion were distinctly linked to narcissism. A small, positive association was additionally found between openness and narcissism. Machiavellianism also positively correlated with neuroticism.

As for maladaptive personality correlates, all four Tetrad traits were positively associated with antagonism. Detachment and psychoticism were significantly positively associated with Machiavellianism, psychopathy, and sadism. Both psychopathy and sadism also correlated positively with disinhibition, a feature more strongly related to the psychopathy factor. Negative affect showed a small, positive correlation with psychopathy.

Table 4
Zero-Order Correlations Among Corresponding Dark Tetrad Scales and Subscales, Normal and Maladaptive Personality Traits, and Psychopathological Problems

	SD4 Mach	SD4 Narc	SD4 Psych	SD4 Sadism
Sadism				
SSIS Sadism (.77)	.21**	.25**	.50**	**.57**
ASP Sadism (.77)	.23**	.27**	.48**	**.58**
FFM ATM				
Antagonism+Planfulness Mach (.41)	**.26**	.14**	.05	.21**
Grandiose Narc (.69)	.41**	**.60**	.45**	.50**
Total Psych (.63)	.32**	.48**	**.60**	.48**
SRP Psychopathy				
Interpersonal (.83)	.50**	.34**	.42**	.59**
Affective (.72)	.31**	.25**	.50**	.70**
Lifestyle (.79)	.20**	.32**	.66**	.51**
Antisocial (.56)	.11*	.21**	.32**	.30**
Total (.89)	.40**	.37**	**.63**	.70**
TriPM Psychopathy				
Boldness (.73)	.25**	.65**	.27**	.28**
Meanness (.75)	.21**	.12*	**.28**	**.31**
Disinhibition (.71)	.18**	.22**	**.57**	.40**
Total (.74)	.31**	.52**	**.56**	.48**
Normal personality (NEO-FFI)				
Neuroticism (.86)	.15**	-.18**	.08	.01
Extraversion (.81)	-.02	**.35**	.02	-.03
Openness (.70)	-.01	.12*	-.01	.09
Agreeableness (.72)	**-.24**	-.19**	**-.43**	**-.41**
Conscientiousness (.87)	.09	.09	**-.29**	-.21**
Maladaptive personality (PID-5)				
Negative affect (.66)	.11	-.15	.17*	.04
Detachment (.67)	.28**	.01	.37**	.35**
Antagonism (.68)	**.45**	.24**	**.41**	**.40**
Disinhibition (.70)	.01	.10	**.58**	.34**
Psychoticism (.76)	.23**	.08	.47**	.42**
BPM Psychopathological problems				
Attention (.82)	.10	-.13	**.32**	.22**
Internalizing (.83)	.18*	-.29**	.18*	.13
Externalizing (.75)	.17*	-.02	**.44**	.23**

Note. Mach = Machiavellianism, Narc = Narcissism, Psych = Psychopathy. Cronbach's Alphas of the scales are shown in brackets next to each variable. Hypothesized large associations are shown in bold (see preregistration).
*$p < .01$. **$p < .001$.

In terms of psychopathological problems, Machiavellianism was characterized by small, positive associations with both internalizing and externalizing problems. Narcissism showed a medium, negative link to internalizing distress. Psychopathy was significantly positively associated with all three psychopathological problems, with medium-to-large effect sizes with inattention and externalizing behavior. Finally, sadism had small-to-medium sized significant positive associations with inattention and externalizing, although with lower correlations than psychopathy.

Discussion

In the present study, we aimed to elaborate on the factor structure, gender invariance, and construct validity of the SD4, while making the instrument available for the Spanish-speaking, adult general population. Regarding factor structure, we found adequate fit indices and item factor loadings for the main ESEM model. Only two cross-loadings above the standard .30 threshold were found, both corresponding to the sadism scale and loading onto psychopathy. However, only one of them (item 27 "Just for kicks, I've said mean things on social media") had a higher cross-loading than target loading value. This is consistent with the SD4 original study (Paulhus et al., 2022) and other studies (Blötner et al., 2022; Neumann et al., 2022). Perhaps a rewording of item 27 could be considered for a better differentiation between psychopathy and sadism. Regarding reliability, the SD4 scales presented acceptable to good internal consistency indices, similar to those reported in the original study (Paulhus et al., 2022) and in other adaptations (Blötner et al., 2022; 2021; Gajda et al., 2022; Liu et al., 2023; Pechorro et al., 2022).

Multiple-group analysis was performed and yielded strong measurement invariance across gender, in line with Neumann et al. (2022), Blötner et al. (2022), and Pechorro et al. (2022). Thus, the present Spanish version of the SD4 would reflect true differences in mean Dark Tetrad scale scores when testing for statistical differences between genders. Thus, men showed higher scores on all four Tetrad traits, particularly sadism, in line with previous studies (Hartung et al., 2022; Neumann et al., 2022; Paulhus et al., 2022; 2021; Pechorro et al., 2022).

Regarding concurrent validity, the SD4 scales generally showed expected associations with other, corresponding dark trait scales. Namely, SD4 sadism presented the highest correlations with the other two sadism scales (SISS and ASP), and psychopathy and narcissism SD4 scales associated highest with their analogous FFM ATM counterparts. SD4 Machiavellianism showed a moderate correlation with the composite score of antagonism plus planfulness of FFM ATM Machiavellianism, the theoretical core components of this dark trait (Miller et al., 2017; Jones & Paulhus, 2009), although lower than desired for concurrent associations. This result is not entirely unexpected, given the very different approaches in developing SD4 and FFM ATM Machiavellianism scales (see Paulhus et al., 2022 for SD4; see Du et al., 2021; Rose et al., 2022 for FFM ATM), and some psychometric issues that this last scale has presented (such as poor internal consistency and low concurrent indices with other Machiavellianism scales; Du et al., 2021; Rose et al., 2022).

Regarding the association of the SD4 scales with Hare's (SRP SF; Paulhus et al., 2017) and Patrick's (TriPM; Patrick, 2010) psychopathy measures, we generally found the expected associations. SD4 psychopathy showed a high association with SRP and TriPM total psychopathy scores, and particularly with the SRP lifestyle subscale, which is characterized by impulsive, erratic, and disorganized behavior, and the TriPM disinhibition scale, in accordance with the impulsive, reckless, and aggressive content of the SD4 scale. SD4 sadism was also highly associated with the SRP SF, indeed showing higher correlations with the affective, interpersonal, and total scores than SD4 psychopathy. Unexpectedly, SD4 sadism was more largely associated with

disinhibition than meanness, the latter correlation being significant but lower than predicted. SD4 narcissism was mainly associated with TriPM boldness, likely because both constructs are strongly related to extraversion (Muris et al., 2017; Poy et al., 2014). Last, SD4 Machiavellianism showed moderate to low associations with TriPM and SRP scales, supporting the differentiation between Machiavellianism and psychopathy, with the noteworthy exception of the high association with the interpersonal facet of the SRP, probably reflecting the common manipulative characteristics of both Machiavellian and psychopathic traits (Paulhus, 2014).

Taken together, the pattern of relationships showed adequate concurrent validity findings for SD4 psychopathy and narcissism, partially for SD4 sadism, whereas the SD4 Machiavellianism and FFM ATM Machiavellianism scales displayed moderate concurrent associations. Despite this, SD4 Machiavellianism presented a distinctive profile from psychopathy, showing a high relationship with the interpersonal manipulative aspects of psychopathy, but low to moderate associations with other psychopathy components. Last, SD4 sadism showed strong concurrent associations with other sadism scales, but also presented high to very high associations with SRP SF affective, interpersonal, and total scales. Thus, the present results raise questions about the sadism scale's true distinctiveness from the psychopathy scale, maybe suggesting that the sadism scale could be reflecting the affective component of the broader construct of psychopathy, whereas the SD4 psychopathy scale would be reflecting the impulsive and disinhibited content of the construct (Hare & Neumann, 2008).

To further examine construct validity and depict the SD4's nomological network, its scales were correlated with normal and maladaptive personality domains, and with the broad psychopathological factors of internalizing, externalizing, and attention problems. Associations of the SD4 scales with FFM personality traits and PID-5 maladaptive personality confirmed preregistered hypotheses and previous findings (Muris et al., 2017; O'Boyle et al., 2015; Vize et al., 2018). A negative link to agreeableness and antagonism was the common pattern across all four SD4 traits, with distinguishing features in the expected direction. In addition, narcissism presented a positive association with extraversion and the small, positive link to openness shown in prior research. Psychopathy also presented consistent correlations with low conscientiousness and high disinhibition, reflecting the impulsive content of the scale (Paulhus, 2014). In contrast, Machiavellianism showed no relation with neither conscientiousness nor disinhibition, and so aligns more closely with theoretical expectations than the commonly reported negative and positive associations, respectively (Miller et al., 2017; Paulhus, 2014). This was expected given the development efforts for the SD4 to distinguish Machiavellianism from psychopathy more adequately (Paulhus et al., 2022), and is in line with Blötner et al. (2021) findings. By and large, despite the moderate concurrent associations with the FFM ATM scale, the construct validity of the SD4 Machiavellianism scale was mostly supported. Sadism showed a very similar pattern of correlations with FFM traits as psychopathy, where low conscientiousness and disinhibition characterized both profiles together with disagreeableness and antagonism, in the same vein as previous findings (Paulhus et al., 2022; Blötner et al., 2021). Partly tempering the issue of similarity between sadism and psychopathy, though, the associations between

sadism and disinhibition were relatively weaker than between disinhibition and psychopathy. A finer-grained analysis of the associations with FFM personality traits, such as links to facets, may be needed in future studies to disentangle the distinctiveness between sadism and psychopathy (Blötner & Mokros, 2023; Bonfá-Araujo et al., 2022). Finally, we did not hypothesize any of the Tetrad components to be linked to psychoticism, and for narcissism to only be slightly inversely associated with detachment. However, and in line with Blötner et al. (2021), we found high positive associations with both maladaptive personality scales, especially psychopathy and sadism. This would be indicative of a tendency for high scorers on psychopathy and sadism toward eccentric behavior and unusual beliefs about themselves, and a lower inclination to form close relationships with others (Grigoras & Wille, 2017). Similarly, other research has linked psychopathy to schizotypal and paranoid personality traits (Gillespie et al., 2021; Klipfel et al., 2017), both of which are comprised of similar content to the construct of psychoticism, at least as operationalized in the PID-5.

Regarding broad psychological problems, psychopathy exhibited the most problematic profile, revealing strong links to externalizing problems and inattention, in the same vein as Blötner et al. (2021). Of interest was also psychopathy's positive association with internalizing problems and negative affect, albeit in the small range, in line with studies linking psychopathy to emotion dysregulation (Colins et al., 2016; Garofalo et al., 2020) and negative emotions such as anger and contempt (Garofalo et al., 2019; Kosson et al., 2020). On the other hand, sadism presented a pattern of associations with psychological problems which was very similar to that of psychopathy, but they were notably attenuated, suggesting that sadism could be considered a similar construct to psychopathy with a less marked impulsivity component (Beauchaine & Sauder, 2017; Paulhus, 2014).

Taken together, these relationships with different measures revealed overall stronger associations between the SD4 features and maladaptive behavioral problems (i.e., antagonism, disinhibition, and externalizing) than to negative emotionality features (i.e., neuroticism and internalizing problems), as predicted. In addition, the patterns of associations for narcissism (extraversion, boldness, and low emotional distress), Machiavellianism (interpersonal manipulation and no impulse-control problems), and psychopathy (disinhibition, externalizing problems, and emotional dysregulation) were in line with predictions and supported their distinctiveness. Thus, SD4 Machiavellianism did not show problematic associations often reported in previous studies, at least concerning low conscientiousness and impulse-control problems. Thereby, as intended (Paulhus et al., 2022), the SD4 Machiavellianism subscale seems to constitute an improved measure compared to previous instruments and supports the differentiation between Machiavellianism and psychopathy. Last, sadism emerged as a distinguishable factor in the ESEM and showed good concurrent validity. However, its very high association with the SRP SF psychopathy scale and its pattern of associations with external correlates point to sadism's similarity with some aspects of psychopathy, suggesting that sadism may be nested within the psychopathy construct.

The present study has some limitations. On the one hand, our registration took place after data collection, although hypotheses were drafted prior to statistical analyses. On the other hand, the use of a convenience sample for the present study should

be highlighted, as it is important to ensure participants are as representative of the sociocultural context as possible. Furthermore, we relied exclusively on cross-sectional data, which should be supplemented in future studies by longitudinal analyses to allow for more explanative inferences regarding the Dark Tetrad's outcomes. In addition, the inclusion of other well-stablished stand-alone measures of narcissism and especially Machiavellianism would be highly recommended. Finally, other relevant outcomes that could better differentiate between the dark traits should be included in future studies with the Spanish SD4, such as bullying and cyberbullying, online trolling behavior, or consumption of violent media such as sports and videogames.

Despite these limitations, the present findings provide support for the reliability and validity of the SD4 for the assessment of the Dark Tetrad traits in the Spanish adult general population. It may also be a useful tool in the Latin American sociocultural context, where the wording may need to be slightly modified. In addition, this study extends the nomological network of the SD4. It appears to represent an efficient screening measure for early detection and prevention efforts toward maladaptive psychological and behavioral outcomes.

Author Contributions

Jordi Ortet-Walker: Conceptualization, Investigation, Methodology, Software, Data curation, Formal Analysis, Visualization, Writing - Original Draft. Carlo Garofalo: Supervision, Software, Writing - Reviewing and Editing, Project Administration. Verónica Vidal-Arenas: Investigation, Writing - Reviewing and Editing. Stefan Bogaerts: Writing - Reviewing and Editing. Laura Mezquita: Investigation, Writing - Reviewing and Editing. Generós Ortet: Investigation, Supervision, Writing - Reviewing and Editing. Manuel I. Ibáñez: Conceptualization, Investigation, Supervision, Writing - Reviewing and Editing, Project Administration.

Acknowledgements

Funding

Declaration of Interests

The authors declare that there is no conflict of interest.

Data Availability Statement

The registration for the present study, databases, analyses scripts, and supplementary material can be found in the Open Science Framework through the following link: https://osf.io/hqs9t/?view_only=c941a00bf8644ef992e2bda6cb553901

References

Achenbach, T. M., & Ivanova, M. Y. (2018). *Manual for the ASEBA Brief Problem Monitor for ages 18-59 (BPM/18-59)*. University of Vermont, Research Center for Children, Youth, and Families.

Back, M. D., Küfner, A. C. P., Dufner, M., Gerlach, T. M., Rauthmann, J. F., & Denissen, J. J. A. (2013). Narcissistic admiration and rivalry: Disentangling the bright and dark sides of narcissism. *Journal of Personality and Social Psychology, 105*(6), 1013-1037. https://doi.org/10.1037/a0034431

Beauchaine, T., & Sauder, C. L. (2017). Trait impulsivity and the externalizing spectrum. *Annual Review of Clinical Psychology, 13*, 343-368. https://doi.org/10.1146/annurev-clinpsy-021815-093253

Blötner, C. & Mokros, A. (2023). The next distinction without a difference: Do psychopathy and sadism scales assess the same construct? *Personality and Individual Differences, 205*, Article 112102. https://doi.org/10.1016/j.paid.2023.112102

Blötner, C., Webster, G. D., & Wongsomboon, V. (2022). Measurement invariance of the Short Dark Tetrad across cultures and genders. *European Journal of Psychological Assessment.* Advance online publication. https://doi.org/10.1027/1015-5759/a000715

Blötner, C., Ziegler, M., Wehner, C., Back, M. D., & Grosz, M. P. (2021). The nomological network of the Short Dark Tetrad Scale (SD4). *European Journal of Psychological Assessment, 38*(3), 187-197. http://dx.doi.org/10.1027/1015-5759/a000655

Bonfá-Araujo, B., Lima-Costa, A. R., Hauck-Filho, N., & Jonason, P. K. (2022). Considering sadism in the shadow of the Dark Triad traits: A meta-analytic review of the Dark Tetrad. *Personality and Individual Differences, 197*, Article 111767. https://doi.org/10.1016/j.paid.2022.111767

Buckels, E. E., Jones, D. N., & Paulhus, D. L. (2013). Behavioral confirmation of everyday sadism. *Psychological Science, 24*(11), 2201–2209. https://doi.org/10.1177/0956797613490749

Chabrol, H., Van Leeuwen, N., Rodgers, R., & Séjourné, N. (2009). Contributions of psychopathic, narcissistic, Machiavellian, and sadistic personality traits to juvenile delinquency. *Personality and Individual Differences, 47*(7), 734–739. https://doi.org/10.1016/j.paid.2009.06.020

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

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*(2), 233-255. https://doi.org/10.1207/S15328007SEM0902_5

Christie, R., & Geis, F. L. (1970). *Studies in Machiavellianism*. Academic Press.

Cohen, J. (1992). A Power primer. *Psychological Bulletin, 112*(1), 155–159. https://doi.org/10.1037/0033-2909.112.1.155

Colins, O. F., Fanti, K. A., Salekin, R. T., & Andershed, H. (2016). Psychopathic personality in the general population: Differences and similarities across gender. *Journal of Personality Disorders, 31*(1), 49-74. https://doi.org/10.1521/pedi_2016_30_237.

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

Du, T. V., Collison, K. L., Vize, C. E., Miller., J. D. & Lynam, D. R. (2021). Development and validation of the Super-Short form of the Five Factor Machiavellianism Inventory (FFMI-SSF). *Journal of Personality Assessment, 103*(6), 732-739. https://doi.org/10.1080/00223891.2021.1878525

European Parliament. (2016). *Regulation (EU) 2016/679 of the European Parliament and of the Council.* https://eur-lex.europa.eu/eli/reg/2016/679/oj

Furnham, A., Richards, S. C., & Paulhus, D. L. (2013). The Dark Triad of personality: A 10-year review. *Social and Personality Psychology Compass, 7*(3), 199–216. https://doi.org/10.1111/spc3.12018

Gajda, A., Morón, M., Królik, M., Maluch, M., & Mraczek, M. (2022). The Dark Tetrad, cybervictimization, and cyberbullying: The role of moral disengagement. *Current Psychology.* Advance online publication. https://doi.org/10.1007/s12144-022-03456-6

Garofalo, C., Neumann, C. S., Zeigler-Hill, V., & Meloy, J. R. (2019). Spiteful and contemptuous: A new look at the emotional experiences related to psychopathy. *Personality Disorders: Theory, Research, and Treatment, 10*(2), 173-184. https://doi.org/10.1037/per0000310

Garofalo, C., Neumann, C. S., Kosson, D. S., & Velotti, P. (2020). Psychopathy and emotion dysregulation: More than meets the eye. *Psychiatry Research, 290*, Article 113160. https://doi.org/10.1016/j.psychres.2020.113160

Gillespie, S. M., Kongerslev, M. T., Bo, S., & Abu-Akel, A. M. (2021). Schizotypy and psychopathic tendencies interactively improve misattribution of affect in boys with conduct problems. *European Child & Adolescent Psychiatry, 30*(6), 885-897. https://doi.org/10.1007/s00787-020-01567-8

Gordts, S., Uzieblo, K., Neumann, C., Van den Bussche, E., & Rossi, G. (2017). Validity of the Self-Report Psychopathy Scales (SRP-III full and short versions) in a community sample. *Assessment, 24*(3), 308-325. https://doi.org/10.1177/1073191115606205

Grigoras, M., Wille, B. (2017). Shedding light on the dark side: Associations between the Dark Triad and the DSM-5 maladaptive trait model. *Personality and Individual Differences, 104*, 516-521. https://doi.org/10.1016/j.paid.2016.09.016

Hare, R. D. (2003). *Hare Psychopathy Checklist-Revised (PCL-R)* (2nd ed.). Multi-Health Systems.

Hare, R. D., & Neumann, C. S. (2008). Psychopathy as a clinical and empirical construct. *Annual Review of Clinical Psychology, 4*, 217-246. https://doi.org/10.1146/annurev.clinpsy.3.022806.091452

Hartung, J., Bader, M., Moshagen, M., & Wilhelm, O. (2022). Age and gender differences in socially aversive ("dark") personality traits. *European Journal of Personality, 36*(1), 3-23. https://doi.org/10.1177/0890207020988435

Jonason, P. K. (2023). *Shining light on the dark side of personality: Measurement properties and theoretical advances.* Hogrefe Publishing.

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., & Paulhus, D. L. (2009). Machiavellianism. In M. R. Leary & R. H. Hoyle (Eds.), *Handbook of individual differences in social behavior* (pp. 93–108). The Guilford Press.

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

Klipfel, K. M., Garofalo, C., & Kosson, D. S. (2017). Clarifying associations between psychopathy facets and personality disorders among offenders. *Journal of Criminal Justice, 53*, 83-91. https://doi.org/10.1016/j.jcrimjus.2017.09.002

Kosson, D. S., Garofalo, C., McBride, C. K., & Velotti, P. (2020). Get mad: Chronic anger expression and psychopathic traits in three independent samples. *Journal of Criminal Justice, 67*, 101672. https://doi.org/10.1016/j.jcrimjus.2020.101672

Liu, Y., Zhou, B., Ouyang, Y., Yang, B. & Xie, Q. (2023). Development and validation of Chinese form Short Dark Tetrad (C-SD4). *Heliyon, 9*(1), Article E12929. https://doi.org/10.1016/j.heliyon.2023.e12929

Marcus, D. K., & Zeigler-Hill, V. (2015). A big tent of dark personality traits. *Social and Personality Psychology Compass, 9*(8), 434–446. https://doi.org/10.1111/spc3.12185

McCrae, R. R., & Costa, P. T. (2008). *NEO PI-R, Revised NEO Personality Inventory and NEO Five-Factor Inventory (NEO-FFI).* TEA Ediciones.

Mededovic, J., & Damjanovic, A. (2018). Measuring psychopathy via small sample of TriPM items. *Zbornik Instituta za kriminološka i sociološka istraživanja, 37*, 7-22.

Miller, J. D., Hyatt, C. S., Maples-Keller, J. L., Carter, N. T., & Lynam, D. R. (2017). Psychopathy and Machiavellianism: A distinction without a 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

Muñiz, J., Elosua, P., & Hambleton, R. K. (2013). Directices para la traducción y adaptación de los tests: Segunda edición [International Test Commission Guidelines for test translation and adaptation: Second edition]. *Psicothema, 25*(2), 151-157. https://doi.org/10.7334/psicothema2013.24

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

Muthén, L. K., & Muthén, B. O. (2017). *Mplus: Statistical analysis with latent variables: User's guide* (version 8). Authors.

Neumann, C. S., Jones, D. N., Paulhus, D. L. (2022). Examining the Short Dark Tetrad (SD4) across models, correlates, and gender. *Assessment, 29*(4), 651-667. https://doi.org/10.1177/1073191120986624

O'Boyle, E. H., Forsyth, D. R., Banks, G., Story, P. A., & White, C. D. (2015). A meta-analytic test of redundancy and relative importance of the Dark Triad and Five-Factor Model of personality. *Journal of Personality, 83*(6), 644-664. https://doi.org/10.1111/jopy.12126

O'Meara, A., Davies, J., & Hammond, S. (2011). The psychometric properties and utility of the Short Sadistic Impulse Scale (SSIS). *Psychological Assessment, 23*(2), 523-531. https://doi.org10.1037/a0022400

Ortet-Walker, J., Giménez-Vidal, S., Mezquita, L., & Ibáñez, M. I. (2019, April 4-5). *Dark personality in 4D: Adaptation of the SSIS and ASP sadism scales to Spanish* [Poster presentation]. II Escuela de Primavera de la Sociedad para el Avance de la Evaluación Psicológica, Barcelona, Spain. https://seaep.es/wp-content/uploads/2020/06/res%C3%BAmenes-p%C3%B3sters-II-ESCUELA.pdf

Ortet-Walker, J. Vidal-Arenas, V., Mezquita, L., Ortet, G., Miller, J. D., Lynam, D. R., & Ibáñez, M. I. (2021, December 2-3). *Spanish adaptation of the Five-Factor Model Dark Triad Inventory (FFM D*TI): Psychometric properties in an adult, community sample* [Poster

presentation]. X AIIDI Conference, Madrid, Spain. https://drive.google.com/file/u/0/d/17iODSKPkOsF2ey0o2sfWjwpuTk1GMgxi/view

Patrick, C. J. (2010). *Operationalizing the triarchic conceptualization of psychopathy: Preliminary description of brief scales for assessment of boldness, meanness, and disinhibition*. Unpublished test manual, Florida State University. Test retrieved from https://www.phenxtoolkit.org/index.php?pageLink=browse.protocoldetails&id=121601

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

Paulhus, D. L., Buckels, E. E., Trapnell, P. D., & Jones, D. N. (2022). Screening for dark personalities: The Short Dark Tetrad (SD4). *European Journal of Psychological Assessment, 37*(3), 208-222. http://dx.doi.org/10.1027/1015-5759/a000602

Paulhus, D. L., Gupta, R., & Jones, D. N. (2021). Dark or disturbed?: Psychopathic aggression from the Dark Tetrad and schizotypy. *Aggressive Behavior, 47*(6), 635-645. https://doi.org/10.1002/ab.21990

Paulhus, D. L., & Jones, D. N. (2015). Measures of dark personalities. In G. J. Boyle, D. H. Saklofske, & G. Matthews (Eds.), *Measures of personality and social psychological constructs* (pp. 562–594). Elsevier Academic Press. https://doi.org/10.1016/B978-0-12-386915-9.00020-6

Paulhus, D. L., Neumann, C. S., & Hare, R. D. (2017). *Self-Report Psychopathy Scale 4th Edition (SRP 4)* Manual. MHS, Multi-Health Systems Incorporated.

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

Pechorro, P., Karandikar, S., Carvalho, B., DeLisi, M., & Jones, D. N. (2022). Screening for dark personalities in Portugal: Intra- and interpersonal correlates, reliability and invariance of the Short Dark Tetrad Portuguese version. *Deviant Behavior, 44*(4), 551-566. https://doi.org/10.1080/01639625.2022.2071655

Plouffe, R. A., Saklofske, D. H., & Smith, M. M. (2017). The assessment of sadistic personality: Preliminary psychometric evidence for a new measure. *Personality and Individual Differences, 104*, 166-171. https://doi.org/10.1016/j.paid.2016.07.043

Poy, R., Segarra, P., Esteller, À., López, R., & Moltó, J. (2014). FFM description of the triarchic conceptualization of psychopathy in men and women. *Psychological Assessment, 26*(1), 69–76. https://doi.org/10.1037/a0034642

Qaderi Bagajan, K., Ziegler, M., Soleimani, M., Paulhus, D. L., Soleimani, Z. A., Kordbagheri, M., Alavinejad, L., Amiri, H., Asl, V. Y., Hoseini, S., & Bagajan, H. Q. (2024). Validation of the Short Dark Tetrad (SD4) in

Persian: Assessment of its structure and nomological network. *Journal of Individual Differences*. Advance online publication. https://doi.org/10.1027/1614-0001/a000417

Raskin, R. N., & Hall, C. S. (1979). A Narcissistic Personality Inventory. *Psychological Reports, 45*(2), 590. https://doi.org/10.2466/pr0.1979.45.2.590

Romero, E. & Alonso, C. (2019). Maladaptive personality traits in adolescence: Behavioural, emotional and motivational correlates of the PID-5-BF scales. *Psicothema, 31*(3), 263-270. https://doi.org/10.7334/psicothema2019.86

Rose, L., Miller, J. D., & Lynam, D. R. (2022). Validation of the Five-Factor Model Antagonistic Triad Measure. *Assessment, 30*(3), 782-797. https://doi.org/10.1177/10731911211068083

Sass, D. A. (2011). Testing measurement invariance and comparing latent factor means within a confirmatory factor analysis framework. *Journal of Psychoeducational Assessment, 29*(4), 347-363. http://dx.doi.org/10.1177/0734282911406661

Schreyer, H., Plouffe, R. A., Wilson, C. A., & Saklofske, D. H. (2021). What makes a leader? Trait emotional intelligence and Dark Tetrad traits predict transformational leadership beyond HEXACO personality factors. *Current Psychology, 42*(3), 2077-2086. https://doi.org/10.1007/s12144-021-01571-4

Skeem, J. L., Polaschek, D. L. L., Patrick, C. J., & Lilienfeld, S. O. (2011). Psychopathic personality. *Psychological Science in the Public Interest, 12*(3), 95–162. https://doi.org/10.1177/1529100611426706

Tomás-Portalés, C. Benhaddou, M., Ortet-Walker, J., Vidal-Arenas, V., & Ibáñez, M. I. (2021a, December 2-3). *Psychometric properties of the Short version of the TriPM, a brief assessment instrument of the Triarchic Model of psychopathy* [Poster presentation]. X AIIDI Conference, Madrid, Spain. https://drive.google.com/file/u/0/d/17iODSKPkOsF2ey0o2sfWjwpuTk1GMgxi/view

Tomás-Portalés, C., Ortet-Walker, J., Calvo-Brun, C., Vidal-Arenas, V., & Ibáñez, M. I. (2021b, December 2-3). *The dark side of the man* [Poster presentation]. X AIIDI Conference, Madrid, Spain. https://drive.google.com/file/u/0/d/17iODSKPkOsF2ey0o2sfWjwpuTk1GMgxi/view

Vize, C. E., Collison, K. L., Miller, J. D., & Lynam, D. R. (2020). The "core" of the Dark Triad: A test of competing hypotheses. *Personality Disorders: Theory, Research, and Treatment, 11*(2), 91-99. http://dx.doi.org/10.1037/per0000386

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

West, S. G., Taylor, A. B., & Wu, W. (2012). Model fit and model selection in structural equation modeling. In R. H. Hoyle (Ed.), *Handbook of Structural Equation Modeling* (pp. 209–231). Guilford Press.