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Article

Relationship Between Online Trolling and Dark Tetrad Personality Traits: A Meta-Analysis

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ABSTRACT

Background: Online trolling refers to a specific form of disruptive behavior in digital environments, aimed at interrupting interactions, provoking other users, and drawing them into fruitless arguments. The Dark Tetrad personality traits (narcissism, Machiavellianism, psychopathy and sadism) have been linked to various forms of antisocial behavior in virtual contexts. **Method:** A systematic literature review was conducted across the PsycINFO, PubMed, Scopus, ERIC, and Web of Science Core Collection databases to identify relevant studies examining these variables. A total of 24 relevant articles from 11 countries were identified, comprising a combined sample size of 14,044 participants. Four random-effects meta-analyses were performed using Pearson's r coefficients. **Results:** The results reveal a positive association between all four personality traits and greater tendency to engage in online trolling. Meta-regression analyses show that the assessment instruments used moderated some of the observed associations. No evidence of publication bias was detected. **Conclusions:** In general, the relationship between Dark Tetrad traits and online trolling was found to be positive, helping to explain individual differences in it.

Relación Entre el Trolling Online y los Rasgos de Personalidad de la Tétrada Oscura: un Metaanálisis

Palabras clave:
Trolling online
Maquiavelismo
Narcisismo
Psicopatía
Sadismo

RESUMEN

Antecedentes: El trolling online se refiere a una forma específica de comportamiento disruptivo en entornos digitales, cuyo propósito es interrumpir las interacciones, provocar a otros usuarios y arrastrarlos a discusiones estériles. Los rasgos de la Tétrada Oscura de la personalidad (narcisismo, maquiavelismo, psicopatía y sadismo) se han asociado con diversas formas de conducta antisocial en contextos virtuales. **Método:** Se llevó a cabo una revisión bibliográfica de estudios relevantes sobre las variables de interés en las bases de datos PsycINFO, PubMed, Scopus, ERIC y Web of Science Core Collection. Se incluyeron 24 artículos procedentes de 11 países, con un tamaño muestral combinado de 14,044 participantes. Se realizaron cuatro metaanálisis de efectos aleatorios utilizando los coeficientes r. **Resultados:** Los resultados revelaron una relación positiva entre los cuatro rasgos de personalidad y la propensión al trolling online. Los análisis de meta-regresión indicaron que los instrumentos de evaluación utilizados moderan algunas de las asociaciones observadas. No se detectó evidencia de sesgo de publicación. **Conclusiones:** En general, la relación entre los rasgos de la Tétrada Oscura y el trolling online fue positiva, lo que ayuda a explicar las diferencias individuales en su perpetración.

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The exponential rise in internet access and usage in recent decades has brought about numerous benefits and opportunities. However, this digital environment has also given rise to disruptive and harmful behaviors, such as online trolling (Demsar et al., 2021). This phenomenon, characterized by posting provocative or malicious comments intended to elicit negative emotional reactions in others, has become particularly important in contemporary society. Previous research indicates that more than one-third of millennials have engaged in online trolling, highlighting the need for further investigation (March & Marrington, 2019; Ortiz, 2020). Despite the lack of consensus regarding its precise definition, most researchers agree that trolling involves intentional behaviors aimed at creating conflict in online interactions (Coles & West, 2016; Craker & March, 2016).

Online trolling not only disrupts the dynamics of digital platforms but also has serious psychological consequences for its victims, contributing to mental health issues (Kircaburun et al., 2020). Various typologies of trolling have been identified; these differ according to the perpetrator's motivations, which range from amusement to aggression or the promotion of political ideologies (Komaç & Çagiltay, 2019). However, these motivations are not randomly distributed; some individuals are more likely to engage in trolling behaviors frequently and systematically. This suggests that individual factors, such as specific personality traits, may predispose individuals to such conduct (Buckels et al., 2014). Understanding these differences not only helps explain why certain users are more prone to trolling but also provides valuable insights for designing interventions tailored to specific psychological profiles (March, 2019).

One of the most relevant and emerging approaches in the study of dysfunctional aspects of personality is the investigation of the Dark Tetrad (Paulhus, 2014). This evolved from the original Dark Triad model (Paulhus & Williams, 2002) comprising three personality traits: narcissism, Machiavellianism, and psychopathy. More recently, everyday sadism has been proposed as a fourth component, forming the Dark Tetrad. Machiavellianism is characterized by manipulativeness, cynicism, and an instrumental view of interpersonal relationships (Rauthmann & Will, 2011). Narcissism involves an inflated sense of self-importance, a constant need for admiration, and a lack of empathy (Thomaes et al., 2008). Psychopathy is associated with impulsivity, emotional callousness, and a tendency toward antisocial behavior (Hare, 1998). Finally, everyday sadism refers to the tendency to derive pleasure from the suffering of others (Buckels et al., 2013). Recent studies have confirmed the relationship between the Dark Tetrad and disruptive behaviors in digital contexts, such as cyberbullying, cyberstalking, and digital technology addiction (Craker & March, 2016; Johnson et al., 2019). Specifically, trolling exhibits a significant association with sadism and psychopathy (Buckels et al., 2014), due to the low empathy and high disinhibition these individuals exhibit in online environments where the consequences of their actions often appear less tangible or immediate (March et al., 2024). Several studies have found that the relationship between the Dark Tetrad and online trolling may be mediated by contextual factors such as normative beliefs about online aggression, introducing significant variability into research findings (Hilvert-Bruce & Neill, 2020). Understanding this relationship is essential for developing preventive strategies and promoting healthier interactions in cyberspace. Certain strategies implemented by digital platforms have shown effectiveness in reducing the prevalence of online trolling and mitigating its impact. These include automated moderation using toxic language detection algorithms (Gorwa et al., 2020), proactive human intervention in content management (Jhaver et al., 2019), the redesign of interfaces to discourage impulsive behavior (Matias, 2019), and the application of graduated sanctions, such as feature limitations or account suspension for repeat offenders.

The present meta-analysis aims to address two research questions to provide a comprehensive understanding of the links between online trolling and the Dark Tetrad: (1) What are the overall correlations between online trolling and the personality traits of the Dark Tetrad? and; (2) Do the sample characteristics (gender and age) and methodological features of the included studies (methodological quality, the instrument used to assess online trolling, and the instruments used to assess Dark Tetrad personality traits), moderate the association between the studied variables?

Method

This study was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA; Page et al., 2021) guidelines, and its protocol was registered in the International Prospective Register of Systematic Reviews (PROSPERO, CRD420250655916).

Search Strategy and Inclusion Criteria

A systematic search for relevant studies on online trolling and the Dark Tetrad was conducted in February 2025 across the databases PsycINFO, PubMed, Scopus, ERIC, and Web of Science Core Collection. The following search terms were used in the title, abstract, and keyword fields: ("online trolling" OR "internet trolling" OR "internet troll" OR "online troll") AND ("dark triad" OR "dark tetrad" OR psychopathy OR narcissism OR machiavellianism OR sadism). The search was focused on articles published in peer-reviewed journals, with no restrictions regarding publication date. In addition, a manual search was conducted by reviewing the reference lists of the selected articles.

To be included in the present meta-analysis, studies had to meet several inclusion criteria. Included studies had to: 1) be empirical research published in peer-reviewed journals; 2) be written in either Spanish or English; 3) use valid and reliable instruments, defined as those with prior psychometric validation, to assess online trolling and at least one of the Dark Tetrad personality traits; 4) report a correlation coefficient (Pearson or Spearman) between online trolling and at least one of the Dark Tetrad traits; 5) provide access to the full text; and 6) report the sample size.

Methodological Quality of the Included Studies

The methodological quality and risk of individual bias of the included studies were assessed using the abbreviated version of the Newcastle-Ottawa Scale developed by Deng et al. (2020). This version consists of five items: (1) sample representativeness (inclusion of the entire population or random sampling); (2) justification of sample size through methods such as power analysis; (3) response rate above 80%; (4) use of valid measures to assess online trolling and Dark Tetrad traits; and (5) appropriate and clearly

described statistical analyses. Each item receives one point if the criterion is met, and zero points if it is not met or if the information is unavailable. The total score ranges from zero to five points, with studies scoring three or more points considered to have a low risk of individual bias, and those scoring fewer than three points considered to have a high risk of individual bias. Evaluations were conducted independently by two authors, and discrepancies were resolved through group discussion. The inter-rater agreement was 96.8%.

Data Coding

The following variables were recorded: study identification (author[s] and year of publication), country (if the sample was reported to come from multiple countries and the percentage of participants per country was specified, the country with the highest representation was coded; if countries were mentioned without specifying percentages, or if the country of origin was not reported, the country of affiliation of the first author was coded), sample size, mean age of participants, participant gender (as the percentage of women in the sample), instrument used to assess online trolling, instrument used to assess Dark Tetrad personality traits, methodological quality of the study (high or low), and correlation between online trolling and Dark Tetrad traits. Data were independently coded by two of the study's authors, and discrepancies were resolved by consensus. The inter-rater agreement was 94.96%.

To complete missing information on the characteristics of the included studies, the corresponding authors of three studies were contacted via email to request data on participants' mean age (Buckels et al., 2019; Gylfason et al., 2021; Schade et al., 2021). All three authors responded, but only two were able to provide the requested data (Buckels et al., 2019; Schade et al., 2021).

Data Analysis

Four meta-analyses were conducted to evaluate the relationship between online trolling and the Dark Tetrad personality traits using Pearson correlations as effect sizes. First, to normalize sample distributions, Pearson correlations were transformed into Fisher's Z scores (Hedges & Olkin, 2014). After the analyses, the average effect size and its confidence interval were back-transformed to Pearson correlations for ease of interpretation (Borenstein et al., 2021). A random-effects model was used due to the expected heterogeneity among the included studies. Parameter estimation for the random-effects model was performed using the restricted maximum likelihood method (Viechtbauer, 2005). Estimated correlations were interpreted according to the criteria proposed by Gignac and Szodorai (2016), who classified correlations of .10 as small, .20 as moderate, and .30 or higher as large, based on an empirical analysis of psychology studies.

Heterogeneity among studies was assessed using Cochran's Q statistic, I^2 (Higgins & Thompson, 2002), and the prediction interval. A significant Q value suggests variability between studies, while the I^2 statistic reflects the percentage of observed variability not attributable to sampling error. According to Higgins et al. (2003), I^2 values of 25%, 50%, and 75% can be interpreted as indicating low, moderate, and high heterogeneity, respectively. Finally, the prediction interval represents the range within which effect sizes of a new study are expected to fall, based on the analyzed dataset (Borenstein, 2023).

Publication bias was assessed through multiple methods: visual inspection of funnel plots, Egger's regression test (Egger et al., 1997), and Begg and Mazumdar's rank correlation test (Begg & Mazumdar, 1994). In the absence of publication bias, the funnel plot should appear symmetrical around the average effect size, and both Egger's test and Begg and Mazumdar's test should yield non-significant results.

To evaluate the robustness of the results and examine the potential excessive influence of any single study, a sensitivity analysis was conducted using the leave-one-out technique, which involves removing one study at a time and recalculating the combined effect size.

Potential moderator variables influencing the relationship between online trolling and the Dark Tetrad traits were explored using meta-regression analyses for continuous variables and subgroup analyses for categorical variables, estimating the average effect and heterogeneity separately within each category. For subgroup analyses, following the recommendation of Fu et al. (2011), each subgroup was required to include a minimum of four studies. When this criterion could not be met due to a limited number of studies, the remaining studies were grouped into an "other" category and included in the analyses under this label, provided this group totaled at least four studies.

All analyses were performed using the meta (Schwarzer, 2007) and metafor (Viechtbauer, 2010) packages in R Studio.

Results

Study Selection

Figure 1 presents a flowchart depicting the literature search. The electronic search yielded a total of 113 records. In the first stage, duplicates were identified and removed. Subsequently, initial screening was conducted by reviewing titles and abstracts, excluding references that were not relevant. Finally, a full-text review of the remaining records was performed to determine their eligibility for inclusion. Additionally, a manual search was carried out by reviewing the reference lists of the included articles, resulting in the inclusion of two additional articles that met the inclusion criteria.

Study Characteristics

The analysis included data from 24 studies conducted in 11 countries, with a combined total sample size of 14,044 participants (Table 1). The mean age of participants was 27.71 years, and most studies' samples comprised a higher percentage of women. The countries with the greatest representation were Australia (nine studies), the United States (four studies), and Japan (two studies). To assess online trolling, the Global Assessment of Internet Trolling (nine studies) and its revised version (nine studies) were predominantly used. Regarding the Dark Triad traits, the most commonly employed instruments were the Short Dark Triad (14 studies) and the Dirty Dozen (six studies). For sadism, the most frequently used scales were the Short Sadistic Impulse Scale (10 studies) and the Comprehensive Assessment of Sadistic Tendencies (six studies).

Figure 1
Flow Diagram of the Search and Selection Process

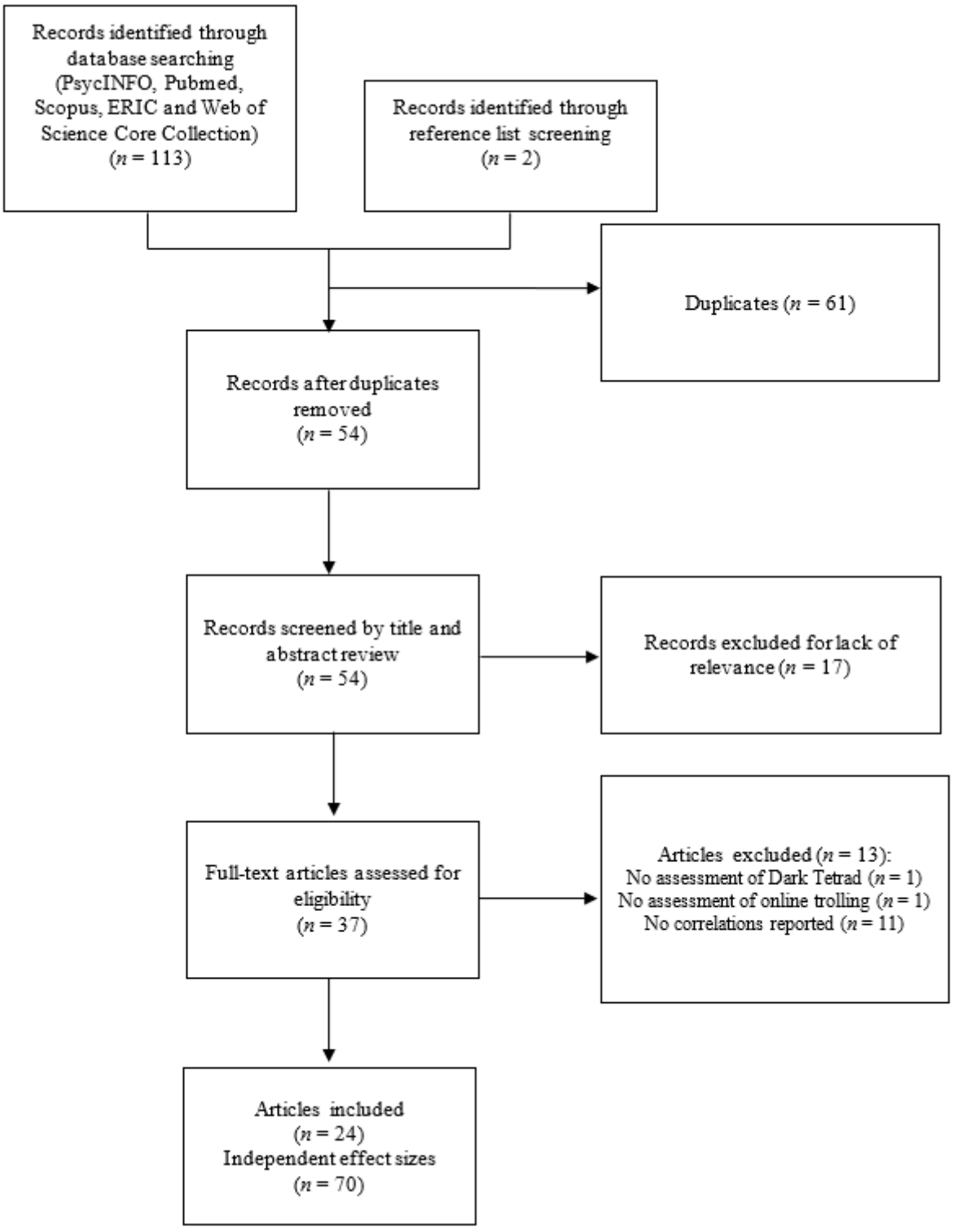


Table 1
Characteristics of the Included Studies

Study	Country	n	Mean age	Gender (% women)	Online trolling measure	Machiavellianism measure	Narcissism measure	Psychopathy measure	Sadism measure
Buckels et al., 2014	USA	797	31,78	45,8	GAIT	SD3	SD3	SD3	CAST
Buckles et al., 2019(1)	USA	345	34,4	51,8	GAIT	SD3	SD3	SD3	CAST
Buckles et al., 2019(2)	Canada	1134	19,71	70,55	iTroll	N.E.	N.E.	N.E.	CAST
Craker & March, 2016	Australia	396	34,41	75,9	GAFT	DD	DD	DD	SSIS
Gylfason et al., 2021	Iceland	139	N.R.	85,6	GAFT	DD	DD	DD	SSIS
Kircaburun et al., 2018	Turkey	761	20,7	63,99	Ad-hoc	DD	DD	DD	SSIS
Lee, 2025	USA	414	38,55	57	GAIT	SD3	SD3	SD3	SSIS
March & Steele, 2020	Australia	400	24,97	67,5	GAIT-R	N.E.	N.E.	SD3	SSIS
March et al., 2017	Australia	357	22,5	71	GAIT (modified)	SD3	SD3	SD3	SSIS
March et al., 2024	Australia	163	27,36	50,3	GAIT-R	N.E.	N.E.	SD3	SSIS
March, 2019	Australia	733	23,53	70,5	GAIT-R	N.E.	HNS	LSRP	VAST
Marrington et al., 2023	Australia	157	15,58	58	GAIT-R	N.E.	N.E.	YPI-SV	SSIS
Masui, 2019	Japan	513	46,8	51,1	GAIT-R	DD	DD	DD	VAST
Masui, 2023	Japan	447	45,7	51,2	GAIT-R	N.E.	N.E.	DD	VAST
Molenda et al., 2022	Poland	1048	22,35	52	ITQ	SD3	SD3	SD3	N.E.
Nitschinsk et al., 2022	Australia	242	21,28	69,01	GAIT (modified)	N.E.	N.E.	SD3	CAST
Nitschinsk et al., 2023	Australia	515	20,47	64,47	iTroll	N.E.	N.E.	SD3	SSIS
Paananen & Reichl, 2019	USA	347	32,67	0	GAIT	N.E.	N.E.	N.E.	CAST
Pineda et al., 2024	Spain	758	31,44	72,8	GAIT	SD3	SD3	SD3	ASP
Resett & González, 2023	Argentina	837	28,4	61	GAIT-R	SD3	SD3	SD3	N.E.
Schade et al., 2021	Austria	743	33,65	54	GAIT	MACH□	NPI-15 and HNS	SRP-III	N.E.
Sest & March, 2017	Australia	415	23,37	63	GAIT-R	N.E.	N.E.	SD3	SSIS
Türk Kurtça & Demirci, 2023	Turkey	234	20	79,1	iTroll	N.E.	N.E.	DD	N.E.
Volkmer et al., 2023	Germany	1026	26,46	77,2	GAIT-R	SD3	SD3	SD3	CAST
Wu et al., 2023	China	1123	19,06	49,1	GAIT	N.E.	N.E.	SD3	N.E.

Notes. n = sample size; N.R. = not reported; N.E. = not evaluated; GAIT = Global Assessment of Internet Trolling; GAIT-R = Global Assessment of Internet Trolling Revised; GAFT = Global Assessment of Facebook® Trolling; ITQ = Internet Trolling Questionnaire; SD3 = Short Dark Triad; DD = Dark Triad Dirty Dozen; MACH* = MACH-IV Machiavellianism Scale short version; HNS = Hypersensitive Narcissism Scale; NPI-15 = Narcissistic Personality Inventory-15; LSRP = Levenson Self-Report Psychopathy Scale; YPI-SV = Youth Psychopathic Index short version; SRP-III = Self-Report Psychopathy-III; CAST = Comprehensive Assessment of Sadistic Tendencies; SSIS = Short Sadistic Impulse Scale; VAST = Varieties of Sadistic Tendencies.

Regarding the methodological quality of the included studies (Table 2), assessed using the short version of the Newcastle-Ottawa Scale, 12 studies demonstrated high quality and a low risk of individual bias, while 13 showed low quality and a high risk of bias. None of the studies met the criterion for item 3 (response rate above 80%), whereas 16% met item 1 (sample representativeness) and 48% met item 2 (sample size justification). All studies fulfilled items 4 and 5 (valid assessment tools and appropriate statistical analyses).

Association Between Online Trolling and Dark Tetrad Personality Traits

The estimated effect sizes and heterogeneity indices for the correlations between online trolling and the Dark Tetrad personality traits are presented in Table 3, while the forest plots are shown in Figures 2, 3, 4, and 5. Among the Dark Tetrad traits, sadism exhibited the strongest association with online trolling (r = .49, p < .001), followed by psychopathy (r = .43, p < .001), Machiavellianism (r = .31, p < .001), and lastly narcissism (r = .20, p < .001). According to the criteria proposed by Gignac and Szodorai (2016), the observed effect sizes for sadism, psychopathy, and Machiavellianism may be considered large, whereas the effect size for narcissism is of moderate magnitude.

Regarding effect heterogeneity, Cochran's Q statistic was significant in all cases, indicating underlying heterogeneity among effect sizes. Additionally, I^2 values ranged between 73.92% and 93.50%, suggesting high heterogeneity. Concerning prediction intervals, which estimate the probable range of effect sizes in a new study, it was observed that the associations of Machiavellianism and sadism with online trolling tend to fall between moderate and high magnitude. In contrast, for narcissism and psychopathy potential effects span from low to high magnitude associations, indicating greater heterogeneity for these traits.

Publication Bias and Sensitivity Analysis

Visual inspection of the funnel plots revealed no indications of publication bias in the cases of psychopathy and sadism. However, the plots for Machiavellianism and narcissism exhibited signs of asymmetry (Figure 6).

However, the results of Egger's regression test and Begg and Mazumdar's rank correlation tests were not significant regarding the association between online trolling and any of the Dark Tetrad traits, thereby ruling out the risk of publication bias. Specifically, the results for Machiavellianism were t = 0.66, p = .525 and τ = 0.08, p = .765; for narcissism, t = -1.69, p = .118 and τ = -0.21, p = .331; for psychopathy, t = -0.33, p = .742 and τ = -0.05, p = .754; and for sadism, t = 0.43, p = .671 and τ = 0.11, p = .542.

The leave-one-out analysis showed that none of the included studies exerted an undue influence on the estimated effect sizes, as the obtained

Table 2
Methodological Quality of the Studies

	Item 1	Item 2	Item 3	Item 4	Item 5	Total
Buckels et al., 2014	0	0	0	1	1	2
Buckels et al., 2019(1)	0	0	0	1	1	2
Buckels et al., 2019(2)	0	0	0	1	1	2
Craker & March, 2016	0	0	0	1	1	2
Gylfason et al., 2021	0	1	0	1	1	3
Kircaburun et al., 2018	0	1	0	1	1	3
Lee, 2025	0	0	0	1	1	2
March & Steele, 2020	0	0	0	1	1	2
March et al., 2017	0	0	0	1	1	2
March et al., 2024	0	1	0	1	1	3
March, 2019	0	0	0	1	1	2
Marrington et al., 2023	0	1	0	1	1	3
Masui, 2019	1	0	0	1	1	3
Masui, 2023	0	1	0	1	1	3
Molenda et al., 2022	1	0	0	1	1	3
Nitschinsk et al., 2022	0	1	0	1	1	3
Nitschinsk et al., 2023	0	0	0	1	1	2
Paananen & Reichl, 2019	0	1	0	1	1	3
Pineda et al., 2024	0	1	0	1	1	3
Resett & González, 2023	0	0	0	1	1	2
Schade et al., 2021	0	0	0	1	1	2
Sest & March, 2017	0	0	0	1	1	2
Türk Kurtça & Demirci, 2023	0	0	0	1	1	2
Volkmer et al., 2023	0	1	0	1	1	3
Wu et al., 2023	1	0	0	1	1	3

correlations did not vary significantly. Specifically, the correlation coefficients in the successive meta-analyses excluding one study at a time ranged between .30 and .33 for Machiavellianism; .19 and .21 for narcissism; .43 and .44 for psychopathy; and .48 and .51 for sadism.

Moderation Analysis

Meta-regression analyses were conducted to examine the role of participants' mean age and sex in the relationship between online trolling and the Dark Tetrad personality traits (Table 4). Neither variable emerged as a significant moderator of this association.

Regarding categorical moderators (Table 5), the methodological quality of the included studies did not significantly moderate the association between online trolling and the Dark Tetrad. The measure used to assess online trolling moderated its association with sadism, accounting for 20.1% of the observed heterogeneity. The instrument employed to evaluate Machiavellianism moderated the relationship between this trait and online trolling, with a significant difference in results depending on the measure used; the Short Dark Triad exhibited a stronger association (r = .38) compared to the Dirty Dozen (r = .29), explaining 16% of the observed heterogeneity. Similarly, the measure used to assess psychopathy moderated the relationship with online trolling, explaining 49.4% of the variance, with the Short Dark Triad exhibiting the strongest correlation (r = .49). Finally, the instrument used to assess sadism moderated the association between online trolling and this personality trait, accounting for 27% of the heterogeneity found. Specifically, the use of the Comprehensive Assessment of Sadistic Tendencies showed a stronger correlation (r = .60) compared to the Short Sadistic Impulse Scale (r = .44) and other instruments employed (r = .44), suggesting that the choice of instrument may influence the magnitude of the observed association.

Table 4
Results of the Moderation Analyses for Continuous Variables

	Coefficient (Standard Error)	CI95%	*p*	R^2
Machiavellianism				
Mean age	0.0035(0.0033)	[-0.0028, 0.0099]	.277	N.A.
Gender (% women)	0.0011(0.0020)	[-0.0029, 0.0051]	.580	N.A.
Narcissism				
Mean age	-0.0021(0.0034)	[-.0087, 0.0045]	.540	N.A.
Gender (% women)	-0.0015(0.0021)	[-0.0057, 0.0026]	.474	N.A.
Psychopathy				
Mean age	-0.0031(0.0042)	[-0.0114, 0.0051]	.455	N.A.
Gender (% women)	-0.0057(0.0030)	[-0.0115, 0.0001]	.056	N.A.
Sadism				
Mean age	0.0025(0.0050)	[-0.0073, 0.0123]	.620	N.A.
Gender (% women)	-0.0035(0.0022)	[-0.0078, 0.0009]	.117	N.A.

Notes. CI95% = 95% confidence interval; R^2 = explained variance; N.A. = not applicable.

Table 3

Effect Sizes and Heterogeneity Indices in the Relationship Between Online Trolling and the Dark Tetrad Personality Traits

Factors	k	N	r	CI95%	PI95%	Q	I^2	τ^2
Machiavellianism	13	8,134	.31***	.27; .35	.18; .43	51.06***	73.92	0.0046
Narcissism	14	8,867	.20***	.16; .25	.05; .34	63.46***	77.33	0.0055
Psychopathy	23	12,563	.43***	.38; .48	.16; .65	257.87***	92.59	0.0233
Sadism	20	10,183	.49***	.43; .55	.20; .71	264.23***	93.50	0.0289

Notes. *k* = number of effect sizes; *N* = combined sample size; *r* = estimated Pearson correlation; CI95% = 95% confidence interval; PI95% = 95% prediction interval; Q = Cochran's Q; *** = $p < .001$; τ^2 = tau squared.

Figure 2

Forest Plot of the Relationships Between Online Trolling and Machiavellianism

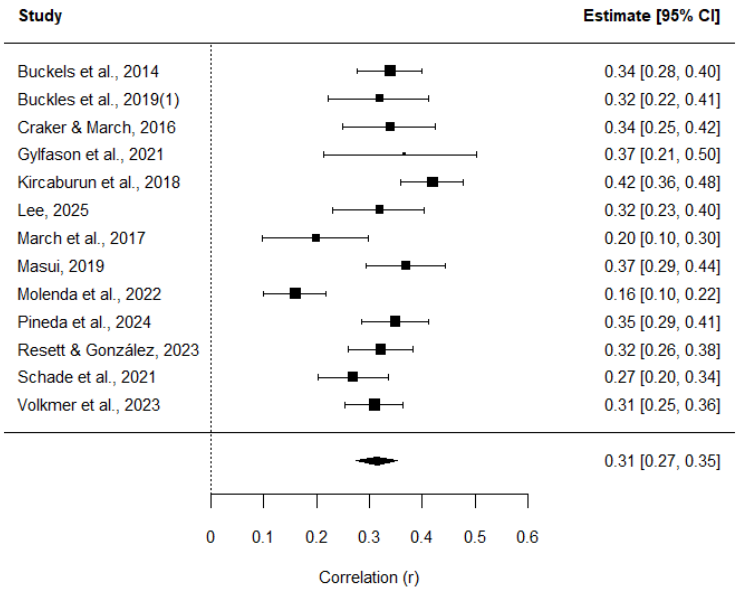


Figure 3

Forest Plot of the Relationships Between Online Trolling and Narcissism

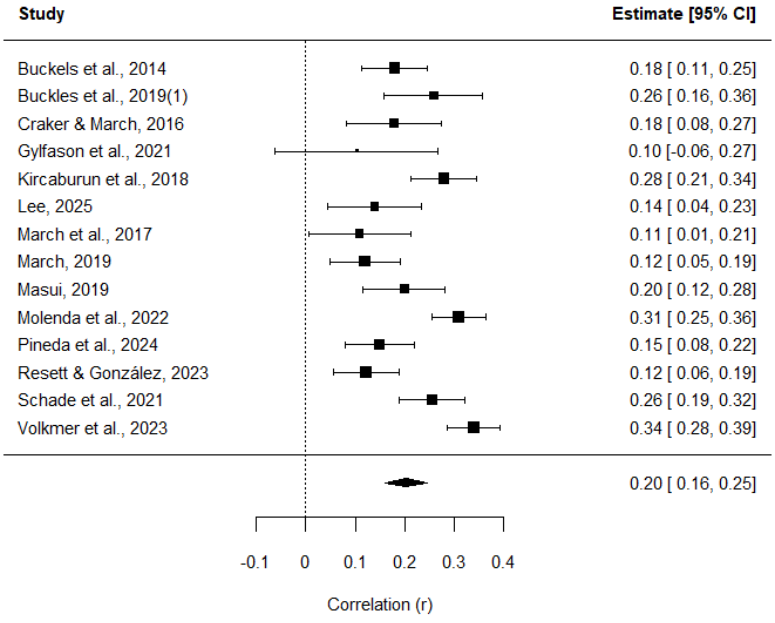


Figure 4
Forest Plot of the Relationships Between Online Trolling and Psychopathy

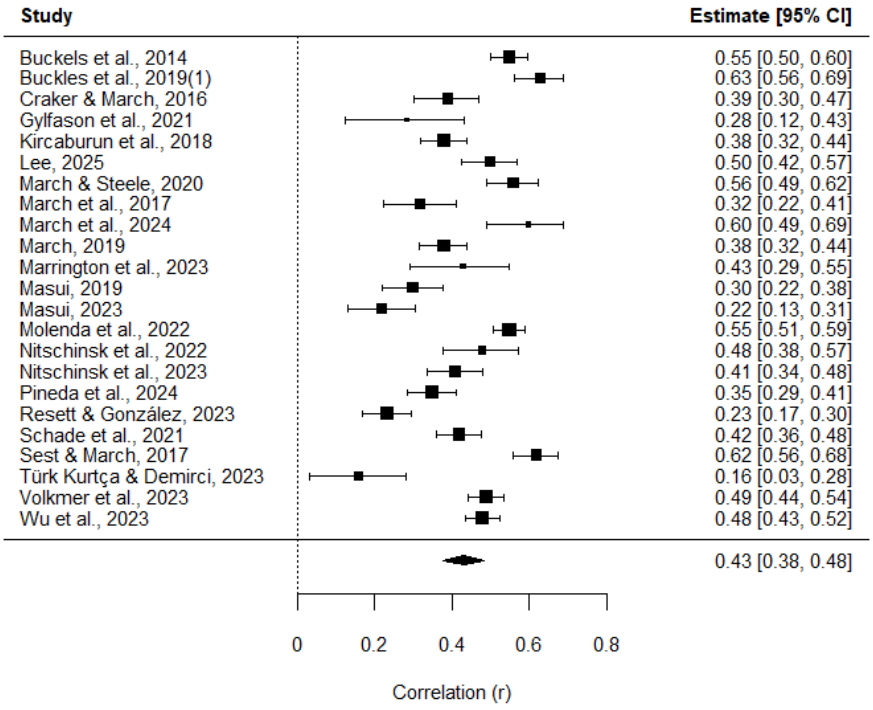


Figure 5
Forest Plot of the Relationships Between Online Trolling and Sadism

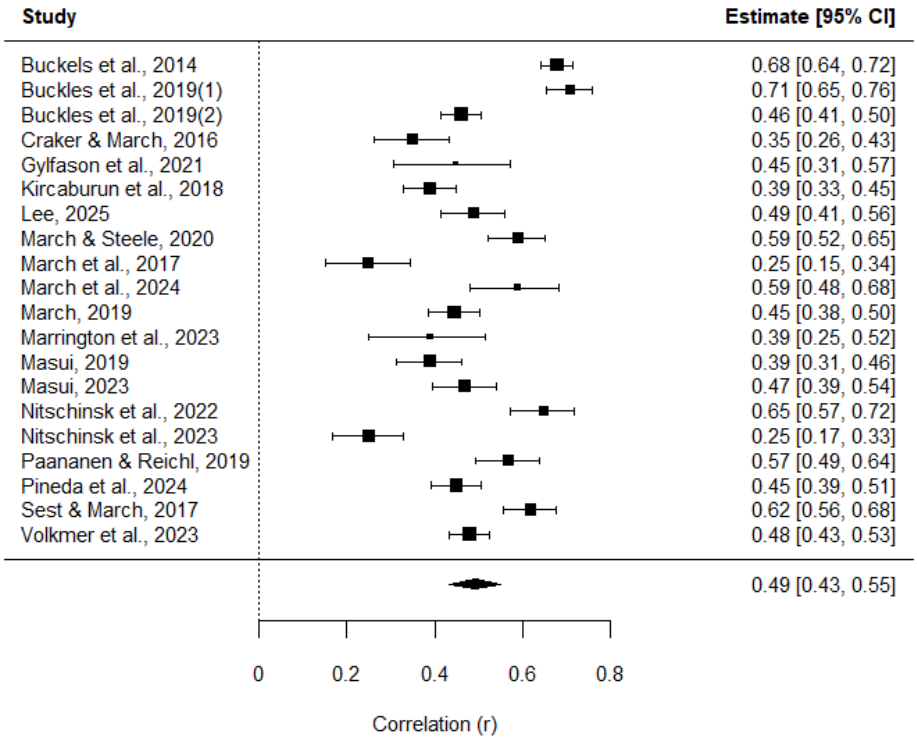
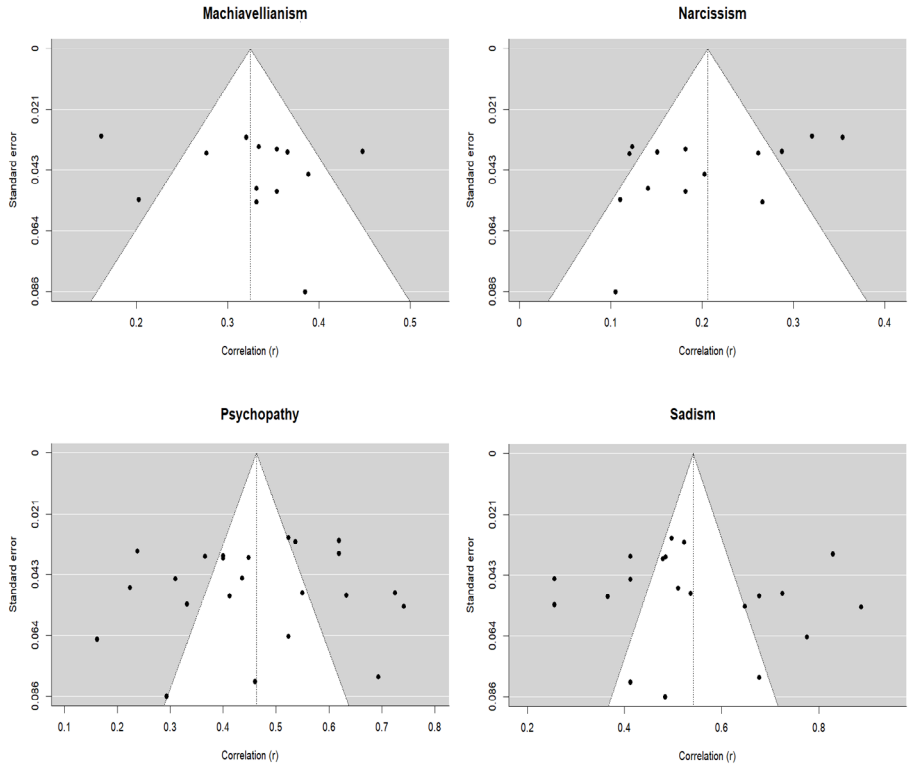


Figure 6
Funnel Plots of the Meta-Analyses on the Relationship Between Online Trolling and Dark Tetrad Personality Traits



Discussion

The objective of this study was to analyze, through meta-analytic techniques, the relationship between online trolling and the personality traits of the Dark Tetrad. The analyses revealed positive correlations between online trolling and the four Dark Tetrad traits. Specifically, strong associations were found with sadism (r = .49), psychopathy (r = .43), and Machiavellianism (r = .31), as well as a moderate association with narcissism (r = .20).

The fact that the strongest association was with sadism reinforces the idea that trolls actively enjoy the suffering of others and seek emotional pleasure through causing humiliation or psychological harm. This result is consistent with previous research indicating that sadism is more strongly related to online trolling than the personality traits of the Big Five model or the other components of the Dark Tetrad (Buckels et al., 2014). This may be because online trolling allows sadistic individuals to exercise their cruelty in a socially unrestricted environment, often protected by the anonymity and feeling of impunity provided by the internet (Nitschinsk et al., 2022). Likewise, psychopathy, characterized by impulsivity, emotional coldness, and lack of empathy, also exhibited a strong relationship with trolling, possibly because these traits facilitate social disinhibition and norm violation in virtual contexts (March, 2019). Moreover, psychopathy has been found to be strongly associated with aggressive behaviors, socioemotional deficits, and interpersonal difficulties (Muris et al., 2017), factors that in turn are related to online trolling (March & Steele, 2020; Marrington et al., 2023). Regarding Machiavellianism, the relationship can be explained by a tendency toward instrumental manipulation, with individuals high in Machiavellianism using trolling as a strategy to control interactions (Jones & Paulhus, 2014). A recent study found that the relationship between online trolling and Machiavellianism is mediated by the pleasure these individuals experience while trolling, suggesting that the behavior is not limited to an instrumental manipulation strategy but also responds to a hedonistic motivation (Craker & March, 2016). That is, Machiavellian individuals use trolling not only as a means to achieve interpersonal goals, but also for the pleasure inherent in the activity itself. Finally, although narcissism presented the weakest association, it remains significant, especially considering that narcissistic individuals may engage in trolling as a way to protect their self-image or reaffirm their superiority (Casale et al., 2016). Narcissists have a distorted self-view based on exaggerated beliefs about their personal importance; therefore, unlike individuals high in psychopathy or sadism, their motivation for engaging in online trolling does not lie in harming others but in establishing favorable social comparisons (Lopes & Yu, 2017). These findings are consistent with and align with previous studies showing that undesirable behaviors in digital environments are related to dark personality traits (Buckels et al., 2014; Craker & March, 2016; Johnson et al., 2019; Lopes & Yu, 2017; Međedović & Petrović, 2016).

Meta-regression analyses demonstrated that continuous variables such as sex and age are not significant moderators and do not explain the heterogeneity in the relationship between online trolling and the Dark Tetrad. The methodological quality of the included studies also did not moderate this relationship, with no differences found between studies with low or high risk of individual bias. However,

Table 5
Results of the Moderation Analyses for Categorical Variables

Machiavellianism	***r***	**CI95%**	***p***	**R^2**
Methodological quality			.593	N.A.
High	.33	.23, .42		
Low	.31	.26, .35		
Machiavellianism measure			.002	16%
Dirty Dozen	.29	.23, .35		
Short Dark Triad	.38	.32, .44		
Online trolling measure			.618	N.A.
Global Assessment of Internet Trolling	.31	.25, .36		
Others	.32	.25, .40		
Narcissism	***r***	**IC 95%**	***p***	**R^2**
Methodological quality			.084	N.A.
High	.24	.15, .34		
Low	.17	.12, .22		
Narcissism measure			.917	N.A.
Dirty Dozen	.21	.10, .31		
Short Dark Triad	.21	.13, .28		
Online trolling measure			.549	N.A.
Global Assessment of Internet Trolling	.18	.12, .25		
Global Assessment of Internet Trolling Revised	.20	.03, .36		
Others	.24	.10, .37		
Psychopathy	***r***	**IC 95%**	***p***	**R^2**
Methodological quality			.707	N.A.
High	.42	.34, .50		
Low	.44	.34, .53		
Psychopathy measure			<.001	49.4%
Dirty Dozen	.30	.20, .39		
Short Dark Triad	.49	.42, .55		
Online trolling measure			.329	N.A.
Global Assessment of Internet Trolling	.47	.38, .55		
Global Assessment of Internet Trolling Revised	.43	.31, .55		
Others	.38	.23, .51		
Sadism	***r***	**IC 95%**	***p***	**R^2**
Methodological quality			.791	N.A.
High	.48	.41, .55		
Low	.50	.37, .61		
Sadism measure			.007	27%
Comprehensive Assessment of Sadistic Tendencies	.60	.48, .70		
Short Sadistic Impulse Scale	.44	.34, .54		
Others	.44	.39, .49		
Online trolling measure				
Global Assessment of Internet Trolling	.56	.40, .68	.012	20.1%
Global Assessment of Internet Trolling Revised	.50	.42, .57		
Others	.38	.27, .48		

Notes. *r* = estimated Pearson correlation; CI95% = 95% confidence interval; R^2 = explained variance; N.A. = not applicable.

the instruments used to assess both online trolling and the personality traits of the Dark Tetrad represent a potential source of heterogeneity in some of the associations.

Certain limitations should be considered when interpreting the results of this study. First, this meta-analysis used correlations as the measure of effect size, which prevents the establishment of causal relationships between the variables. Second, only articles published in English and Spanish were considered, which may represent a selection bias. Third, although methodological quality did not moderate the associations, more than half of the studies presented a high risk of individual bias, highlighting the need to strengthen methodological rigor in future research. Fourth, it should be noted that the restricted maximum likelihood estimation method may underestimate both average effect and heterogeneity, as the distribution of parametric effects deviates from normality (Blázquez-Rincón et al., 2023; Suero et al., 2025); this could represent an additional source of bias in the results. Finally, the number of available studies was not very large, especially given the use of subgroup analyses. These analyses usually require a larger number of studies than primary analyses to achieve adequate statistical power (Cuijpers et al., 2021). Therefore, the results obtained should be interpreted with caution, as there is a possibility that significant differences between subgroups were not detected.

Nonetheless, the present meta-analysis adds to the literature demonstrating that Dark Tetrad traits are strongly associated with antisocial behavior in digital environments (Kim, 2023; Van Geel et al., 2017; Xu et al., 2024). This knowledge not only allows for a better theoretical understanding of the underlying mechanisms of online trolling, but also provides a solid empirical basis for the development of early detection and intervention tools. For example, integration of detection algorithms based on linguistic and behavioral patterns characteristic of users with high levels of these traits could be implemented on digital platforms where trolling is particularly prevalent, promoting more effective and proactive moderation (Balakrishnan et al., 2019).

Declaration of Author Contributions

Sergio Hidalgo-Fuentes: Conceptualization, Data curation, Formal Analysis, Methodology, Supervision, Writing – Original draft. **Isabel Martínez-Álvarez**: Conceptualization, Investigation, Validation, Writing – Original draft, Writing – Review & editing. **Elisa González-Pérez**: Conceptualization, Investigation, Visualization, Writing – Original draft, Writing – Review & editing.

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Conflict of Interests

The authors declare that there are no conflicts of interest.

Data Availability Statement

The data described in the manuscript and the analytical code will be available upon request to the corresponding author.

References

References marked with an asterisk (*) were included in the meta-analysis.

Balakrishnan, V., Khan, S., Fernandez, T., & Arabnia, H. R. (2019). Cyberbullying detection on twitter using Big Five and Dark Triad features. *Personality and Individual Differences, 141*, 252-257. https://doi.org/10.1016/j.paid.2019.01.024

Begg, C. B., & Mazumdar, M. (1994). Operating characteristics of a rank correlation test for publication bias. *Biometrics, 50*, 1088-1101. https://pubmed.ncbi.nlm.nih.gov/7786990

Blázquez-Rincón, D., Sánchez-Meca, J., Botella, J., & Suero, M. (2023). Heterogeneity estimation in meta-analysis of standardized mean differences when the distribution of random effects departs from normal: A Monte Carlo simulation study. *BMC Medical Research Methodology, 23*(1), 19. https://doi.org/10.1186/s12874-022-01809-0

Borenstein, M. (2023). How to understand and report heterogeneity in a meta-analysis: the difference between I-squared and prediction intervals. *Integrative Medicine Research, 12*(4), 101014. https://doi.org/10.1016/j.imr.2023.101014

Borenstein, M., Hedges, L. V., Higgins, J. P., & Rothstein, H. R. (2021). *Introduction to Meta-Analysis*. John Wiley & Sons

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

*Buckels, E. E., Trapnell, P. D., Andjelovic, T., & Paulhus, D. L. (2019). Internet trolling and everyday sadism: Parallel effects on pain perception and moral judgment. *Journal of Personality, 87*(2), 328-340. https://doi.org/10.1111/jopy.12393

*Buckels, E. E., Trapnell, P. D., & Paulhus, D. L. (2014). Trolls just want to have fun. *Personality and Individual Differences, 67*, 97-102. https://doi.org/10.1016/j.paid.2014.01.016

Casale, S., Fioravanti, G., & Rugai, L. (2016). Grandiose and vulnerable narcissists: who is at higher risk for social networking addiction? *Cyberpsychology, Behavior, and Social Networking, 19*(8), 510-515. https://doi.org/10.1089/cyber.2016.0189

*Craker, N., & March, E. (2016). The dark side of Facebook®: The Dark Tetrad, negative social potency, and trolling behaviours. *Personality and Individual Differences, 102*, 79-84. https://doi.org/10.1016/j.paid.2016.06.043

Coles, B. A., & West, M. (2016). Trolling the trolls: Online forum users constructions of the nature and properties of trolling. *Computers in Human Behavior, 60*, 233-244. https://doi.org/10.1016/j.chb.2016.02.070

Cuijpers, P., Griffin, J. W., & Furukawa, T. A. (2021). The lack of statistical power of subgroup analyses in meta-analyses: a cautionary note. *Epidemiology and Psychiatric Sciences, 30*, e78. https://doi.org/10.1017/S2045796021000664

Demsar, V., Brace-Govan, J., Jack, G., & Sands, S. (2021). The social phenomenon of trolling: understanding the discourse and social practices of online provocation. *Journal of Marketing Management, 37*(11-12), 1058-1090. https://doi.org/10.1080/0267257X.2021.1900335

Deng, J., Zhou, F., Hou, W., Silver, Z., Wong, C. Y., Chang, O., Huang, E., & Zuo, Q. K. (2020). The prevalence of depression, anxiety, and sleep disturbances in COVID-19 patients: a meta-analysis. *Annals of the New York Academy of Sciences, 1486*(1), 90-111. https://doi.org/10.1111/nyas.14506

Egger, M., Smith, G. D., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *British Medical Journal, 315*, 629-634. https://doi.org/10.1136/bmj.315.7109.629

Fu, R., Gartlehner, G., Grant, M., Shamliyan, T., Sedrakyan, A., Wilt, T. J., Griffith, L., Oremus, M., Raina, P., Ismaila, A., Santaguida, P., Lau, J., & Trikalinos, T. A. (2011). Conducting quantitative synthesis when comparing medical interventions: AHRQ and the Effective Health Care Program. *Journal of Clinical Epidemiology, 64*(11), 1187-1197. https://doi.org/10.1016/j.jclinepi.2010.08.010

Gignac, G. E., & Szodorai, E. T. (2016). Effect size guidelines for individual differences researchers. *Personality and Individual Differences*, *102*, 74-78. https://doi.org/10.1016/j.paid.2016.06.069

Gorwa, R., Binns, R., & Katzenbach, C. (2020). Algorithmic content moderation: Technical and political challenges in the automation of platform governance. *Big Data & Society, 7*(1), 1-15. https://doi.org/10.1177/2053951719897945

*Gylfason, H. F., Sveinsdottir, A. H., Vésteinsdóttir, V., & Sigurvinsdottir, R. (2021). Haters gonna hate, trolls gonna troll: The personality profile of a Facebook troll. *International Journal of Environmental Research and Public Health*, *18*(11), 5722. https://doi.org/10.3390/ijerph18115722

Hare, R. D. (1998). Psychopathy, Affect and Behavior. In D. J. Cooke, A. E. Forth, & R. D. Hare (Eds), *Psychopathy: Theory, Research and Implications for Society* (NATO ASI Series, Vol. 88) (pp. 105-137). Springer. https://doi.org/10.1007/978-94-011-3965-6_6

Hedges, L. V., & Olkin, I. (2014). *Statistical Methods for Meta-Analysis*. Academic Press.

Higgins, J. P., & Thompson, S. G. (2002). Quantifying heterogeneity in a meta-analysis. *Statistics in Medicine, 21*(11), 1539-1558. https://doi.org/10.1002/sim.1186

Higgins, J. P., Thompson, S. G., Deeks, J. J., & Altman, D. G. (2003). Measuring inconsistency in meta-analyses. *British Medical Journal, 327*(7414), 557-560. https://doi.org/10.1136/bmj.327.7414.557

Hilvert-Bruce, Z., & Neill, J. T. (2020). I'm just trolling: The role of normative beliefs in aggressive behaviour in online gaming. *Computers in Human Behavior, 102*, 303-311. https://doi.org/10.1016/jchb.2019.09.003

Jhaver, S., Birman, I., Gilbert, E., & Bruckman, A. (2019). Human-machine collaboration for content regulation: The case of Reddit Automoderator. *ACM Transactions on Computer-Human Interaction, 26*(5), 1-35. https://doi.org/10.1145/3338243

Johnson, A. K., Bevan, J. L., & O'Mara, E. M. (2019). Trolling for sympathy: The Dark Tetrad and online needs-based stress relief. *Computers in Human Behavior, 96*, 44-50. https://doi.org/10.1016/j.chb.2019.02.008

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

Kim, B. (2023). A multilevel meta-analysis of cyberstalking: Domains (and subdomains) of contributing factors. *Journal of Criminal Justice, 87*, 102084. https://doi.org/10.1016/j.jcrimjus.2023.102084

Kircaburun, K., Alhabash, S., Tosuntaş, Ş. B., & Griffiths, M. D. (2020). Uses and gratifications of problematic social media use among university students: A simultaneous examination of the Big Five of personality traits, social media platforms, and social media use motives. *International Journal of Mental Health and Addiction*, *18*, 525-547. https://doi.org/10.1007/s11469-018-9940-6

*Kircaburun, K., Jonason, P. K., & Griffiths, M. D. (2018). The Dark Tetrad traits and problematic social media use: The mediating role of cyberbullying and cyberstalking. *Personality and Individual Differences*, *135*, 264-269. https://doi.org/10.1016/j.paid.2018.07.034

Komaç, G., & Çagiltay, K. (2019). An overview of trolling behavior in online spaces and gaming context. *In 2019 1st International Informatics and Software Engineering Conference (UBMYK)* (pp. 1-4). IEEE. https://10.1109/UB-MYK48245.2019.8965625

*Lee, S. Y. (2025). Do bored people engage in online trolling more actively? Exploring the role of dark personalities and boredom proneness. *Personality and Individual Differences*, *234*, 112956. https://doi.org/10.1016/j.paid.2024.112956

Lopes, B., & Yu, H. (2017). Who do you troll and why: An investigation into the relationship between the Dark Triad Personalities and online trolling behaviours towards popular and less popular Facebook profiles. *Computers in Human Behavior, 77*, 69-76. https://doi.org/10.1016/j.chb.2017.08.036

*March, E. (2019). Psychopathy, sadism, empathy, and the motivation to cause harm: New evidence confirms malevolent nature of the internet troll. *Personality and Individual Differences, 141*, 133-137. https://doi.org/10.1016/j.paid.2019.01.001

March, E., & Marrington, J. (2019). A qualitative analysis of internet trolling. *Cyberpsychology, Behavior, and Social Networking, 22*(3), 192-197. https://doi.org/10.1089/cyber.2018.0210

*March, E., & Steele, G. (2020). High esteem and hurting others online: Trait sadism moderates the relationship between self-esteem and internet trolling. *Cyberpsychology, Behavior, and Social Networking, 23*(7), 441-446. https://doi.org/10.1089/cyber.2019.0652

*March, E., Grieve, R., Marrington, J., & Jonason, P. K. (2017). Trolling on Tinder® (and other dating apps): Examining the role of the Dark Tetrad and impulsivity. *Personality and Individual Differences*, *110*, 139-143. https://doi.org/10.1016/j.paid.2017.01.025

*March, E., McDonald, L., & Forsyth, L. (2024). Personality and internet trolling: a validation study of a representative sample. *Current Psychology, 43*(6), 4815-4818. https://doi.org/10.1007/s12144-023-04586-1

*Marrington, J.Z., March, E., Murray, S., Jeffries, C., Machin, T., & March, S. (2023). An exploration of trolling behaviours in Australian adolescents: An online survey. *PLoS ONE, 18*(4), e0284378. https://doi.org/10.1371/journal.pone.0284378

Matias, J. N. (2019). Preventing harassment and increasing group participation through social norms in 2,190 online science discussions. *Proceedings of the National Academy of Sciences, 116*(20), 9785-9789. https://doi.org/10.1073/pnas.1813486116

*Masui, K. (2019). Loneliness moderates the relationship between Dark Tetrad personality traits and internet trolling. *Personality and Individual Differences, 150*, 109475. https://doi.org/10.1016/j.paid.2019.06.018

*Masui, K. (2023). Interactional effects of adverse childhood experiences, psychopathy, and everyday sadism on Internet trolling. *Personality and Individual Differences, 214*, 112327. https://doi.org/10.1016/j.paid.2023.112327

Međedović, J., & Petrović, B. (2016). Can there be an immoral morality?: Dark personality traits as predictors of moral foundations. *Psihologija, 49*(2), 185-197. http://www.doiserbia.nb.rs/img/doi/0048-5705/2016/0048-57051602185M.pdf

* Molenda, Z. A., Marchlewska, M., Rogoza, M., Michalski, P., Górska, P., Szczepańska, D., & Cislak, A. (2022). What makes an Internet troll? On the relationships between temperament (BIS/BAS), Dark Triad, and Internet trolling. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 16*(5), 5-11. https://doi.org/10.5817/CP2022-5-11

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

*Nitschinsk, L., Tobin, S. J., & Vanman, E. J. (2022). The disinhibiting effects of anonymity increase online trolling. *Cyberpsychology, Behavior, and Social Networking*, *25*(6), 377-383. https://doi.org/10.1089/cyber.2022.0005

*Nitschinsk, L., Tobin, S. J., & Vanman, E. J. (2023). A functionalist approach to online trolling. *Frontiers in Psychology*, *14*, 1211023. https://doi.org/10.3389/fpsyg.2023.1211023

Ortiz, S. M. (2020). Trolling as a collective form of harassment: an inductive study of how online users understand trolling. *Social Media + Society, 6*(2), 1-9. https://doi.org/10.1177/2056305120928512

*Paananen, A., & Reichl, A. J. (2019). Gendertrolls just want to have fun, too. *Personality and Individual Differences*, *141*, 152-156. https://doi.org/10.1016/j.paid.2019.01.011

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., Whiting, P., & Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *International Journal of Surgery, 88*, 105906. https://doi.org/10.1016/j.ijsu.2021.105906

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., & 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

*Pineda, D., Rico-Bordera, P., Ballester-Pascual, M., Piqueras, J. A., & Galán, M. (2024). How Spiteful Are We? Validation of the Spitefulness Scale in Spaniards. *Aggressive Behavior, 50*(6), e70008. https://doi.org/10.1002/ab.70008

Rauthmann, J. F., & Will, T. (2011). Proposing a multidimensional Machiavellianism conceptualization. *Social Behavior and Personality: An International Journal, 39*(3), 391-403. https://doi.org/10.2224/sbp.2011.39.3.391

*Resett, S., & González, P. C. (2023). Psychometric Properties of the Revised Trolling Questionnaire in Argentinean Adults. *Acta Colombiana de Psicología*, *26*(2), 101-113. https://doi.org/10.14718/acp.2023.26.2.9

*Schade, E. C., Voracek, M., & Tran, U. S. (2021). The nexus of the dark triad personality traits with cyberbullying, empathy, and emotional intelligence: a structural-equation modeling approach. *Frontiers in Psychology*, *12*, 659282. https://doi.org/10.3389/fpsyg.2021.659282

*Sest, N., & March, E. (2017). Constructing the cyber-troll: Psychopathy, sadism, and empathy. *Personality and Individual Differences, 119*, 69-72. https://doi.org/10.1016/j.paid.2017.06.038

Schwarzer, G. (2007). meta: An R package for meta-analysis. *R News, 7*(3), 40-45. https://journal.r-project.org/articles/RN-2007-029/RN-2007-029.pdf

Suero, M., Botella, J., Duran, J. I., & Blazquez-Rincón, D. (2025). Reformulating the meta-analytical random effects model of the standardized mean difference as a mixture model. *Behavior Research Methods, 57*(2), 74. https://doi.org/10.3758/s13428-024-02554-6

Thomaes, S., Brummelman, E., Reijntjes, A., & Bushman, B. J. (2008). When narcissism and self-esteem clash: Self-esteem instability predicts increased aggression in narcissistic children. *Development and Psychopathology, 20*(2), 411-422. https://doi.org/10.1017/S095457940800020X

*Türk Kurtça, T., & Demirci, I. (2023). Psychopathy, impulsivity, and internet trolling: Role of aggressive humour. *Behaviour & Information Technology*, *42*(15), 2560-2571. https://doi.org/10.1080/0144929X.2022.2133635

Van Geel, M., Goemans, A., Toprak, F., & Vedder, P. (2017). Which personality traits are related to traditional bullying and cyberbullying? A study with the Big Five, Dark Triad and sadism. *Personality and Individual Differences, 106*, 231-235. https://doi.org/10.1016/j.paid.2016.10.063

Viechtbauer, W. (2005). Bias and efficiency of meta-analytic variance estimators in the random-effects model. *Journal of Educational and Behavioral Statistics, 30*(3), 261-293. https://doi.org/10.3102/10769986030003261

Viechtbauer, W. (2010). Conducting meta-analyses in R with the metafor package. *Journal of Statistical Software, 36*, 1-48. https://doi.org/10.18637/jss.v036.i03

*Volkmer, S. A., Gaube, S., Raue, M., & Lermer, E. (2023). Troll story: The dark tetrad and online trolling revisited with a glance at humor. *PLoS One*, *18*(3), e0280271. https://doi.org/10.1371/journal.pone.0280271

*Wu, B., Xiao, Y., Zhou, L., Li, F., & Liu, M. (2023). Why individuals with psychopathy and moral disengagement are more likely to engage in online trolling? The online disinhibition effect. *Journal of Psychopathology and Behavioral Assessment, 45*(2), 322-332. https://doi.org/10.1007/s10862-023-10028-w

Xu, W., Zhao, B., & Jin, C. (2024). A meta-analysis of the relationship between personality traits and cyberbullying. *Aggression and Violent Behavior, 79*, 101992. https://doi.org/10.1016/j.avb.2024.101992