Mediating Effects of Dark Personality Triad and Real and Mediated Social Interaction on Social Media Addiction and Academic Performance in University Students

Rehab Tahoon*

Department of Psychology, Faculty of Education, University of Sadat City, Egypt

Corresponding Author*

Rehab Tahoon
Associate Professor
Department of Psychology, Faculty of Education
University of Sadat City
Sadat City 32958, Menoufia, Egypt
Tel: 01092324705
E-mail: Rehab.Tahoon@edu.usc.edu.eg

Abstract

Objective: The objective of this study was to investigate the mediating effects of dark personality triad and real and mediated social interactions on social media addiction and academic performance of university students.

Methods: A total of 247 university students studying during the summer term of 2019 were asked to respond on the Short Dark Triad Scale, Social Interaction Scale, and Bergen Social Media Addiction Scale.

Results: The results of this study revealed a strong direct positive path from the mediated social interaction to social media addiction (β=0.53) (p<0.01). Moreover, it partially mediated the indirect path from psychopathy to social media addiction. The narcissistic personality directly enhanced student's academic performance and did not affect social interaction or social media addiction. In summary, excessive mediated social interaction might be the step before social media addiction, whereas social media addiction negatively affected student's academic performance. Furthermore, psychopathic personality has a tendency toward social media addiction, whereas narcissistic personality shows improved academic performance.

Keywords: Emotion regulation strategies • Social media addiction • Real-social interaction • Mediated social interaction • Dark personality triad • Academic performance

Introduction

Since the dawn of the social technology era, executives have recognized the potential of social networks to strengthen human communication and knowledge sharing. Social media such as Facebook, WhatsApp, Twitter, Instagram, and YouTube have divided the world into two divergent portions: the first is the online world (virtual) and the second is the real world (offline). Social media are online technologies that help people to communicate with each other regardless of the distance. It helps individuals to communicate with different identities, discovering acquaintances, and talk about important issues, which are considered as important, especially for the young generation. Consequently, it is used more frequently during the important stages of their life [1].

Social media is considered dangerous to teenagers, as they could develop false impressions and construct fake love and friendships, which can be easily destroyed [2]. Therefore, researchers have different opinions about the use of social media use among students. Some researchers believe that social media helps students acquire basic information and exchange it quickly [3]. In contrast, other researchers believe that social media can have a bad effect on student's academic life [4]. Therefore, some schools and universities in different countries have restricted the use of social media inside the premises, regardless of the useful scientific content available through these media [5].

Social media has become an integral part of a student's life [6]. In addition, students are mostly interested in spending their time on social media instead of real face-to-face communication [7]. Consequently, students tend to misuse social media, which will eventually negatively affect their academic performance [8]. In addition, the misuse of social media might affect the general, psychological, social, and mental health [9] and affect their quality of social interaction [7].

Academic performance and mediated social interaction

Using social media as an educational tool can improve the academic performance of the students. However, some educators fail to acknowledge the positive benefits of social media, as they cannot provide the scientific courses on the familiar social media to the students. Arnold et al. suggested that social media could be used for educational purposes as it may get attention of the students to study in different technical ways. In contrast, Lin et al. proposed that social media may have adverse effects on studying, as it is primarily designed for communication. Moreover, social media might be dangerous as it distracts the students into unnecessary chatting rather than studying, especially among teenagers. However, with the help of social media, it is possible for the educators to share study materials, which might prove beneficial to the students. Moreover, the collaboration between students throughout social media could improve their academic gain [10]. Furthermore, the collaboration between students and educators might be beneficial for disseminating the knowledge using social media. However, the ill use of social media might depress the academic performance of the students [8].

Academic performance and social media addiction

Social media addiction reflects badly on the individual's social and academic life [11]. Conversely, Lau [12] has suggested that the educational use of social media did not predict the academic performance of the students, whereas non-educational use negatively affected their academic performance. A study conducted in the United States has revealed a significant negative relationship between the time spent on Facebook and student's GPA score [13]. Likewise, Wood et al. [14] proposed that the writing mistakes during texting via email, MSN, and Facebook negatively influence learning performance on real-time basis.

Social Media Addiction

Excessive social media and internet use have adverse effects on individuals [15]. People with high self-esteem consider social media as a safe place to express themselves [16]. Such individuals may feel anxiety, tension, anger, and impulsivity when the internet is not available. Thus, logging into the social media sites might quickly turn into addiction [17]. Previous research has shown that the primary symptoms of social media addiction are changes in mood and cognitive development, bad physical and emotional reactions, as well as personal and psychological problems [18].

Social media addiction is defined as the inability to control the use of social media [11]. Andreassen [19] defined it as a great interest shown by a person with a strong motivation to log in to social media and spend a lot of time and effort on social media. The social media addiction might result in reduced interest in social activities, studies, employment, interpersonal relationships, and psychological well-being. Furthermore, Andreassen et al. [17] have proposed that social media addiction among individuals is also seen as a result of the individual's desire to reduce negative emotional stress and to forget personal problems. In general, individuals who suffer

from such issues spend a lot of much time on social media. This gradually leads to a situation where the amount of time spent by the individual, in order to get the desired level of satisfaction, on the social media is too high. Next, they become anxious, irritable, and bored when they cannot use social media. Such individuals have massive difficulty in controlling, stopping, or reducing the use of social media. They usually ignore their hobbies, partners, family members, and their relationships. Therefore, social media addiction is considered an unfavorable consequence with a loss of ability to control it [19].

Mediated and real-social interaction

Today, many people describe social media as an alternative way to real-social interaction. Such individuals find what saturates their emotional, social, and psychological needs on social networking sites [20,21]. To some people, social networking appears to be more attractive, effective, confident, and comfortable than real face-to-face social interaction [20].

Social interaction and social media addiction

Human is a social being by nature and does not live alone and is not self-sufficient. His real environment is not limited to him but extends to include parents, acquaintances, friends, and other persons; he learns and acquires behaviors and skills from them [22]. His personality grows and thrives through his real-social interactions. Orr et al. [23] revealed a negative correlation between the number of friends on the net and shame, as shy students have more positive attitude toward the use of Facebook. Shy people see social networking to be an attractive way to communicate, interact, and spend more time than that of face-to-face interactions. Yang et al. [24] confirmed that students who feel shy, are in depression, have low self-esteem, and are dependent have more positive attitude toward internet use. Another study has revealed that there is a strong association between individuals with high levels of loneliness and internet use [25].

Real (face-to-face) social interaction based on friendliness, compassion, participation, and face-to-face communication no longer exists today. Social media sites have become the means to communicate with parents, loved ones, and acquaintances instead of visiting them [26].

The dark triad of personality

The dark triad of personality is composed of three main socially separated personality traits: narcissism, Machiavellianism, and psychopathy [27]. Narcissistic individuals are described as interest seekers, who imagine unlimited success or power and have great sense of importance and merit [28]. Narcissism is related to selfishness and such people take a personal interest at the expense of others. The narcissistic individual finds himself distinct and he/she always seeks to appear attractive and sees everyone around him less thoughtful and beautiful [29]. Moreover, such individuals may be generally unhappy and disappointed when they're not given the special favors or admiration, they believe they deserve. Furthermore, they hate being ignored and neglected by others and also reject their criticism. They only want to hear the words of praise, thanks, appreciation, and admiration.

Being a narcissist is not necessarily to diagnose as a diseased individual or a psychiatric condition. Therefore, narcissism has been divided into two different groups: normal narcissism and a pathological one [30,31]. Most of the previous studies have considered normal narcissism varying in its strength; however, it is commonly homogenous while pathological narcissism is considered as a miscellaneous structure involving various qualitative behaviors [31]. Likewise, normal narcissistic persons are highly self-worth and self-confident individuals, as they do not care with the adverse impacts in the surrounding environment. In addition, they refuse to use external resources except after achieving a deserved assessment to keep their self-confidence high [30].

Machiavellians tend to be deceitful, manipulative, and often use deception or compliments to serve their benefits [32]. Always a Machiavellian seeks to achieve his/her goals via manipulation, cunningness, deception, fraud, and ridicule [33]. Their first concern is to get money, power, and competition by any means, regardless of harassing others. While psychopathy is branded by the pursuit of suspense, irregular behavior, charisma, lack of anxiety, and empathy [27]. A psychopathic individual resorts to repeated lying, hypocrisy, evasion of responsibility, and abandon his/her duties. Furthermore, they have a lack of passion, kindness, and tolerance [10]. In other words, individuals with a dark personality tend to be predominantly antisocial. Social media sites are considered a fertile environment for the growth of dark personality traits as these sites provide dark personalities with an ideal place to lie, deceive, manipulate, show cunningness, cheat, and transcend. Previous studies

have revealed a positive correlation between the narcissistic trait and the active use of social media [34,35].

The dark triad of personality and social interaction

The dark personality triad is related to reward-seeking in a certain sense [36]. Social media provides such individuals with the ability to reveal their desires and achievements to a huge number of individuals [34]. Similarly, narcissistic individuals probably use social media to improve their self-promotion [37]. While, a psychopathic individual finds a suitable place in social media to show their adverse attitudes without anxiety from the penalty [38]. In addition, the use of social media among Machiavellians provides self-promotion and self-monitoring [39].

Previous studies have revealed a strong impact of narcissism on social media use. A narcissistic individual satisfies his motives and shows his achievements, excellence, and aspirations through virtual environment [16,40]. Similarly, Garcia et al. [41] recorded sharing of the semantic content posts via social media was related to psychopathy. In addition, narcissism could be used as a predictor for the time spent on social media. Moreover, either narcissism or psychopathy might be used as predictors for the number of selfish posts on social media [42].

Social media use might positively increase the dark personality traits by providing online relationships that compensate for the lack of social relationships in real life. Similarly, Ryan et al. [43] reported that the users of Facebook tend to be more narcissistic than other individuals who stay away from Facebook use. In addition, Sorokowski et al. [44] revealed a positive relationship between selfie posts and male narcissism levels. However, this relationship does not appear in women. Similarly, Davenport, Bergman, Bergman et al. [45] revealed a moderate relationship between social media use and narcissism, as narcissism could be used to predict Twitter use rather than Facebook use.

The dark triad of personality and social media addiction

A previous study has revealed that the psychopathy trait positively correlated with social media addiction [46]. Narcissism was positively correlated to social media addiction, even when the sociodemographic variables (age and sex) were statistically controlled [34]. Furthermore, Demircioğlu et al. [47] revealed a significant positive path from psychopathy to social media addiction.

This study

Against this theoretical and empirical background, data stemming from the study sample were analyzed to investigate whether the dark triad of personality and social interaction were associated with the addictive use of social media and the academic performance of undergraduate students. Although some of these hypotheses have to some extent been tested in previous research, most empirical studies have denied the effect of the real (face-to-face) social interaction and mediated social interaction as a new human behavior on the addictive use of the social media. Furthermore, other studies have relied upon nonvalidities measures of social media addiction [11,19]. Accordingly, this study was conducted to highlight the effects of the dark personality triad, real and mediated social interaction, and their impact on social media addiction and academic performance of university students. This study contributes to the literature in at least two important ways. First, this study is aimed to describe the psychological features of the consequences of the mediated social interaction as a new human behavior and real face-to-face social interaction on developing social media addiction. Second, the study investigates the effects of the dark personality triad upon the different forms of social interaction and their effects on social media addiction using psychometrically validated instruments in which addictive use of social media was used in general (instead of focusing on a specific platform). The study posed the following hypotheses:

1) There are no significant paths from narcissism to real and mediated social interaction, as well as social media addiction.

2) There is no significant path from narcissism and psychopathy to academic performance

3) There are no significant paths from Machiavellianism and psychopathy to mediated social interaction

4) There is no significant causal path from mediated social interaction to social media addition.

5) There is no significant causal path from mediated social interaction to the academic performance of the students.

6) There is no significant negative path from social media addiction to the academic performance of the students.

Method

Participants

This study was conducted at the summer training course from July to August 2019. Students were voluntarily enrolled in the study with only two eligibility criteria: the first was participants in the age group of 18–22 years, and the second was the active use of social media. The study was conducted following the ethical standards of the University of Sadat City.

The study sample was formed of two different samples separately collected: the first is the psychometric sample collected firstly to assess the psychometric properties of the study tools, whereas the second was the main study sample. The psychometry sample was composed of 156 university students of either sex used for evaluation of the psychometric prosperities of the social interaction scale. The psychometric sample was composed of 77 males and 79 females in the age group of 19-21 years (mean (M) ± standard deviation (SD) = 19.07± 0.852 years).

The primary sample of this study consisted of 247 undergraduate university students of either sex. The sample was composed of 88 male and 159 female students in the age group of 19-21 years (M ± SD = 19.980±0.377 years). Students were predominately female (64.372%) and Caucasian (100%). The average academic degree percentage of the participants was 71.613% (range = 43.100%-91.390%).

Instruments

1. Short Dark Triad (SD3): This scale was used according to Jones et al. [33], which consisted of 27 statements evaluating the three dark personality traits (Machiavellianism, narcissism, and psychopathy). The Short Dark Triad is a self-report instrument evaluating dark triad. The responses were rated as follows: Strongly agree, Agree, neither agree nor disagree, Disagree, and Strongly disagree, where responses ranged from 5=Strongly agree to 1=Strongly disagree. The Short Dark Triad represents expressions of Machiavellianism (M=3.318, SD=0.484; α=0.852), narcissism (M=3.067, SD=0.370; α=0.897), and psychopathy (M=2.543, SD=0.363; α=0.861).

2. Social interaction scale: This scale was constructed by the researcher and was composed of 2 domains with 23 statements: the first domain is based on mediated social interaction and the second domain is the real (face-to-face) social interaction. Responses were evaluated using the Likert-type format with responses ranging from 5=Very often to 1 = Very rarely.

3. Stability of the social interaction scale: Table 1 shows that the value of Cronbach's alpha coefficient (α) was high for the dimensions of

the social interaction variable, as it reached 0.945 for the dimension of real social interaction and 0.944 for the dimension of mediated social interaction. This indicates the acceptable stability of the social interaction scale.

4. The validity of the social interaction scale: The validity of the social interaction scale was tested via the exploratory and confirmatory factor analysis. The exploratory factor analysis was conducted on 23 statements via the extraction method of principal component analysis through the rotation method of Varimax with Kaiser Normalization. The results showed that two factors were derived from the social interaction scale with a cumulative explained variance of 63.565 (Table 2). In comparison, the first factor explained 37.679 from the total variation and the second explained 25.886 from the total variation. Table 3 shows the distribution of statements on the dimensions of social interaction scale after the exploratory factor analysis. Moreover, good saturation was attained from all statements on the factor which it belongs to (range=0.856-0.733). The first factor was named mediated social interaction, whereas the second factor was named real-social interaction based on the content of the highest saturation statements.

The confirmatory factor analysis showed acceptable saturation values of the scale statements on the dimensions of the social interaction variable (Figure 1). Further more, it revealed a good model fit (χ^2 = 245.919 with a degree of freedom (df) of 214) and was not significant at p<0.05. Furthermore, the chi-square/df ratio was 1.149, which indicates a good model fit. In addition, the values of NFI, RFI, IFI, TLI, CFI, and GFI were 0.952, 0.952, 0.992, 0.991, 0.992, and 0.953, respectively which indicated a good model fit as all of them were more than 0.95. Likewise, the values of the root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) were 0.025 and 0.0450, respectively, which revealed a good model fit as these results were less than 0.07 and 0.08, respectively.

5. Internal consistency of the social interaction scale: The internal consistency of the social interaction scale was estimated by calculating the correlation coefficient between the degree of each statement and the total degree of the dimension to which it belongs (Table 4). The findings showed strong correlation coefficients among statements, and their related dimension and all of which were positively and statistically significant (p < 0.01). The correlation coefficients for the statements of the social interaction scale ranged from 0.857 for statement 6 in the dimension of Mediated social interaction to 0.742 for statements 16 and 23 in the dimension of real-social interaction.

6. Bergen Social Media Addiction Scale (BSMAS): This scale is a modified version of the validated Bergen Facebook Addiction Scale [34]. The modified version uses the terms "social media" instead of the word "Facebook." Social media is defined as Facebook, Twitter, Instagram, YouTube, and the like in the instruction. The BSMAS includes 18 statements

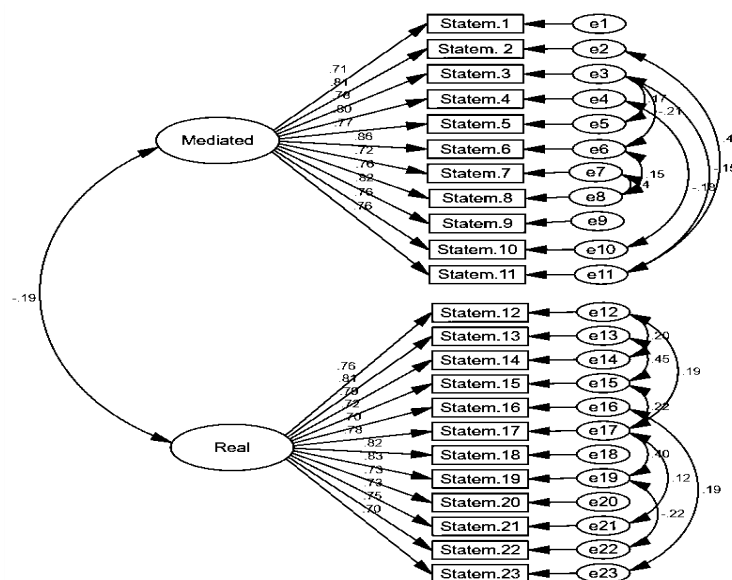**Table 1.** Reliability of the social interaction scale.

Dimension	α	M	SD	Stat.	α	Dimension	α	M	SD	Stat.	α
Mediate social interaction	0.944	2.586	0.305	1	0.942	Real social interaction	0.945	3.536	0.141	12	0.940
				2	0.937					13	0.938
				3	0.939					14	0.939
				4	0.939					15	0.940
				5	0.939					16	0.942
				6	0.937					17	0.938
				7	0.941					18	0.939
				8	0.939					19	0.938
				9	0.938					20	0.941
				10	0.941					21	0.941
				11	0.939					22	0.941
										23	0.942

Table 2. Eigenvalues, total variances explained for the final two-factor structure.

Component	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
1.	8.666	37.679	37.679
2.	5.954	25.886	63.565

Table 3. The statements and final two-factor structure of the social interaction instrument after factor reduction procedures.

No.	Stat.	Value 1	Value 2
	First factor: mediated social interaction	**1**	**2**
1	I find social media the opportunity to represent my negative ideas	0.746	--
2	I feel more intimate with social media friends than offline friends.	0.839	--
3	I feel comfortable when talking to people who I do not know through social media.	0.798	--
4	I enjoy playing online games with friends and acquaintances through social media rather than playing games face to face.	0.809	--
5	I share my concerns and problems with people through social media rather than face to face.	0.798	--
6	I find in the online environment through social media the appropriate place to express my feelings.	0.856	--
7	I trust the information comes through social media.	0.765	--
8	I spend a lot of time communicating with people through social media daily.	0.806	--
9	I rely on social media to ensure the health status of my acquaintances and friends.	0.828	--
10	The rate of your relatives and acquaintances' visits decline due to the increase in communication with them through social media.	0.75	--
11	My friends and acquaintances through social media were much more than my friends and acquaintances that I know face to face.	0.784	--
	Second factor: real social interaction	--	--
12	I am enjoying spending time with relatives, acquaintances, and friends.	--	0.784
13	I am interested in attending the family social events	--	0.829
14	I have an effective speech when I am talking to the people around me.	--	0.812
15	I am enjoying with friends and acquaintances outdoors rather than spend time using social media.	--	0.771
16	I am interested in knowing new friends and acquaintances rather than knowing friends and acquaintances through social media.	--	0.736
17	I insisted on continuing the direct discussion to represent my point of view.	--	0.823
18	Visiting relatives, acquaintances, and friends constantly conceder as an important concern to me.	--	0.826
19	I enjoy playing games and social group activities	--	0.834
20	I accept criticism from people around me	--	0.758
21	I can speak to people who I do not know and discuss subjects with them	--	0.763
22	I always doubt in the information which came to me through social media.	--	0.75
23	Friends come to consult me on various matters	--	0.733

Figure 1. The confirmatory factor analysis of dimensions of the social interaction scale.

Table 4. Internal consistency of the social interaction scale. *Correlation is significant when $p < 0.05$. **Correlation is significant when $p < 0.01$.

Dimension	Statement serial	Correlation	Dimension	Statement serial	Correlation
Mediated social interaction	1	0.750**	Real social interaction	12	0.792**
	2	0.839**		13	0.831**
	3	0.798**		14	0.811**
	4	0.812**		15	0.777**
	5	0.802**		16	0.742**
	6	0.857**		17	0.836**
	7	0.759**		18	0.824**
	8	0.803**		19	0.843**
	9	0.834**		20	0.750**
	10	0.768**		21	0.762**
	11	0.796**		22	0.749**
				23	0.742**

within 6 domains (salience, mood modification, tolerance, withdrawal, conflict, and relapse), where the responses can be rated as Very often, Often, Sometimes, Rare, and Very rear (from 5 = Very often to 1 = Very rare. The internal consistency of the BSMAS in the current research was high (M=3.05, SD=0.54; α=0.70).

Academic performance

The academic performance of the students was determined from their GPA score of the foregoing year, as this information is collected on the first page of the questionnaires. The participants were asked to write down their academic degree in the foregoing year. The academic grade was ranged from 43.100 to 91.390 with 25.101% of the students obtaining the grade of pass, whereas 35.223% of the students achieved the grade of good. Moreover, 26.721% of the students obtained a grade of very good, whereas 12.956% of the students achieved a grade of excellent.

Procedure

The study protocol was granted permission from the University of Sadat City. The participants were informed that they were participating in the educational study related to the impact of dark triad and real and mediated social interactions on social media addiction and academic performance. Consent to participation was obtained from students, and no financial payment was offered. Interested participants were informed that their participation would be voluntary and anonymous.

The data were screened for missing or incomplete data. The normality of the data was confirmed via the Kolmogorov-Smirnov test, which revealed that all variables followed a normal distribution (p>0.05). Furthermore, the homogeneity of the different study variables was confirmed via Levene's test. Different demographical grouping of data revealed no significant differences via one-way analysis of variance (ANOVA). The path analysis was performed by using SPSS software package version 24 (IBM Corp, 2016) together with AMOS software package version 24 to build a path model.

The path analysis was used to build a conceptual model, where social media addiction and student academic performance were used as dependent variables, real and mediated social interaction were used as intermediate variables, and dark triad of personality and age were used as independent predictor variables. The process of construction of the hypothetical model achieved according to the correlation matrix and suggested literature.

Results

The correlation matrix among different study variable possessed a negative correlation between the student age and the academic performance (−0.160) (p<0.05) (Table 5). In addition, narcissism and psychopathy were significantly correlated with the academic performance; however, these correlations were contradictory to each other. Narcissistic personality improved the student's academic performance as these variables positively correlated with a correlation coefficient of (0.219) (p<0.01). Conversely, psychopathic personality negatively correlated with academic performance (-0.180) (p<0.01).

Machiavellianism correlated with other dark personality components, as it positively correlated with narcissism and psychopathy with a correlation coefficient of 0.249 and 0.294, respectively (p<0.01). Moreover, both Machiavellianism and psychopathy were positively correlated with the mediated social interaction by 0.243, and 0.285, respectively (p<0.01).

Path analysis was used to examine the fitting of the suggested path model in addition to verifying the study hypotheses (Figure 2). The analysis findings of the suggested path model found that the model was nearer to fit the data of this study. However, it still did not match the data and was significant at p < 0.05 (χ^2= 11.264, df = 1). Moreover, the chi-square/df ratio was 11.264. Similarly, the values of NFI, RFI, IFI, TLI, CFI, and GFI were 0.947, −0.489, 0.951, −0.564, 0.944, and 0.989, respectively, as the majority of these indices did not reach to 0.950, which indicated poor model fit. Likewise, the value of the RMSEA was 0.250, which was above its threshold value of 0.07. In contrast, the SRMR value was 0.0430, which indicates a good model fit, as this value was less than 0.08.

Hence, the path model proposed in this study showed poor model fit. The standardized residual matrix was carefully examined for the highest residual values which represent between real and mediated social interaction variables. Accordingly, a correction path from real social interaction variable to mediated social interaction variable was added into the model. Moreover, all of the nonsignificant paths were deleted from the model and then the modified path model was examined, and its fit indices were examined (Figure 3).

Table 5. Pearson correlation for the associations between student's age, dark personality triad, real and mediated social interaction, social media addiction, and academic performance.N = 247, *p < 0.05, **p < 0.01, two-tailed tests.

Parameters	1	2	3	4	5	6	7	8
1.Age	1							
2.Academic performance	-0.160*	1						
3.Machiavellianism	0.093	0.003	1					
4.Narcissism	-0.096	0.219**	0.249**	1				
5.Psychopathy	0.089	-0.180**	0.294**	0.121	1			
6.Mediated social interaction	-0.037	-0.088	0.243**	0.05	0.285**	1		
7.Real social interaction	0.065	-0.013	0.018	0.088	0.073	-0.185**	1	
8.Social media addiction	0.068	-0.182**	0.147*	0	0.151*	0.536**	-0.079	1
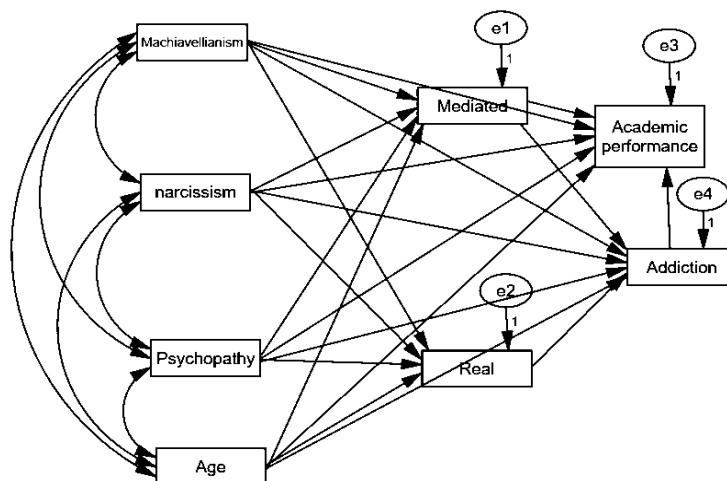
Figure 2. Suggested path model of the effect of dark personality triad and real and mediated social interaction on social media addiction and academic performance of university students.

The model fit indices for the modified path model showed good model fit but was not significant at p < 0.05 (χ^2 = 7.693, df=14). Furthermore, the chi-square/df ratio was 0.550. Similarly, the values of NFI, RFI, IFI, TLI, CFI, and GFI were 0.965, 0.950, 1.031, 1.066, 1.000, and 0.992, respectively, and all of them were above 0.950. This shows it was an efficient model fit. Similarly, the values of the RMSEA and SRMR were 0 and 0.030, which indicated a good model fit, as these values were under the values of their thresholds.

With respect to the effect of the dark personality triad on the social interaction (Tables 6 and 7), either Machiavellian or psychopathic personality improved the student's use of mediated social interaction with a direct standardized beta load of 0.173 and 0.248. However, narcissism possessed no direct or indirect paths to the mediated social interaction. Furthermore, no significant direct or indirect paths were detected between any of the dark personality triad and real-social interaction. In addition, the psychopathic personality adversely affected the academic performance with a direct standardized beta load of -0.161. Moreover, this negative psychopathic effect aggravated via another very week negative indirect

effect (-0.019) on academic performance. In comparison, Machiavellian personality did not affect the academic performance directly. However, it had a very weak negative indirect effect (-0.014) on the academic performance of the students. Conversely, not all dark personality triad affected the academic performance so badly, as the narcissistic personality improved the academic performance of the student with a direct beta load of 0.227 (p<0.01).

The psychopathic personality improved the social media addiction with only an indirect way via a standardized beta load of 0.133. Nevertheless, the Machiavellian personality indirectly and negatively affected the social media addiction with a weak standardized beta load of −0.014.

Regarding the results of social interaction, it was clear that real-social interaction negatively affected the mediated social interaction via a direct way only with a standardized beta load of -0.205. However, the real social interaction did not affect the social media addiction directly, but it affected the addiction through a negative indirect path with a standard beta load of -0.110 (p < 0.01). Conversely, the mediated social interaction affected the addiction with a positive and strong direct impact with a beta load of
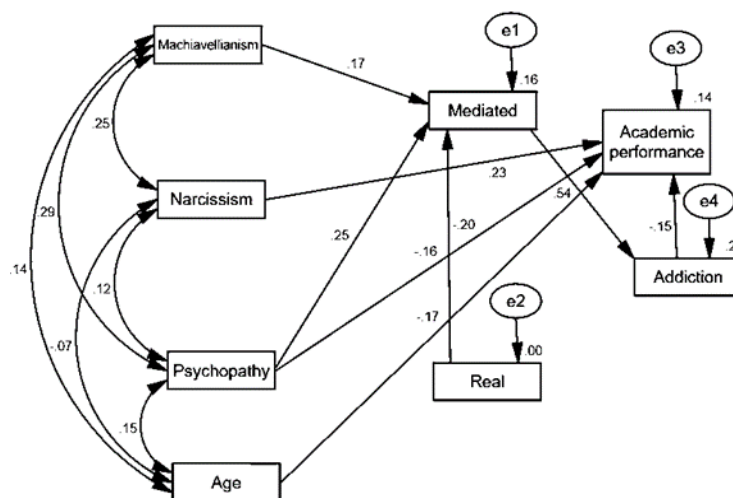
Figure 3. Modified path model of the effect of dark personality triad and real and mediated social interaction on social media addiction and academic performance of university students.

Table 6. Standardized beta load between the dark personality triad and real and mediated social interaction on social media addiction and academic performance in the path model.

Structural Paths			β	C.R.	P-Value
Machiavellianism	→	Mediated social interaction	0.173	2.821	0.005
Narcissism	→	Academic performance	0.227	3.795	0.001
Psychopathy	→	Mediated social interaction	0.248	4.047	0.001
Psychopathy	→	Academic performance	-0.161	-2.632	0.008
Age	→	Academic performance	-0.166	-2.764	0.006
Real social interaction	→	Mediated social interaction	-0.205	-3.501	0.001
Mediated social interaction	→	Social media addiction	0.538	10.003	0.001
Social media addiction	→	Academic performance	-0.146	-2.433	0.015

Table 7. Standardized direct, indirect, and total effects between different study variables.

Parameters	Mediated social interaction			Social media addiction			Academic performance		
	Direct	Indirect	Total	Direct	Indirect	Total	Direct	Indirect	Total
Machiavellianism	0.173	0	0.173	0	0.093	0.093	0	-0.014	-0.014
Narcissism	0	0	0	0	0	0	0.227	0	0.227
Psychopathy	0.248	0	0.248	0	0.133	0.133	-0.161	-0.019	-0.180
Age	0	0	0	0	0	0	-0.166	0	-0.166
Real social interaction	-0.205	0	-0.205	0	-0.11	-0.11	0	0.016	0.016
Mediated social interaction	0	0	0	0.538	0	0.538	0	-0.079	-0.079
Social media addiction	0	0	0	0	0	0	-0.149	0	-0.149

0.538 (p < 0.01). Furthermore, neither real nor mediated social interaction affected the academic performance of the students directly; however, they affected the academic performance indirectly with a weak standardized beta load of 0.016 and -0.079, respectively.

One of the interesting results of this study was the effect of social media addiction on the students' academic performance. The current path model evidenced that the academic performance of the students was negatively affected by the social media addiction with a standardized beta load of -0.149 (p < 0.01).

The student age had a direct negative impact on academic performance of the students by a standardized load of -0.166 (p < 0.01). However, the path model revealed no additional paths that originated from age of the students to the rest of the study variables.

The path model revealed a significant correlation among the dark personality traits, as Machiavellianism significantly correlated with narcissism with a correlation coefficient of 0.249, whereas it correlated with psychopathy with the value of 0.294 in Figure 3. Similarly, narcissism significantly correlated with psychopathy with a value of 0.121. Moreover, the age of students was significantly correlated with psychopathy and Machiavellianism with values of 0.15 and 0.14, respectively. The study path model succeeded in explaining about 0.29 from the total variation in social media addiction and 0.16 from the variations of the mediate social interaction. In comparison, the path model succeeded to explain only 0.14 from the variance of the students' academic performance.

Discussion

The objective of this study was to estimate some of the factors that may affect the problem of social media addiction, as well as the academic performance of the university students. Therefore, this study tested the impact of the dark personality triad and social media interaction on social media addiction and the academic performance of the students. The casual path model between the study variables revealed that Machiavellianism directly and positively affected the mediated social interaction. This result was consistent with the findings of Abell et al. [39]. This finding shows that Machiavellian person uses the virtual environment to satisfy his aggressive behaviors and personal goals without interference with anyone.

This study recommended that narcissistic personality directly improved academic performance, which is consistent with the findings of Lima et al. [48]. Moreover, there is no limit to the aspirations of the narcissistic individuals, and they have high confidence in their abilities. Furthermore, the sense of self-worth gives the narcissistic individual a mental rigor that drives him to success. Lima, et al. reported a high association between the narcissistic personality and greater achievement in academic performance. However, they suggested that the narcissistic personality governs the expectations sooner than the learning process.

In contrast, narcissism did not affect real and mediated social interactions, which was in contrast to those of previous studies [34,35]. The aforementioned studies have reported an important positive relationship between the use of the social media and narcissistic personality, which might be due to the lack of time in the life of the narcissistic individuals. Kılıçet al. [49] have reported that narcissistic individuals are deprived of spending time with others, and they have low patience, which considered as a negative predictor for narcissistic personality traits. Deficiency of patience might affect the social relationships as a result of decreasing amount of time spent with others [30,31].

The results of this study suggested that narcissism did not affect social media addiction, which may be because the narcissistic individuals have no time to spend on social media. Such individuals make every effort to be strong and successful [34,35]. Conversely, Andreassen et al.have reported that narcissism was positively related to social media addiction. Similarly, Ryan et al. have suggested that Facebook users were more narcissistic than others.

Interestingly, the results suggest that narcissistic personality improves academic performance of the students. However, such individuals have a very low affinity to real and mediated social interactions or have a low tendency for social media addiction. In addition, psychopathic individuals did not get affected by the real-social interaction. This might be due to the fact that psychopathic individual prefers mediated social interaction over the real-social interaction. Moreover, psychopathy has a direct negative impact on students' academic performance. This could be attributed to the fact that psychopathic individuals have personality disorder, are hasty

and impulsive, have real problems in behavior control, resort to frequent lying, evade responsibility, and abandon their duties. Moreover, our results suggest that psychopathy directly influenced mediated social interaction and indirectly influenced social media addiction through mediate social interaction. This result was consistent with the finding of Lee. This may be due to the fact that psychopathic individual finds social media as a perfect place to display their antagonistic point of view without worry [38].

The study finding revealed a strong impact of mediated social interaction on social media addiction. This could be evidenced by the fact that students misuse mediated social interaction, which is the beginning stage of social media addiction. Likewise, Griffiths (2012) has reported that the easy use of the internet and the social media apps might drive the person toward social media addiction which characterized by excessive use of social media with little interest in normal day-to-day life.

Real (face-to-face) social interaction negatively affected the mediated social interaction. This may be because of the fact that students tend to prefer only one direction of social interaction as the individuals who prefer real face-to-face social interaction are not interested in the virtual environment of the mediated social interaction. These findings suggest that the need for socialization by a person can be satisfied via two different methods: the first is the real face-to-face social interaction and the second is the mediated one. Moreover, Stone et al. [50] have suggested that the rapid development of information technology together with the rapid proliferation of social media apps has resulted in changing methods of interpersonal communication.

Thus, the results of this study reveal that neither real nor mediated social interaction affect academic performance of university students. Conversely, social media addiction negatively and directly affected their academic performance. This result agrees with those reported by Hou et al. They reported that academic performance was negatively related to social media addiction. Similarly, social media addiction was found to be related to emotional growth, interpersonal skills, health outcome, and performance disorders [51].

Limitation of the study

This study has some limitations. First, the sample size obtained from the students of the University of Sadat City, Menoufia, Egypt could draw causal inferences about the relationship between the studied variables. Second, this study was limited to investigate the causal effects of dark personality triad and real and mediated social interaction on social media addiction and academic performance of university students. Third, the product causal model was able to predict social media addiction and the academic performance of undergraduate students. Therefore, we recommend further longitudinal studies in order to study the mediated social interaction as a new human behavior. When evaluating the limitations of the study, it should also be considered that the conditions under which the measurement scales were completed, as mentioned in the procedure, may have caused variations in the responses given by the participants.

Conclusion

In summary, student's age and social media addiction have a negative effect on academic performance. Moreover, mediated social interaction showed a strong positive impact on social media addiction with no direct effect on academic performance. Moreover, real-social interaction negatively and directly affected the mediated social interaction. Narcissistic individuals directly enhanced the academic performance and did not get affected by social interaction or social media addiction. The results could be informative to parents, educators, education policymakers, and Internet policymakers, as well as researchers.

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Availability of data and materials

Raw data analyzed in this study are available from the author upon reasonable request.

Consent for publication

Not applicable.

Declaration of conflicting interests

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References

1. Shena, A., et al. "Social media use and perceived emotional support among US Young adults". *Journal of Community Health* 41(2015): 541-549.

2. East, S. "Teens: Thisishow social media affects your brain".*CNN*(2016).

3. Devi, K.S., et al. "Role of Social Media in Teaching-Learning Process". *JETIR* 6(2019):96-103.

4. Abdulahi, A., et al. "A Study on the Negative Effects of Social Networking Sites Such as Facebook among Asia PacificUniversity Scholars in Malaysia". *International Journal of Business and Social Science* 5 (2014): 133-145.

5. Kolan, B., et al. "Effect of social media on academic performance of students in Ghanian Universities: A case study of University of Ghana, Legon". *Library Philosophy and Practice* (2018).

6. Vivian, R.J. "Students Use of personal social network sites to support their learning experience". *Thesis (Ph.D.). University of South Australia* (2012).

7. Jenaabadi, H., et al. "A study of the relationship between internet dependence and social skills of students of medical sciences". *Modern Applied Science* 9(2015): 49-56.

8. Ghulami, H. "Relationship between internet addictions and academic performance among Afghan Universities students". *International Journal of Innovative Research and Scientific Studies* 1(2018): 63-72.

9. Hou, Y., et al. "Social media addiction: Its impact, mediation, and intervention Cyberpsychology". *Journal of Psychosocial Research on Cyberspace* 13(2019): 1-17.

10. Griffiths, MD. "Facebook addiction: concerns, criticism, and recommendations: A response to Andreessen and colleagues". *PsychologicalReports*110(2012): 518-520.

11. Ryan, T., et al. "The uses and abuses of Facebook: a review of Facebook addiction". *Journal of Behavioral Addictions* 3(2014):133-148.

12. Lau, WW.,et al. "Effects of social media usage and social media multitasking on the academic performance of university students". *Computers in Human Behavior* 68(2017): 286-291.

13. Junco, R. "The relationship between frequency of Facebook use, participation in Facebook activities, and student engagement". *Computers & Education* 58 (2012):162-171.

14. Wood, E., et al. "Examining the impact of distracting multitasking with technology on real-time classroom learning". *Computers & Education* 58 (2012): 365-374.

15. Andreassen, C., "Development of a Facebook addiction scale 1, 2". *Psychological Reports* 110 (2012): 501-517.

16. Malik, S., et al. "Impact of Facebook addiction on narcissistic behavior and self-esteem among students". *Journal of Pakistan Medical Association* 65(2015): 260-263.

17. Andreassen, C., et al. "Social network site addiction-an overview". *Current Pharmaceutical Design* 20 (2014): 4053-4061.

18. Błachnio, A., et al. "The role of personality traits in Facebook and internet addictions: A study on Polish, Turkish, and Ukrainian samples". *Computers in Human Behavior* 68(2017): 269-275.

19. Andreassen, CS., et al. "Online social network site addiction: a comprehensive review"*Current Addiction Reports* 2(2015):175-184.

20. Caplan, S., et al. "Preference for online social interaction: A theory of problematic internet use and psychosocial well-being". *Communication Research* 30(2003): 625-648.

21. Stepanikova, I. "Time on the internet at home, loneliness, and life satisfaction: Evidence from panel time-diary data". *Computers in Human Behavior* 26(2010): 329-338.

22. Wang, Q. "The autobiographical self in time and culture".*New York, NY: Oxford University Press* (2013).

23. Orr, E.,et al. "The influence of shyness on the use of Facebook in an undergraduate sample". *Cyber Psychology & Behavior* 12(2009): 337-340.

24. Yang, S.,et al."Comparison of internet addicts and non-addicts in Taiwanese high school."*Computers in Human Behavior* 23(2007): 79-96.

25. Erdogan, Y.,et al. "Exploring the relationships among internet usage, internet attitudes, and loneliness of Turkish adolescents". *Cyberpsychology Journal of Psychosocial Research on Cyberspace* 2(2008): 1-7.

26. Buran Kose, O., et al. "The relationship between social media addiction and self-esteem among Turkish university students". *Addicta: The Turkish Journal on Addictions* 6(2019): 175-190.

27. Paulhus, D., et al. "The dark triad of personality: Narcissism, Machiavellianism, and psychopathy". *Journal of Research in Personality* 36(2002): 556-563.

28. Emmons, R. "Narcissism: Theory and measurement". *Journal of Personality and Social Psychology*52(1987): 11-17.

29. Miller, J., et al. "Comparing clinical and social? Personality conceptualizations of narcissism". *Journal of Personality*76(2008): 449-476.

30. Karaaziz M., et al. "A review on narcissism and researches related narcissism". *Nesne Psikoloji Derg* 1(2013): 44-59.

31. Barry, CT., et al. "Adolescent self-compassion: Associations with narcissism, self-esteem, aggression, and internalizing symptoms in at-risk males". *Pers Individ Differ* 77(2015):118-123.

32. Jakobwitz, S., et al. "The dark triad and normal personality traits". *Personality and Individual Differences*. 40(2006): 331-339.

33. Jones, D., et al. "Introducing the short dark triad (SD3): A brief measure of dark personality traits. Assessment". 21(2014): 28-41.

34. Andreassen, C., et al."The relationship between addictive use of social media, narcissism, and self-esteem: findings from a large national survey". *Addictive Behaviors* 64(2017): 287-293.

35. Brailovskaia, J., et al. "I present myself and have a lot of facebook-friends-Am I a happy narcissist?". *Personality and Individual Differences* 148(2019):11-16.

36. Miller, J., et al. "Searching for a vulnerable dark triad: Comparing factor 2 psychopathy, vulnerable narcissism, and borderline personality disorder". *Journal of Personality* 78(2010): 1529-1564.

37. Carpenter, CJ., et al. "Narcissism on Facebook: self-promotional and anti-social behavior". *Personality and Individual Differences* 52(2012): 482-486.

38. Jonason, PK., et al. A protean approach to social influence: Dark triad personalities and social influence tactics. Personal. *Individ. Differ* 52(2012): 521-526.

39. Abell, L., et al. "Machiavellianism, self-monitoring, self-promotion and relational aggression on Facebook". *Computers in Human Behavior* 36(2014): 258-262.

40. Liu, D., et al. "Social networking online and personality of self-worth: A meta-analysis". *Journal of Research in Personality* 64(2016): 79-89.

41. Garcia, D., et al. "The dark side of Facebook: semantic representations of status updates predict the dark triad of personality". *Personality and Individual Differences* 67(2014): 92-96.

42. Fox, J., et al. "The dark triad and trait self-objectification as predictors of men's use and self-presentation behaviors on social networking sites". *Personality and Individual Differences* 76(2015): 161-165.

43. Ryan, T., et al. "Who uses Facebook? An investigation into the relationship between the big five, shyness, narcissism, loneliness, and Facebook usage". *Computers in Human Behavior* 27(2011): 1658-1664.

44. Sorokowski, P., et al. "Selfie posting behaviors are associated with narcissism among men". *Personality and Individual Differences* 85(2015):123-127.

45. Davenport, SW., et al."Twitter versus Facebook: Exploring the role of narcissism in the motives and usage of different social media platforms". *Computers in Human Behavior* 32(2014): 212-220.

46. Lee, SL. "Predicting SNS addiction with the big five and the dark triad". *Journal of Psychosocial Research on Cyberspace* 13(2019):1-11.

47. Demircioğlu, Z., et al. "Effects of attachment styles, dark triad, rejection

sensitivity, and relationship satisfaction on social media addiction: A mediated model". *Current Psychology* 13(2018): 1-15.

48. Lima, D., et al. "Narcissism: Are accounting students using their personality traits to perform better?". *Accounting and Organizations Magazine* 31(2017): 58-74.

49. Kılıç, N., et al. "Investigating narcissistic personality traits in the context of positive psychotherapy". *Arch Neuropsychiatry* 56(2019): 40-46.

50. Stone, C., et al. "From conversations to digital communication: The mnemonic consequences of consuming and sharing information via social media". *Topics in Cognitive Science* 3(2018): 1-20.

51. Marino, C., et al. "A comprehensive meta-analysis on problematic Facebook use". *Computers in Human Behavior* 83(2018): 262-277.