

# **The Dark Triad is Dead, Long Live the Dark Triad: An Item-Response Theoretical Examination of the Short Dark Tetrad**

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### **Abstract**

Research on the *Dark Tetrad* (Machiavellianism, narcissism, psychopathy, and sadism) is burgeoning. Therefore, psychometrically sound measures are required to ensure that predictions based on these constructs are reliable and valid. A recently devised scale to assess all traits simultaneously is the *Short Dark Tetrad* (SD4; Paulhus et al., 2021). Previous studies demonstrated the general suitability of the SD4 in terms of classical test theory, but item response theoretical (IRT) analyses are still missing, whereby IRT approaches extract more information on the items and scales and tests assumptions untested in classical test theory. Thus, we evaluated the subscales of the SD4 using IRT modeling ( $N = 594$ ). Unlike the sadism subscale, the Machiavellianism, narcissism, and psychopathy subscales had satisfactory fit of the two-parameter polytomous IRT models and provided ample information across the respective trait continua. The sadism subscale, however, exhibited problems related to item discrimination (i.e., in differentiating between individuals with similar levels) and item (category transition) difficulties (i.e., quantifying how “difficult” it is to endorse higher compared to next lower response categories). The results thus emphasize the need for a thorough revision of the items of the sadism scale.

*Keywords:* Machiavellianism, Narcissism, Psychopathy, Sadism, IRT

## 1. Introduction

During the last two decades, personality research engaged in a plethora of endeavors to examine the *Dark Triad of personality* (i.e., *Machiavellianism*, *narcissism*, and *psychopathy*) and its successor, the *Dark Tetrad* (Dark Triad, extended by *everyday sadism*; Kowalski et al., 2021). Machiavellianism is thereby characterized by a manipulative, long-term oriented, cynical, amoral style. Narcissism reflects a pattern of entitlement, self-absorption, and valuing oneself over others. Psychopathy deals with impulsivity, aggression, and social malevolence. Last, sadism exhibits enjoyment of harming other individuals or seeing them suffer (Paulhus & Williams, 2002; Foulkes, 2019). Criticisms had been raised concerning the concepts and measures of the traits not only when the Dark Triad emerged as a concept (Kowalski et al., 2021). For example, popular assessments of Machiavellianism appeared to be more consistent with theoretical postulates of psychopathy (Miller et al., 2017) and psychopathy measures appear to be at least equally apt to assess core features of sadism (Blötner & Mokros, 2022). Accordingly, psychometric evaluations are crucial to ensure that the focal traits can be measured reliably and validly. One recently devised measure of the Dark Tetrad is the *Short Dark Tetrad* (SD4; Paulhus et al., 2021).

### 1.1. Extant Evidence Regarding the Short Dark Tetrad

The SD4 sought to reduce undesired overlaps between the traits it is supposed to measure by focusing on the unique features of each trait. Previous studies largely supported its construct validity (Blötner, Ziegler et al., 2022; Neumann et al., 2021; Paulhus et al., 2021; Pechorro et al., 2022). For instance, the psychopathy, Machiavellianism, and sadism subscales yielded negative correlations with core features of antagonistic traits, such as agreeableness, honesty, and a dominance orientation (Blötner, Ziegler et al., 2022; Paulhus et al., 2021). The psychopathy and sadism subscales were positively correlated with impulsivity, delinquency, and aggression. The narcissism subscale exhibited positive correlations with self-esteem and the Machiavellianism subscale was only weakly related to constructs it should be unrelated to,

such as aggression and impulsivity (Blötner, Ziegler et al., 2022; Neumann et al., 2021; Pechorro et al., 2022). Furthermore, the measurement invariance between genders was largely supported (Blötner, Webster & Wongsomboon, 2022; Neumann et al., 2021; Pechorro et al., 2022). On the other hand, in some analyses, the proposed four-factor structure revealed a poor fit (Blötner, Ziegler et al., 2022; Webster & Wongsomboon, 2020) and the measurement invariance of the SD4 between German and US cultures could not be entirely substantiated (Blötner, Webster & Wongsomboon, 2022). All available evaluations of the SD4 were limited to *Classical Test Theory* (CTT), but systematic examinations in light of *Item Response Theory* (IRT) are still pending. CTT and IRT augment each other since IRT discerns item and person characteristics and explicitly tests several assumptions which are untested in CTT. For instance, unlike CTT, IRT does not assume that a scale's reliability was constant along the whole spectrum of the trait; instead, information — and thereby reliability — is a function of a person's latent trait. In order to determine whether the traits are distinct, reliable assessment is required. IRT is particularly suited to this because — unlike CTT —, IRT provides information even on the level of items (Embretson & Reise, 2000). To further the understanding of the utility of the SD4, we subjected its four subscales to IRT analyses to evaluate their psychometric properties and measurement precision.

## **1.2. Item Response Theoretical Evidence From Other Dark Triad Measures**

Webster and Jonason (2013) demonstrated with two samples that the 12 items of the *Dirty Dozen* (DD; Jonason & Webster, 2010) — a prominent measure for the comprehensive assessment of the Dark Triad — revealed favorable *item discriminations* for the items on the intended constructs, with item discrimination being the degree to which an item can differentiate between individuals with similar levels on the trait of interest (Embretson & Reise, 2000). Likewise, *item thresholds* (indicating the trait level required to have a 50% chance to endorse a particular scale anchor) were dispersed across a sufficient range, emphasizing distinctiveness among individuals endorsing high levels of agreement to the

statements (see also Savard et al., 2017, for similar findings on the DD). The *Short Dark Triad* (SD3; Jones & Paulhus, 2014) — the antecessor of the SD4 — contains 27 items and was devised to address some of the psychometric problems of the DD. For instance, scholars argued that it was hard to assess the complexity of each Dark Triad trait with only four items per dimension. Furthermore, the DD yielded relatively high intercorrelations among the three dimensions, potentially due to low content coverage and insufficient construct validity (Maples et al., 2014). The findings related to item difficulties and thresholds are basically consistent between SD3 and DD. IRT studies on these measures further mostly align in that — on average — narcissism items were easiest to endorse and psychopathy items were hardest to endorse in both scales (Bonfá-Araujo et al., 2021; Grigoraş et al., 2020; Kajonius et al., 2016; Persson et al., 2017; Savard et al., 2017; Somma et al., 2020; Webster & Jonason, 2013). Persson et al. (2017) argued in this vein that narcissism was the least and psychopathy the most malevolent traits in the Dark Triad. Few studies found that psychopathy and narcissism items were easiest to endorse in the DD and the SD3, respectively, and that Machiavellianism items were hardest to endorse both in the DD and the SD3 (Burtäverde et al., 2022; Dinić et al., 2018). However, acknowledging the conciseness of both scales, extant analyses reported high information obtainable at least for high levels on the respective latent spectra.

## 2. Method

### 2.1. Sample

We re-analyzed data from Blötner, Ziegler et al.'s (2022) study in a German sample. After excluding participants who were too young (age < 18,  $n = 2$ ) or who experienced technical problems during study processing ( $n = 4$ ), the sample entailed 594 participants (458 women,  $M_{\text{age}} = 28.4$ ,  $SD_{\text{age}} = 9.0$ ). The data was predominantly collected in universities and on social media platforms.

### 2.2. Measures

### 2.2.1. *Short Dark Tetrad*

The SD4 contains seven items each to assess Machiavellianism, narcissism, psychopathy, and sadism. Respondents indicate the degree to which they agree to these statements (1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, 5 = *strongly agree*).

### 2.3. *Analysis Plan*

We carried out IRT analyses using the R package *mirt* (version 1.36.1; Chalmers, 2012). Acknowledging the ordinal nature of the response scales, and in line with previous studies examining Dark Triad measures, we utilized the polytomous *graded response model* (GRM; Samejima, 1997). For each subscale, we fitted a one-parameter (1P-GRM, i.e., constrained) and a two-parameter (2P-GRM; i.e. full) version of the GRM and compared the fit of the two. A 1P-GRM considers only different item difficulty parameters but equal item discrimination among all items of a scale (Embretson & Reise, 2000). As indicated by Persson et al. (2017), conventional cutoffs for IRT analyses have not yet been proposed, but reliance on cutoffs from structural equation modeling appears viable. Thus, to evaluate each model, we computed *Comparative Fit Indices* (CFI; ideally > .90), *Root Mean Square Errors of Approximation* (RMSEA; ideally < .08), and *Standardized Root Mean Square Residuals* (SRMSR; ideally < .08; Hu & Bentler, 1999). We also computed  $C_2$ -statistics for each model, which should ideally be non-significant. However, in abundantly large samples, this statistic yields significance even for negligible deviations. Thus, the  $C_2$  statistics were rather subsidiary to our evaluations. To compare 1P-GRMs and 2P-GRM, we computed  $\chi^2$ -difference tests, with a significant difference implying the superiority of the 2P-GRM. The focal results of our analyses were the *item discriminations*, *item (category transition) difficulties* (representing the difficulty to transition from one response category to the next one or higher, e.g., from 1 = *strongly disagree* and 2 = *disagree* or higher), *category probability functions* (CPF; as a graphical illustration of the probabilistic relation between expected response behavior and item characteristics as a function of the latent trait), *item information*

*functions* (IIF; indicating the degree of information obtainable from each item as a function of the latent trait), *test information functions* (TIF; indicating the degree of information obtainable from the total scale as a function of the latent trait), and the subscale's reliability as a function of the latent trait. TIF is calculated as the sum over all IIFs. More information obtained from TIF implies higher reliability in the particular spectrum of the latent trait. To evaluate item discrimination parameters, we followed Baker's (2001) guidelines, treating parameters as very low, low, moderate, high, and very high when exceeding 0.00, 0.35, 0.65, 1.35, and 1.70, respectively. To evaluate the items' and the total scale's suitability to represent the latent trait spectrum, we referred to a classification of well below average ( $\theta < -2$ ), below average ( $-2 < \theta < -1$ ), average ( $-1 < \theta < 1$ ), above average ( $1 < \theta < 2$ ), and well above average ( $\theta > 2$ ), as applied in Rauthmann (2013). Our online supplement provides the dataset and the R script (<https://osf.io/kc9jx/>).

### 3. Results

#### 3.1. Machiavellianism

Both the 1P-GRM and 2P-GRM revealed good fit,  $C_2(20) = 88.31, p < .001, CFI = .91, RMSEA = .08, 95\% \text{ CI } [.06, .09], SRMSR = .07$  versus  $C_2(14) = 69.51, p < .001, CFI = .93, RMSEA = .08, 95\% \text{ CI } [.06, .10], SRMSR = .06$ . Given that the 2P-GRM yielded better fit ( $\Delta\chi^2[6] = 24.004, p = .001$ ), we inspected item-specific discrimination parameters. Referring to the classifications proposed by Baker (2001) and Rauthmann (2013), the item discriminations were mostly in the moderate to high range in that only few parameters were outliers of these categories. Item 7 from the Machiavellianism scale was comparatively “easy” across response categories, while item 2 was most “difficult” (see Table 1). Thus, the model would imply that persons scoring high on item 2 likely also score high on the remaining items. Likewise, the loadings were moderate, in general, ultimately revealing lower reliabilities — as compared to the other three subscales (see Table 1 and Figure 1). Depending on the item, the CPFs were more or less narrow with partly considerable overlaps (see Figure

2). Across items, the whole range of  $\theta$  was quite well covered in terms of information (see Figure 3). For instance, item 7 provides high information especially for low scores, whereas items 2 and 4 provide high information for high scores (see Table 2 for an overview of the item contents). Therefore, the items are complementary in differentiating individuals along the latent spectrum. Likewise, the IIF suggested high information along a normal range of the latent spectrum. Thus, the latent construct can be measured with sufficient reliability ( $r_{tt} \approx .70$ ) across a wide range.

### 3.2. Psychopathy

Both the 1P-GRM and 2P-GRM revealed good fit,  $C_2(20) = 90.22$ ,  $p < .001$ ,  $CFI = .93$ ,  $RMSEA = .08$ , 95% CI [.06, .09],  $SRMSR = .08$  versus  $C_2(14) = 53.86$ ,  $p < .001$ ,  $CFI = .96$ ,  $RMSEA = .07$ , 95% CI [.05, .09],  $SRMSR = .05$ . Given that the 2P-GRM yielded better fit ( $\Delta\chi^2[6] = 45.12$ ,  $p < .001$ ), we inspected item-specific discrimination parameters. Most item discriminations were in the moderate to very high range (Baker, 2001; Rauthmann, 2013; see Table 1). The CPFs were overall comparatively narrow, but still overlapped considerably in some cases (e.g., items 2, 4, and 5; see Figure 2; see also Table 2 for the item contents). No clear hierarchy of category transition difficulties emerged (Table 1): While items 4 and 7 were comparatively “easy” in terms of transitions between lower response categories, they were among the most difficult ones in terms of transitions between higher response categories. The reversed pattern was observed for items 1 and 3. Likewise, the IIF suggested sufficient information only for high levels on the latent spectrum. Consequently, psychopathy as measured by the SD4 can be measured with sufficient reliability (i.e.,  $r_{tt} > .80$ ) only in individuals with high scores (i.e.,  $\theta > 0$ ; Figure 1).

### 3.3. Narcissism

Unlike the 1P-GRM, which yielded acceptable fit only with regard to the  $CFI$ , all indices suggested good fit for the 2P-GRM,  $C_2(20) = 143.83$ ,  $p < .001$ ,  $CFI = .92$ ,  $RMSEA = .10$ , 95% CI [.09, .12],  $SRMSR = .11$  versus  $C_2(14) = 31.89$ ,  $p = .004$ ,  $CFI = .99$ ,  $RMSEA =$



.05, 95% CI [.02, .07],  $SRMSR = .04$ . Given that the 2P-GRM yielded better fit ( $\Delta\chi^2[6] = 99.51, p < .001$ ), we inspected item-specific discrimination parameters. Item discriminations were dispersed from moderate to very high. Except for item 7, all CPFs were steep. For the narcissism subscale, there was no clear pattern of difficulties hierarchies (Table 1): Item 7 was “easy” on the lower end of the scale, but “difficult” in the highest transition. Item 6 was overall more “difficult” but comparatively “easier” than item 7 in the last transition. Item 5 was “easiest” across transition probabilities. Across items, most of the range of  $\theta$  (except very low values) was well covered in terms of IIF. Thus, narcissism as measured by the SD4 can be measured with sufficient reliability (i.e.,  $r_{tt} > .80$ ) in individuals slightly below average to well above average in narcissism (approx.  $-2 \leq \theta \leq 4$ ; Figure 1).

### 3.4. Sadism

Whereas the 1P-GRM yielded less than acceptable fit, the 2P-GRM had poor fit only with regard to the  $RMSEA$ ,  $C_2(20) = 336.04, p < .001, CFI = .72, RMSEA = .16$ , 95% CI [.15, .18],  $SRMSR = .16$  versus  $C_2(14) = 103.24, p < .001, CFI = .92, RMSEA = .10$ , 95% CI [.09, .12],  $SRMSR = .08$ . Given that the 2P-GRM yielded better fit ( $\Delta\chi^2[6] = 266.08, p < .001$ ), we inspected item-specific discrimination parameters. Item discriminations were dispersed from moderate to extremely high. As can be seen in Figure 2, the response probabilities overlapped considerably for all items; this was the case for narrow and for relatively flat CPFs (especially item 4 and items 3 and 7, respectively). Latter indicates poor discriminatory power for some items (see Table 1). Table 1 further shows that item 6 was the most “difficult” across transition probabilities. Items 3, 5, and 7 were comparatively “easy” on the lower and comparatively “difficult” on the upper end of the scale. Furthermore, the IIFs demonstrate that most items provide appropriate information only in relatively narrow areas of the spectrum, with items 1 and 4 having downward peaks at  $\theta = 2$  (see Figure 3). Good reliability (i.e.,  $r_{tt} \approx .90$ ) can be achieved only within a narrow range,  $0 \leq \theta \leq 3$  (Figure 1). Thus, the sadism facet of the SD4 provides only little information for low scorers. Due to conspicuous characteristics

of the fourth item tapping sadism regarding its item difficulty, item discrimination, CPF, and IIF, we re-computed the analyses of the sadism subscale after excluding this item. We reported these analyses in our online supplement.

#### **4. Discussion**

In an attempt to explain these findings on the sadism scale, we would like to point to details on the development of this subscale, to recent findings derived from confirmatory analyses of the latent structure, and the nomological network. In developing the SD4, Paulhus et al. (2021) emphasized the most central aspects of each trait and omitted contents jeopardizing the minimization of overlaps between the scales. For instance, the sadism scale predominantly assesses joy derived from seeing others suffer instead of directly harming others because the latter is also typical of psychopathy. Likewise, Paulhus et al. (2021) prioritized agentic, self-exhibiting narcissism over antagonistic narcissism, whereby antagonistic narcissism represents the defense of the threatened, grandiose ego (Back, 2018). In doing so, they intended to provide an economic measure for screening purposes. However, by reducing the empirical overlaps among the four traits, true/desired overlaps in terms of content were potentially dismissed. For instance, aggressiveness is important both in sadism and psychopathy, but the psychopathy subscale of the SD4 rather reflects antisocial and impulsive behavior. Likewise, numerous constructs have been sought to underlie all antagonistic traits, such as disagreeableness, dishonesty, dominance, and callousness (Kowalski et al., 2021). Referring to the item contents of the SD4, the entire narcissism subscale reflects self-promotion and thus implies dominance orientation, but lacks links to the other elements (e.g., Blötner, Ziegler et al., 2022). Conversely, by employing egotistic strategizing, impulsive recklessness, and schadenfreude, the Machiavellianism, psychopathy, and sadism subscales suggest disagreeableness, dishonesty, and callousness, but provide little to no dominance-related contents.

*Exploratory Structural Equations Models* fitted to the SD4 data by Blötner, Webster,

and Wongsomboon (2022) revealed that there is little support for a sadism subscale as currently conceptualized in the SD4 because the sadism factor does not yield substantial loadings onto all of its corresponding items. In some cases, no factor loads onto a genuine sadism item or there are stronger loadings from other factors. This held in two independent datasets, but small or double-loadings were observed even in the original analysis of the SD4 (Paulhus et al., 2021). Unlike the other subscales of the SD4, the sadism subscale yielded poor model fit in a confirmatory factor analysis when examined in isolation (Blötner, Ziegler et al., 2022). Going beyond the levels of subscale compositions, sadism appears to be redundant in the Dark Tetrad since different psychopathy scales are at least equally predictive of core features of sadism as sadism measures themselves (Blötner & Mokros, 2022) and the nomological networks of various psychopathy and sadism subscales were very similar (Blötner & Mokros, 2022; Blötner, Ziegler et al., 2022). The current analyses are thus well-suited to explain these previous findings since we could not extract information from the sadism subscale of the SD4 across the entire latent spectrum. Accordingly, there is low reliability for low scores on the latent trait spectrum, ultimately limiting the validity, for instance in analyses of the nomological network.

#### **4.1. Limitations**

Since we re-analyzed existing data, our study had the same limitations as the project from which we adopted them. For instance, the sample predominantly entailed (German) students, a population presumably affected by variance restriction concerning malevolent behavior (see also Webster & Jonason, 2013) and limited coverage of culture-related values concerning which behaviors and cognitions are more or less appropriate. Hence, we echo claims made by Blötner, Ziegler et al. (2022) to replicate the current findings in clinical or forensic samples.

#### **4.2. Conclusion and Future Directions**

Unlike the items assessing the traits of the former Dark Triad, the item difficulties of

the sadism subscale were comparatively high for a comparatively high number of items. In general, there was a tendency that Machiavellianism and narcissism items were (in particular with regard to high scores) easier to endorse than psychopathy and sadism items. This order as well as the general latent properties replicated with findings on other Dark Triad measures. Another similarity to studies on related measures is that most information could be obtained at high levels of the latent traits (see above). Accordingly, the SD4 provides insufficient information for low scorers — especially concerning sadism. Relatedly, Persson et al. (2017) questioned what Dark Triad scales were even supposed to measure at low levels and what low levels of these traits even mean. However, besides discrimination, as indicated by examinations in two independent samples by Blötner, Webster, and Wongsomboon (2022), the sadism items appeared rather inappropriate to establish a sadism factor, necessitating certain adaptations of the sadism subscale. Therefore, besides replication in a wider population (in terms of culture, age, and education), we would like to encourage future research to develop new items, especially for sadism, to ensure that the content is suitable for a wide array of people. An interesting approach to take might be analyses investigating which item formulations and contents of extant items account for good or poor psychometric properties (“explanatory IRT”).

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**Table 1***Standardized Loadings, Discrimination and Difficulty Parameters of the Short Dark Tetrad*

	$\lambda$	$\alpha$ (SE)	$\beta_1$ (SE)	$\beta_2$ (SE)	$\beta_3$ (SE)	$\beta_4$ (SE)
Machiavellianism						
M1	0.48	0.93 (0.12)	-3.95 (0.48)	-1.72 (0.21)	-0.16 (0.10)	2.14 (0.25)
M2	0.65	1.45 (0.16)	-0.76 (0.10)	0.49 (0.09)	1.84 (0.17)	3.74 (0.40)
M3	0.66	1.51 (0.16)	-1.75 (0.15)	-0.42 (0.08)	0.70 (0.09)	2.36 (0.20)
M4	0.53	1.05 (0.12)	-1.98 (0.22)	-0.46 (0.10)	1.33 (0.16)	3.69 (0.42)
M5	0.49	0.96 (0.12)	-3.12 (0.37)	-1.68 (0.20)	-0.04 (0.10)	3.00 (0.35)
M6	0.58	1.21 (0.14)	-2.07 (0.21)	-0.78 (0.11)	0.38 (0.09)	3.22 (0.33)
M7	0.39	0.73 (0.11)	-5.34 (0.82)	-4.12 (0.61)	-1.95 (0.30)	1.30 (0.21)
Psychopathy						
P1	0.74	1.86 (0.20)	0.50 (0.07)	1.42 (0.12)	2.28 (0.18)	3.31 (0.32)
P2	0.55	1.11 (0.12)	-0.98 (0.13)	0.63 (0.10)	1.59 (0.17)	3.33 (0.34)
P3	0.71	1.73 (0.19)	0.49 (0.08)	1.24 (0.11)	2.18 (0.18)	3.00 (0.27)
P4	0.50	0.99 (0.11)	-1.14 (0.15)	0.76 (0.12)	1.72 (0.20)	4.38 (0.52)
P5	0.63	1.37 (0.16)	0.76 (0.10)	1.70 (0.16)	2.28 (0.21)	3.97 (0.46)
P6	0.74	1.86 (0.18)	-0.24 (0.07)	0.78 (0.08)	1.49 (0.12)	2.94 (0.25)
P7	0.53	1.07 (0.12)	-0.77 (0.12)	0.50 (0.10)	2.38 (0.24)	4.32 (0.50)
Narcissism						
N1	0.75	1.92 (0.17)	-1.10 (0.10)	-0.04 (0.07)	0.97 (0.09)	2.32 (0.17)
N2	0.79	2.16 (0.19)	-1.28 (0.10)	-0.11 (0.06)	0.97 (0.08)	2.62 (0.20)
N3	0.67	1.53 (0.14)	-0.87 (0.10)	0.39 (0.08)	1.84 (0.15)	3.93 (0.43)
N4	0.72	1.78 (0.15)	-1.29 (0.11)	-0.22 (0.07)	1.02 (0.09)	2.35 (0.18)
N5	0.60	1.29 (0.12)	-2.88 (0.25)	-1.24 (0.13)	0.04 (0.08)	2.17 (0.19)
N6	0.62	1.34 (0.14)	0.25 (0.08)	1.20 (0.13)	2.55 (0.25)	4.57 (0.59)
N7	0.36	0.65 (0.09)	-2.52 (0.37)	-0.39 (0.15)	1.28 (0.22)	6.93 (1.10)
Sadism						
S1	0.91	3.69 (0.42)	0.57 (0.06)	1.13 (0.07)	1.63 (0.10)	2.96 (0.27)
S2	0.73	1.84 (0.17)	0.26 (0.07)	0.95 (0.09)	1.57 (0.12)	2.74 (0.23)
S3	0.38	0.69 (0.10)	-1.88 (0.28)	-0.06 (0.13)	1.48 (0.23)	4.27 (0.61)
S4	0.96	5.95 (1.18)	0.55 (0.06)	1.04 (0.07)	1.62 (0.09)	2.51 (0.19)
S5	0.49	0.96 (0.11)	-0.32 (0.11)	0.98 (0.14)	1.86 (0.22)	4.02 (0.48)
S6	0.52	1.03 (0.15)	1.40 (0.18)	2.42 (0.30)	3.32 (0.43)	4.73 (0.69)
S7	0.24	0.43 (0.09)	-6.03 (1.31)	-3.09 (0.69)	-0.90 (0.28)	4.18 (0.91)

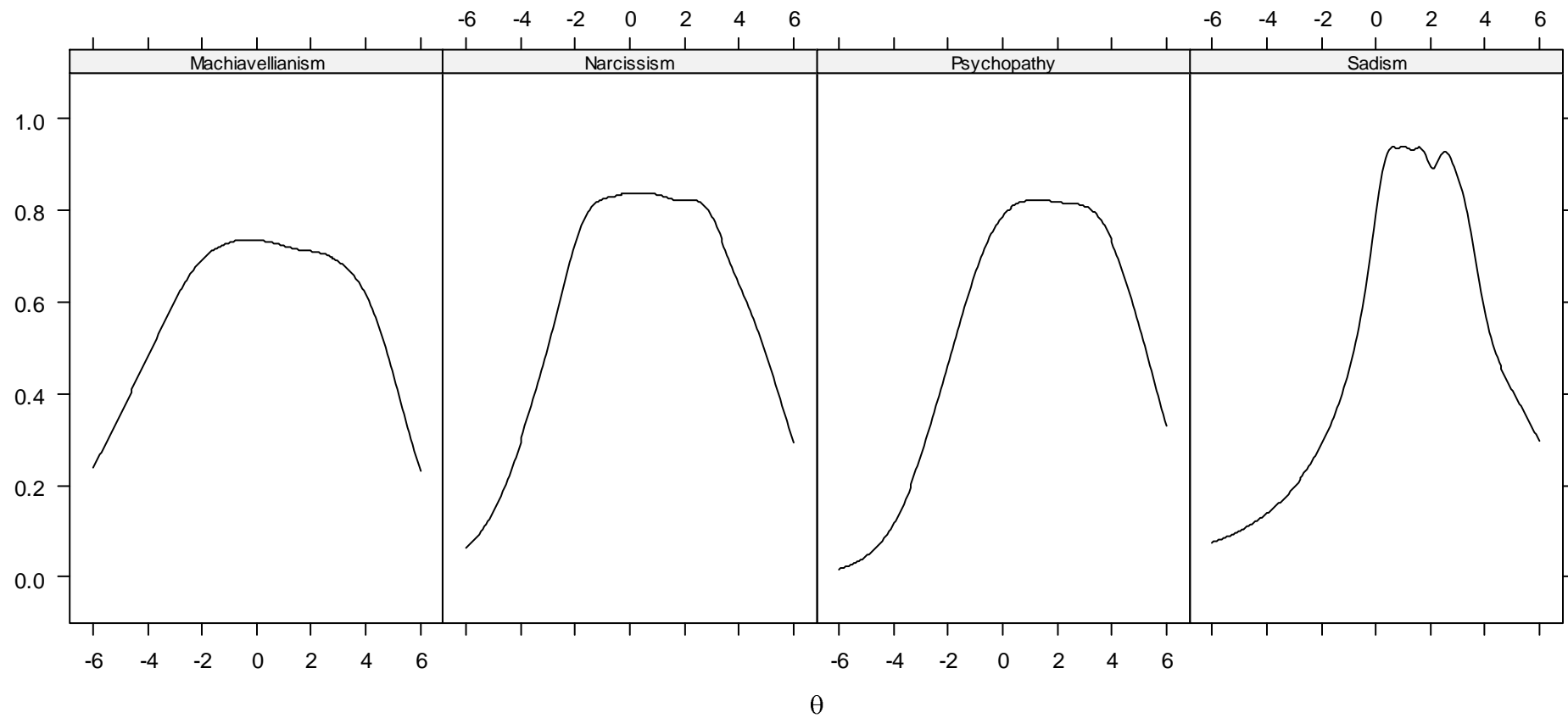
Note.  $\lambda$  = Standardized factor loading.  $\alpha$  = Item discrimination.  $\beta_{1-4}$  = Category (transition) specific difficulties.

All parameters refer to the 2-Parameter graded response model in discrimination-difficulty parameterization.

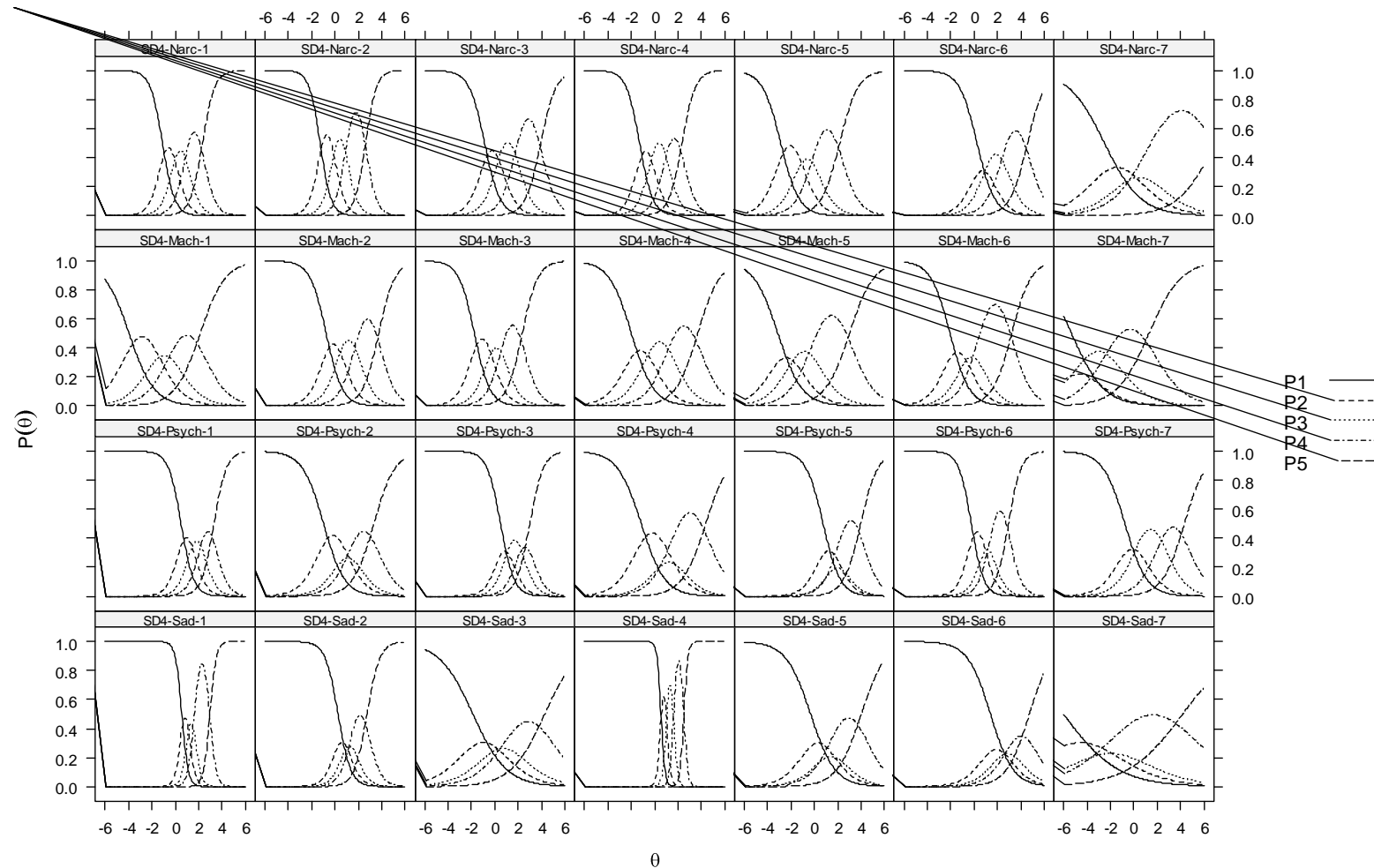
**Table 2***Overview of the Contents Entailed in the Short Dark Tetrad (Paulhus et al., 2021)*

Item content
Machiavellianism
1. avoid telling your secrets.
2. draw important people to your side.
3. avoid conflicts.
4. behave subtly.
5. planned manipulation.
6. flattering helps convincing people.
7. enjoy succeeded plan.
Narcissism
1. good leader.
2. capable of persuasion.
3. group activities are boring without me.
4. I am special.
5. special talents.
6. upcoming star.
7. bragging.
Psychopathy
1. out of control.
2. rebelling against authorities.
3. been in many fights.
4. act first, think later.
5. troubles with law enforcement.
6. been in danger.
7. others should not provoke me.
Sadism
1. watching fights.
2. violent media.
3. laugh when someone falls.
4. watching violent sports.
5. some must suffer.
6. posted nasty comments on the internet.
7. make others suffer with insulting words.

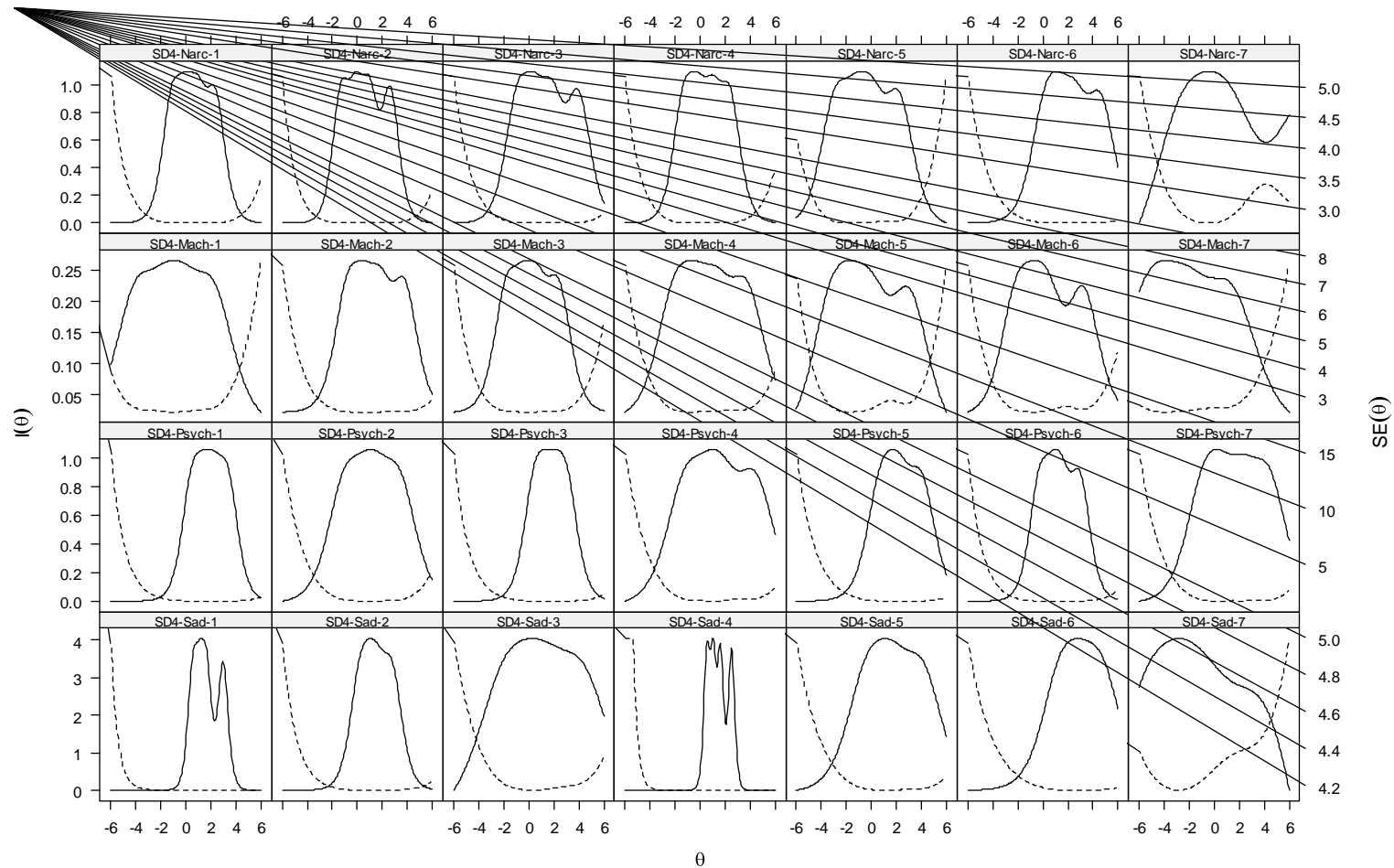
*Note.* The entire item pools can be retrieved from Paulhus et al. (2021).

**Figure 1***Reliability Plots of the Subscales of the Short Dark Tetrad*

*Note.*  $\theta$  denotes the latent trait spectrum.

**Figure 2***Category Probability Functions of the Subscales of the Short Dark Tetrad*

*Note.* SD4-Narc, -Mach, -Psych, and -Sad indicate the narcissism, Machiavellianism, psychopathy, and sadism subscales of the Short Dark Tetrad. P1 to P5 indicate the probabilities to endorse the respective anchor, given the latent trait parameter  $\theta$ .

**Figure 3***Item Information Functions of the Subscales of the Short Dark Tetrad*

*Note.* SD4-Narc, -Mach, -Psych, and -Sad indicate the narcissism, Machiavellianism, psychopathy, and sadism subscales of the Short Dark Tetrad. Solid and dashed lines in the item information functions indicate information and standard errors, respectively.