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Dark triad and social media addiction: A meta-analysis

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Keywords
dark triad, social media addiction, meta-analysis

Abstract
The dark triad consists of three personality traits including narcissism, Machiavellianism, and psychopathy. Social media addiction is defined as individuals' losing control over social media use and thus experiencing negative reflections on academic, social, and emotional life. Dark triad personality traits can be considered to be positively associated with social media addiction. This study aims to investigate the association between the dark triad and social media addiction using meta-analysis method. The meta-analysis includes a total of 7064 participants in 15 studies. Results indicated a positive association between the dark triad and social media addiction. The study also utilized meta-regression analysis to determine the moderator role of measures used for dark triad and social media addiction. The results showed that measures did not have a significant moderator role in the association between the dark triad and social media addiction. Analyses indicated high and significant heterogeneity. In conclusion, a medium-level, positive, and significant effect size was found in the association between the dark triad and social media addiction. The results of this study indicate the need to focus on personality factors for the prevention of and intervention for social media addiction.

Anahtar kelimeler
karanlık üçlü, sosyal medya bağımlılığı, meta-analiz

Öz

Karanlık üçlü ve sosyal medya bağımlılığı: Bir meta-analiz çalışması

Karanlık üçlü, üç kişilik özelliğinden oluşmaktadır. Bunlar, narsisizm, Makyavelizm ve psikopatidir. Sosyal medya bağımlılığı bireyin sosyal medyayı kullanım kontrolünü kaybetmesi ve bunun sonucunda bireyin akademik, sosyal ve duygusal yaşam alanlarına olumsuz yansıması olarak tanımlanmaktadır. Karanlık üçlü kişilik özellikleri sosyal medya bağımlılığı pozitif ilişkili olabilir. Bu çerçevede çalışmanın amacı karanlık üçlü ile sosyal medya bağımlılığı arasındaki ilişkinin meta-analiz ile incelenmesidir. Bu meta-analiz çalışması 15 ayrı çalışma ve 7064 katılımcıyı içermektedir. Yapılan analiz sonucunda narsisizm, Makyavelizm ve psikopati ile sosyal medya bağımlılığı arasında pozitif ilişki bulunmuştur. Ayrıca karanlık üçlü ve sosyal medya bağımlılığı için kullanılan ölçek tiplerinin düzenleyici rolünü belirlemek için meta-regresyon analizi yapılmıştır. Yapılan analiz sonucunda karanlık üçlü kişilik özellikleri ile sosyal medya bağımlılığı arasındaki ilişkide ölçek tipinin düzenleyici rolünün anlamlı olmadığı bulunmuştur. Yapılan analiz sonucunda heterojenlik anlamlı bulunmuştur. Sonuç olarak karanlık üçlü kişilik modeli ile sosyal medya arasındaki ilişkide orta düzeyde pozitif yönde anlamlı etki büyüklüğü olduğu sonucuna ulaşılmıştır.

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The recent dramatic increase in telecommunication has enabled to access social media platforms at any time via the internet and smart devices (Andreassen & Pallesen, 2014), which has brought the opportunity of using social media platforms constantly (Hou et al., 2019). However, this excessive and uncontrolled use of social media has brought along addiction (Andreassen & Pallesen, 2014). Social media addiction (SMA) is defined as individuals' losing control over social media use and thus experiencing negative reflections on academic, social, and emotional life (Ryan et al., 2014). SMA is accepted as a form of internet addiction (Young, 1998). Symptoms of social media addiction include changes in emotional state (i.e., mood modification); thinking about social media excessively (i.e., salience); gradual increase in the time allocated to social media to be satisfied with social media use (i.e., tolerance); feeling tense and angry when not using social media (i.e., withdrawal); experiencing problems in reducing and ending social media use, recurrent cycle of quitting and using social media (i.e., relapse); experiencing family, education, and work life difficulties caused by social media (i.e., conflict) (Andreassen, 2015). These symptoms are also parallel to the symptoms of substance abuse in the Diagnostic and Statistical Manual of Mental Disorders published by the American Psychiatric Association (APA, 2013).

The Interaction of Person-Affect-Cognition-Execution (I-PACE) Model was proposed by Brand et al. (2016) to explain SMA. This model explains factors associated with the development of social media addiction. Person (P) contains personal factors associated with the development of social media addiction**,** which include personality, genetic dispositions, and psychopathology. Affect (A) and Cognition (C) contain emotional and cognitive components affecting the development of social media addiction. These components include craving, cognitive biases, attentional biases, cue-reactivity, and urge for mood regulation. Execution (E) consists of the decrease in executive functions (Brand et al., 2016). According to the I-PACE model, social media addiction is associated with many problem areas (Brand et al., 2019). Hence, the literature reports that social media addiction is positively associated with alexithymia (Lyvers et al., 2022), neuroticism (Turel et al., 2018), depression (Nguyen et al., 2020), impulsivity (Sindermann et al., 2020), and aggression (Güler et al., 2022). In addition, according to the I-PACE model, Person (P), namely the individual's personality dispositions and psychopathology, is associated with social media addiction (Brand et al., 2016). In this regard, narcissism, Machiavellianism, and psychopathy are considered to be associated with social media addiction (Hussain et al., 2021; Lee, 2019; Tang et al., 2022).

Dark triad and social media addiction

Dark Triad (DT) consists of three personality traits including narcissism, Machiavellianism, and psychopathy (Paulhus & Williams, 2002). Individuals with narcissistic personality overestimate their self-perception and see themselves as magnificent and almighty (Paulhus, 2001). They think that other people have to meet their desires, and they do not feel empathy with others (Morf & Rhodewalt, 2001). Individuals with Machiavellianism characteristics use others according to their own needs, demonstrate manipulative and deceptive behaviors, put their interests before their principles, and have negative thoughts about human nature (Gunnthorsdottir et al., 2002; Sherry et al., 2006). Psychopathic individuals reject social rules, behave impulsively and detrimentally, do not feel regretful or guilty for their negative behaviors, and demonstrate risky behaviors to meet their desires (Arrigo & Shipley, 2001; Hare & Neumann, 2009). DT personality characteristics were suggested to be associated with maladaptive outcomes (Paulhus & Williams, 2002), and addiction is one of them (Gardiner & Lawson, 2022). Previous studies shows that DT is positively associated with substance abuse (Jauk & Dieterich, 2019), game addiction (Tang et al., 2020), smartphone addiction (Servidio et al., 2021), shopping addiction (Müller et al., 2021), and digital game addiction (Mejía-Suazo et al., 2021).

According to the Self-Presentational Theory, the individual attaches great importance to the impression s/he has on others and checks this impression frequently (Leary, 2001). Hence, individuals with narcissistic personality can use social media in line with these purposes in an uncontrollable way (Bergman et al., 2011). Besides, the Compensatory Internet Use Model indicates that individuals reflect their real-life psychological problems in internet use (Kardefelt-Winther, 2014). In this respect, individuals with Machiavellianism and psychopathic personality traits can demonstrate their aggression and manipulations on social media platforms (Abell & Brewer, 2014; Monacis et al., 2020). When all these factors are considered, the DT personality traits can be considered to be positively associated with SMA. The I-PACE model also emphasizes the relationship between personality tendencies and SMA (Brand et al., 2016), and previous studies reported a relationship between DT and SMA (Demircioğlu & Göncü-Köse, 2021; Monacis et al., 2020; Savcı, 2019).

The Present Study

Although the literature includes studies investigating the association between dark triad and social media addiction, no studies have so far investigated and synthesized these studies as a whole. In this regard, determining the effect size of the relationship between DT and SMA is considered to contribute to understanding the association mechanisms between these two variables. Besides, considering its reflection on SMA, DT can help to design intervention programs by

determining the effect size of the association between DT and SMA. In light of this importance, the purpose of this study is to investigate the effect size of the association between DT and SMA through meta-analysis. Three hypotheses investigated in line with the literature and the theoretical framework are as follows:
Hypothesis 1. There is a positive and significant effect size in the association between narcissism and SMA.
Hypothesis 2. There is a positive and significant effect size in the association between Machiavellianism and SMA.
Hypothesis 3. There is a positive and significant effect size in the association between psychopathy and SMA.

METHODS

Eligibility Criteria

For eligibility criteria, studies that utilized scales measuring the DT and SMA psychometrically were included in this study. The association between SMA and narcissism, Machiavellianism, and psychopathy, was determined as the criterion to report the effect size values.

Search Strategy

Google scholar, ProQuest, PubMed, Web of Science, ERIC, EBSCO, Taylor & Francis, Springer, and PsycINFO databases were used between January 2022 and March 2022 to access the studies on the issue. The keywords used in the search included 'social media use disorder' or 'excessive social media use' or 'social media addiction' or 'problematic social media use' and 'dark triad' or 'dark tetrad' or 'dark triad personality or 'narcissism' or 'Machiavellianism' or 'psychopathy'. In May 2022, another search was conducted using the same keywords and databases. Reviews also included references of the studies accessed as well as the studies that cited them.

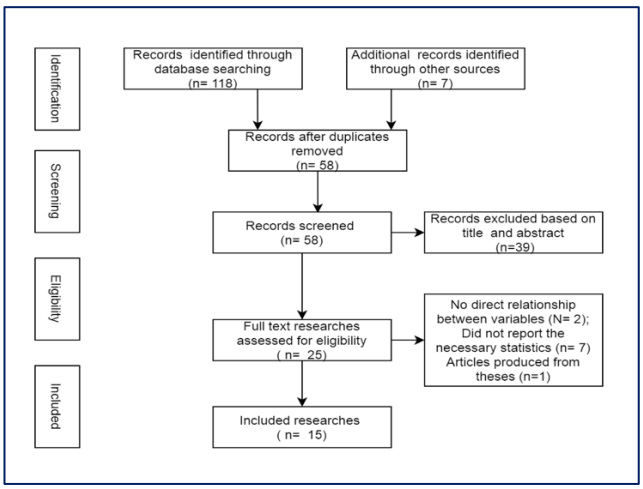

Figure 1. Flow Diagram

Data Extraction and Coding

The studies that met the inclusion criteria were recorded while those which did not were extracted. In this process, the correlation value is necessary for calculating the effect size. Coding was performed in line with Cochrane collaboration standards (Higgins et al., 2019). The coded data included (1) authors and publication dates, (2) participants' average age, (3) the number of participants, (4) the average number of female participants, (5) measures for the DT and SMA, (6) reliability and validity of the measurement tools, (7) research design (correlational), (8) type of the study: thesis or article, and (9) source of the sample. Studies accessed within the scope of all these criteria were analyzed. MOOSE protocol steps were followed in each phase of the meta-analysis.

Data Analyses

This study utilized Comprehensive Meta-Analysis Software (CMA 3.0) for analysis. Pearson correlation (r) was utilized to calculate the effect size (Borenstein et al., 2013). This r value posed a problem in terms of normal distribution between ± 0.25 and ± 1. Hence, as suggested by Cooper (2010), the r value was converted to Fisher's z value and then the effect size was calculated. In the reporting phase, Fisher's z value was presented by transforming it into r value. According to Gignac and Szodorai (2016), the effect size value accessed as a result of the analysis is accepted low if it is 0.1 and below; medium if it is between 0.1 and 0.3; and strong if it is 0.3 and above. Fixed and random effect models are utilized to calculate the effect size in meta-analysis studies. A random effect model is utilized if the study demonstrates heterogeneity values (Borenstein et al., 2013). Q value should be significant for heterogeneity. Besides, heterogeneity is accepted to be low if the I^2 value is 25% or below; medium if it is between 25% and 75%; and high if it is 75% and over (Card, 2012). After heterogeneity was determined, meta-regression analysis was performed with the variable (i.e., different measures for DT and SMA) considered to have a moderating role in the association between the DT and SMA.

Funnel plot, Begg and Mazumdar's rank correlation (1994), classic fail-safe N, Orwin's fail-safe, Duval, and Tweedie's trim and fill methods were performed to determine publication bias. To prevent publication bias in these analyses, they should be distributed symmetrically around the general effect size in the funnel plot (Borenstein et al., 2013). P value indicating the Tau coefficient should not be significant in the Begg and Mazumdar's rank correlation test (Begg & Mazumdar, 1994). There should be no difference or trivial difference between the corrected and observed effect sizes in the Duval and Tweedie's trim and fill test (Duval & Tweedie, 2000). In the classic fail-safe

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Table 1. Descriptive Information for Studies Included in the Meta-Analysis

Author (s)	Publication Type	Country	Sample size	Sample source	Mean age	% Female	SMA tool	DT tool	DT type	Result *r*
Chung et al. (2019)	Journal	Malaysia	128	Community	19.73	52.34	BSMAS	SD3	N	0.04
									M	-0.01
									P	0.21
Demircioğlu (2020)	Dissertation	Turkey	595	Student	15.80	49.9	SMAS	SD3	N	0.12
									M	0.16
									P	0.32
Demircioğlu and Göncü-Köse (2021)	Journal	Turkey	229	Student	21.51	67.9	SMAS	SD3	N	0.04
									M	0.24
									P	0.25
Hussain et al. (2021)	Journal	United Kingdom	555	Community	33.32	47.57	BSMAS	SD3	N	0.29
									M	0.34
									P	0.35
Kircaburun et al. (2019)	Journal	Turkey	495	Student	20.36	63.5	SMDS	DTDDS	N	0.28
									M	0.19
									P	0.10
Kircaburun et al. (2018)	Journal	Turkey	761	Student	20.70	63.99	SMDS	DTDDS	N	0.22
									M	0.23
									P	0.15
Kumpasoğlu et al. (2021)	Journal	Turkey	364	Student	24.02	60.02	SMAS	SD3	N	-0.01
									M	0.13
									P	0.13
Lee (2019)	Journal	Malaysia	204	Student	22.94	60.0	BSMAS	SD3	N	0.18
									M	0.11
									P	0.25
Monacis et al. (2020)	Journal	Italia	490	Student	21.23	53.1	BSMAS	SD3	N	0.15
									M	0.15
									P	0.18
Necula (2020)	Journal	Romania	290	Community	22.50	78.6	BFAS	SD3	N	0.08
									M	0.14
									P	0.18
Nikbin et al. (2022)	Journal	Oman	315	Community	26.42	80.0	BFAS	DTDDS	N	0.25
									M	0.26
									P	0.16
Savcı (2019)	Journal	Turkey	296	Student	22.17	60.14	SMCS	SD3	N	0.45
									M	0.32
									P	0.31
Tahoon (2020)	Journal	Egypt	247	Student	19.98	64.37	SMAS	SD3	N	0.04
									M	0.14
									P	0.15
Tang et al. (2022)	Journal	Germany	1865	Community	27.65	54.39	SMDS	DTDDS	N	0.32
									M	0.47
									P	0.47
Wong et al. (2020)	Dissertation	India	230	Student	23.17	57.5	BSMAS	SD3	N	0.09
									M	0.21
									P	0.20

Table 2. Meta-analysis of DT and SMA

Dark triad	*N*	Meta-analytic *r* (95% CI)	*p*	Heterogeneity analyses			
				Q	*df*	*p*	I^2
Narcissism	7064	0.18 (0.11, 0.24)	0.00	106.02	14	0.00	86.80
Machiavellianism	7064	0.21 (0.13, 0.29)	0.00	159.79	14	0.00	91.24
Psychopathy	7064	0.23 (0.15, 0.31)	0.00	157.86	14	0.00	91.13

N test, the number of studies that need to be included in the analysis should be high. Besides, the trivial correlation value in Orwin's fail-safe test should be determined based on the direction of the hypothesis (Orwin, 1983). 1% of the variable shared as the personality trait is considered trivial; the trivial correlation value should be determined as 0.10 or -0.10 depending on the direction of the hypothesis (Winters et al., 2022). This study considered these criteria.

RESULTS

Studies Included and Excluded

This study presented the inclusion and exclusion steps for the studies accessed within flow diagram (Moher et al., 2009). As a result of these steps, a total of 15 studies were included in the meta-analysis (See figure 1).

Study Characteristics and Quality Assessment

Table 1 presents the descriptive characteristics of each study included in the meta-analysis. When the participants of each study were taken into consideration, there was a total of 7064 participants. Short Dark Triad Scale (SD3) and Dark Triad Dirty Dozen Scale (DTDDS) were utilized in the studies that aimed to measure the DT. SD3 was composed of 27 items and 3 sub-scales. Cronbach's alpha values were 0.71 for narcissism, 0.77 for Machiavellianism, and 0.80 for psychopathy (Jones & Paulhus, 2014). The DTDDS was composed of 12 items and 3 sub-scales. Cronbach's alpha values were 0.78 for narcissism, 0.77 for Machiavellianism, and 0.69 for psychopathy (Jonason & Webster, 2010). The Bergen Social Media Addiction Scale (BSMAS) was one of the scales that measured social media addiction. The scale was composed of 6 items and one sub-scale, and Cronbach's alpha value was reported as 0.88 (Andreassen et al., 2017). The Bergen Facebook Addiction Scale (BFAS) was another scale utilized. This scale was composed of 18 items and one sub-scale. Cronbach's alpha value was reported as 0.83 (Andreassen et al., 2012). The Social Media Addiction Scale (SMAS) was composed of 41 items and 4 sub-scales, and Cronbach's alpha value was reported as 0.92 for the total scale (Tutgun-Ünal & Deniz, 2015). The Social Media Disorder Scale (SMDS) was composed of 27 items and 9 sub-scales, and Cronbach's alpha value was reported as 0.92 for the total scale (van den Eijnden et al., 2016). The Social Media Craving Scale (SMCS) had 5 items and one sub-scale, and Cronbach's alpha value was reported as 0.82 (Savci & Griffiths, 2019).

Main Results

As it is shown in Table 2, heterogeneity for the association between narcissism and SMA was significant ($Q = 106.02$, $p < 0.01$) and high ($I^2 = 86.80$); heterogeneity for the association between Machiavellianism and SMA was significant ($Q = 159.79$, $p < 0.01$) and high ($I^2 = 91.24$); and heterogeneity for the association between psychopathy and SMA was significant ($Q = 157.86$, $p < 0.01$) and high ($I^2 = 91.13$).

According to the random effects model in Table 2, there was a significant and medium-level effect size in the association between narcissism and social media addiction ($r = 0.18$; 95% CI: 0.11, 0.24). A significant and medium-level effect size was found in the association between Machiavellianism and social media addiction ($r = 0.21$; 95% CI: 0.13, 0.29). Besides, there was a significant and medium-level effect size in the association between psychopathy and social media addiction ($r = 0.23$; 95% CI: 0.15, 0.31).

Moderator

Measures used for DT and SMA as a moderator role were analyzed using meta-regression in the effect size of the association between DT and SMA. As is seen in Table 3 and Table 4, the moderator roles of the scales used for DT and SMA were not significant.

Publication Bias

As it is demonstrated in Fig. 2-4, a funnel plot was analyzed for the association between each DT and SMA, and the studies were found to distribute relatively symmetrically around the effect size. Besides, as is seen in Table 5, no differences were found between each DT in Duval and Tweedie's trim and fill test and observed and corrected effect size, and they were found to have the same value. Observed and corrected effect sizes were reported as 0.18 for narcissism; 0.29 for Machiavellianism; and 23 for psychopathy. The number of studies that needed to be included in the classic fail-safe N test was 914 for narcissism, 1415 for Machiavellianism, and 1579 for psychopathy. Orwin's fail-safe test results were 19 for narcissism, 28 for Machia-

Table 3. Meta-analysis of DT and SMA: DT Measure Type as a Moderator

Covariate	Coefficient	Standard error	95% CI	Z-value	p-value	*Q*	*df*
Model (Narcissism)							
Intercept	0.09	0.13	[-0.15, 0.34]	0.72	0.47		
DTDDS	0.19	0.14	[-0.08, 0.46]	1.35	0.17	4.06	2
SD3	0.05	0.13	[-0.20, 0.31]	0.43	0.66		
Model (Machiavellianism)							
Intercept	0.21	0.14	[-0.07, 0.50]	1.45	0.14		
DTDDS	0.09	0.16	[-0.22, 0.41]	0.56	0.57	2.27	2
SD3	-0.04	0.15	[-0.33, 0.26]	-0.21	0.83		
Model (Psychopathy)							
Intercept	0.20	0.17	[-0.13, 0.54]	1.17	0.24		
DTDDS	0.03	0.19	[-0.34, 0.40]	0.17	0.86	0.04	2
SD3	0.04	0.18	[-0.31, 0.39]	0.21	0.84		

Table 4. Meta-analysis of DT and SMA: SMA Measure Type as a Moderator

Covariate	Coefficient	Standard error	95% CI	Z-value	p-value	*Q*	*df*
Model (Narcissism)							
Intercept	0.09	0.09	[-0.09, 0.27]	1.35	0.32		
BFAS	0.07	0.11	[-0.13, 0.29]	-0.05	0.47		
BSMAS	0.09	0.10	[-0.11, 0.29]	-0.29	0.33	2.87	5
SMAS	-0.03	0.10	[-0.20, 0.25]	-0.26	0.70		
SMCS	0.08	0.12	[-0.14, 0.31]	0.54	0.50		
SMDS	0.19	0.10	[-0.04, 0.39]	0.57	0.06		
Model (Machiavellianism)							
Intercept	0.21	0.15	[-0.09, 0.52]	0.99	0.17		
BFAS	-0.01	0.19	[-0.38, 0.36]	0.72	0.96		
BSMAS	-0.05	0.17	[-0.39, 0.29]	0.96	0.77	2.81	5
SMAS	-0.04	0.17	[-0.38, 0.29]	e0.38	0.79		
SMCS	0.11	0.22	[-0.31, 0.55]	0.74	0.59		
SMDS	0.10	0.17	[-0.24, 0.45]	1.92	0.56		
Model (Psychopathy)							
Intercept	0.20	0.18	[-0.26, 0.56]	1.09	0.27		
BFAS	-0.03	0.22	[-0.47, 0.41]	-0.14	0.89		
BSMAS	0.05	0.20	[-0.35, 0.46]	0.26	0.79	0.62	5
SMAS	0.01	0.20	[-0.39, 0.42]	0.08	0.93		
SMCS	0.11	0.26	[-0.39, 0.62]	0.45	0.65		
SMDS	0.05	0.21	[-0.36, 0.47]	0.26	0.79		

vellianism, and 29 for psychopathy. On the other hand, Begg and Mazumdar's rank correlation test (1994) showed that the p-value indicating the Tau coefficient was not significant. Findings included narcissism and SMA (-0.29, $p > 0.05$), Machiavellianism and SMA (-0.20, $p > 0.05$), and psychopathy and SMA (0.10, $p > 0.05$).

DISCUSSION

Analysis results revealed a positive and significant effect size in the association between narcissism, Machiavellianism, psychopathy, and SMA. This result supports all three hypotheses of the study. Self-report scales measuring DT and SMA were also included in the analysis as a moderator variable. However, the moderator roles of the scales were not significant.

Individuals with narcissistic personality are more vulnerable to addictions (Bilevicius et al., 2019). Previous studies have reported positive associations between narcissism and exercise addiction (Bruno et al., 2014), smart phone addiction (Pearson & Hussain, 2017), substance abuse (Mowlaie et al., 2016), and game addiction (Tang et al., 2020). Individuals with nar-

Table 5. Meta-analysis of DT and SMA: Publication Bias Analyses

Dark triad	Classic fail-safe *N*	Orwin's fail-safe *N*	Begg and Mazumdar's rank correlation (1994) Tau (p-value)	Observed *r*	Duval and Tweedie's trim and fill T-test Corrected effect size r (95% CI)
Narcissism	914	19	-0.29 (0.13)	0.18	0.18 (0.11, 0.24)
Machiavellianism	1415	28	-0.20 (0.29)	0.29	0.29 (0.13, 0.30)
Psychopathy	1579	29	0.10 (0.58)	0.23	0.23 (0.15, 0.31)

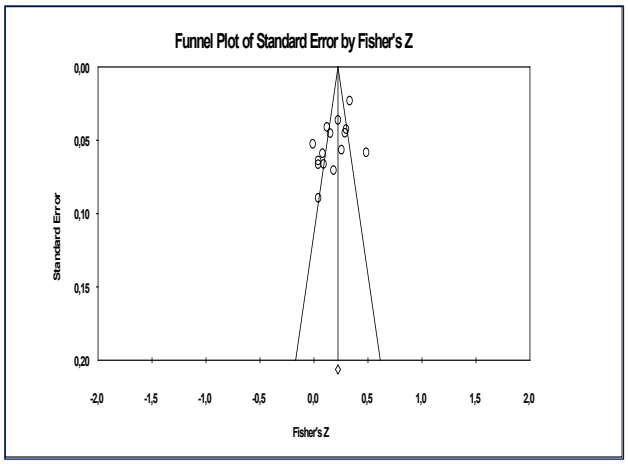

Figure 2. Narcissism and SMA: Funnel Plot Assessing Publication Bias

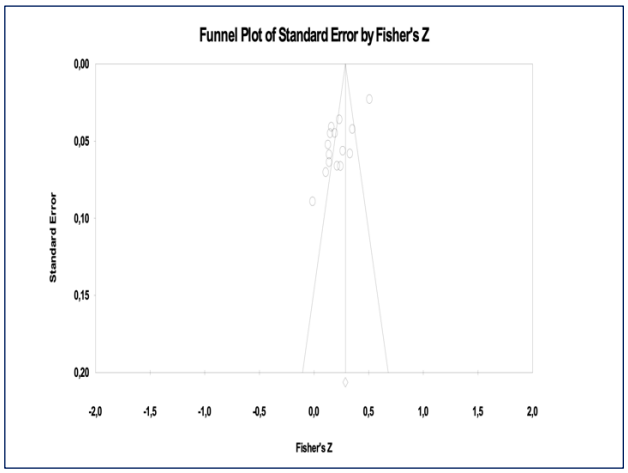

Figure 3. Machiavellianism and SMA: Funnel Plot Assessing Publication Bias

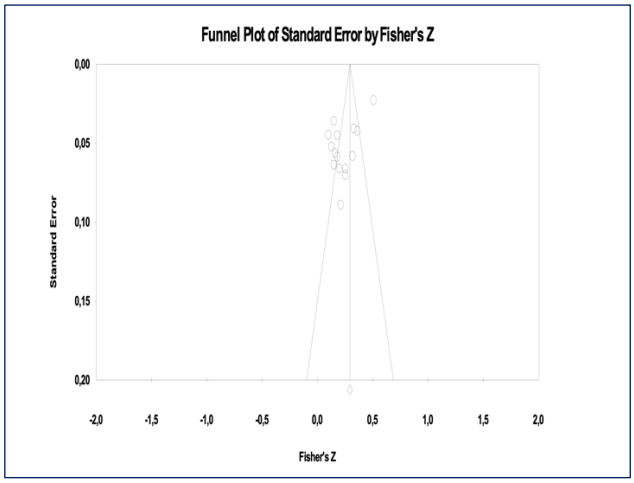

Figure 4. Psychopathy and SMA: Funnel Plot Assessing Publication Bias

cissistic personality give great importance to having an impression on others and looking magnificent (Paulhus, 2001). Online and instant sharing on social media platforms serves these desires of individuals with narcissistic personality (Bergman et al., 2011). According to the Self-Presentational Theory, individuals have the desire to constantly check the impression they have on others (Leary, 2001). Hence, online and constant control of the impression they have on others via social media could explain the relationship between narcissism and SMA. On the other hand, Kuss and Griffiths (2020) see personality traits as a risk factor for SMA. According to the I-PACE model, personality traits can be associated with an individual's development of SMA (Brand et al., 2016). In this regard, in line with the results of the present study, the literature includes studies indicating a positive association between narcissism and SMA (Demircioğlu & Göncü-Köse, 2021; Monacis et al., 2020). As a result, previous studies and the theoretical framework may explain the effect size of the relationship between narcissism and SMA.

This study found a positive effect size in the relationship between Machiavellianism and psychopathy and SMA. Individuals with Machiavellianism and psychopathy have a high tendency to demonstrate addiction (Hare & Neumann, 2009; Jauk & Dieterich, 2019). Previous studies have reported positive relationships of psychopathy and Machiavellianism with digital game addiction (Mejía-Suazo et al., 2021; Tang et al., 2020) and smart phone addiction (Balta et al., 2019; Servidio et al., 2021) as behavioral addictions. In this framework, according to the I-PACE model, personality and psychopathological tendencies can be associated with individuals' development of SMA (Brand et al., 2016). According to the Compensatory Internet Use Model, individuals use the internet in uncontrolled and excessive ways as a reflection of wishes and desires and psychological problems in real life, which leads to internet addiction (Kardefelt-Winther, 2014). Hence, individuals who demonstrate Machiavellianism and psychopathy personality traits reflect their wishes, desires, and problems in social media (Abell & Brewer, 2014; Monacis et al., 2020). Therefore, the Compensatory Internet Use Model reveals the effect of Machiavellianism, psychopathy on SMA. Hence, previous studies have reported a positive relationship between Machiavellianism and psychopathy and SMA (Hussain et al., 2021; Lee, 2019; Monacis et

al., 2020). As a result, previous studies noting the relationship between Machiavellianism and psychopathy and SMA and the theoretical framework can be considered to explain the effect size obtained in this study.

This study found that the measures used for the association between the DT and SMA did not have significant moderating roles. SD3 and DTDDS scales used for the DT within the scope of the meta-analysis showed that the reliability and validity values for each sub-scale were in an acceptable range (Jonason & Webster, 2010; Jones & Paulhus, 2014). Studies that investigated the moderator role of these two scales also reported no significant moderator roles (Michels, 2022; Vize et al., 2018). This study also found that the moderator roles of the scales used for SMA were not significant. The reliability and validity values of each scale used for SMA within the scope of the meta-analysis were in an acceptable range (Andreassen et al., 2017; Savci & Griffiths, 2019; Tutgun-Ünal & Deniz, 2015; van den Eijnden et al., 2016). A meta-analysis that analyzed the moderating roles of the scales used for SMA reported no significant moderating effects of these scales (Huang, 2022). The non-significant moderating role could point out the robustness of the relationship patterns between those personality traits and social media addiction, indicating consistent findings for the existing body of knowledge.

Limitations and Future Directions

One of the important limitations of this study is the low number of studies included. Besides, no causality may be mentioned due to the correlation value used. The scales used in the studies were self-report scales, which might have caused some prejudices and biases to affect them. Besides, this study analyzed the measures as a moderator role in the effect size of the association between the DT and SMA. The lack of other moderator roles can be considered a limitation. Another limitation is the cross-sectional design of the study, so no longitudinal characteristics can be mentioned. Lack of investigation of the cultural differences is also a limitation in this study.

The results of this study indicate the need to focus on personality factors for the prevention of and intervention for SMA. Prevention and intervention programs can be formed for individuals who have the DT personality characteristics and SMA. In addition, longitudinal meta-analysis studies could analyze the effect size of the association between the DT and SMA. Future studies could involve field meta-analyses analyzing the effect size of the association of DT with game, gambling, shopping, and smart phone addiction as behavioral addictions.

Conclusions

The results of this meta-analysis study indicate an association between narcissism, Machiavellianism, and psychopathy and SMA. A medium-level, positive, and significant effect size was found in the association between the DT personality model and SMA. In addition, scale types were found to have no moderating roles. These results have revealed the relationship between the DT personality trait and SMA. On the other hand, effect sizes obtained indicate the importance of considering individuals' personality traits while forming programs that prevent and intervene with SMA. Future studies could contribute to the literature on the relationship between SMA and personality traits by analyzing the effect size of the relationship between SMA and other personality traits.

DECLARATIONS

Compliance with Ethical Standards It is not a study that requires ethics committee approval.

Conflict of Interest The author(s) declare that they have no conflict of interest.

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