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The Role of the Dark Tetrad and Impulsivity in Social Media Addiction: Findings from Malaysia

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Highlights

- Time spent on social media was positively associated with social media addiction.
- Psychopathy was positively associated with social media addiction.
- Impulsivity was not associated with social media addiction.
- Being female was predictive of higher social media addiction.
- Time spent on social media and psychopathy were positive predictors of addiction.

1. Introduction

1.1. Addictive social media use

The use of social media has markedly increased over the past few years. Although social media platforms, being the cornerstone of modern communication, bring many benefits to the users, habitual use that is seemingly innocuous may be a sign of behavioural addiction. Such excessive use has been explained using general addiction models ~~(Griffiths, 2005)~~, in which it is manifested by being consumed by social media (salience), ever-increasing use to gain the same amount of pleasure from it (tolerance/craving), using social media to trigger positive alteration in emotional states (mood modification), failure in attempts to control its use (relapse), experiencing distress if unable to use social media (withdrawal), and neglecting other important aspects of life due to its use (conflict/functional impairment) (Griffiths, 2005). Concerns have been raised about the potential harmful consequences of frequent, excessive, and compulsive social network activity, especially on the users' health, wellbeing, and offline relationships.

There has been consistent evidence demonstrating that people who spend more time on social media platforms, specifically Facebook, report higher addictive tendencies (Hong, Huang, Lin, & Chiu, 2014; Koc & Gulyagci, 2013; Pornsakulvanich, 2018). A few studies have examined the problematic use of social media more generally (Bányai et al., 2017; Wu, Cheung, Ku, & Hung, 2013), and reported similar findings. However, the abovementioned studies have assessed the time spent on social media platforms using retrospective self-report. There is therefore a likelihood that such reports from social media users are inaccurate due to recall bias, or the fact that they have not consciously monitored their usage. A potential solution to this limitation would be to use a more objective measure to directly retrieve information on social media usage from the user's device.

1.2. Dark Tetrad, impulsivity, and social media addiction

Problematic (i.e., excessive and/or deviant) use of social media can be shaped by many factors; personality is arguably a key individual differences variable that plays an important role in the initiation, development, and maintenance of addictive behaviours. Aversive personality traits, particularly four traits collectively known as the Dark Tetrad – psychopathy, narcissism, Machiavellianism, and sadism – seem to have unique features that may lead to pathological online use. Individuals high in psychopathy are often impulsive and reckless, and have been found to be more willing to engage in unsolicited Internet pornography (Shim, Lee, & Paul, 2007); narcissistic people have a constant need for approval and admiration, making them more at risk for developing social media addiction (Casale & Fioravanti, 2018); highly Machiavellian people tend to demonstrate strategic planning in their social interactions, and have shown to employ more self-presentation tactics on Facebook (Abell & Brewer, 2014); while those with sadistic tendencies derive pleasure from others' suffering, and sadism has been found to be a unique predictor of Internet trolling and cyberbullying behaviours (van Geel, Goemans, Toprak, & Vedder, 2017). There is also evidence that the Dark Tetrad traits are related to other addictive behaviours. For instance, cocaine-addicted individuals have reported significantly higher Machiavellianism scores than stimulant-naïve controls (Quednow, Hulka, Peller, Baumgartner, Eisenegger, & Vonmoos, 2017). Psychopathy, narcissism, and Machiavellianism have all been associated with increased substance use and the risk for problematic gambling behaviour (Stenason & Vernon, 2016; Trombly & Zeigler-Hill, 2017). Drawing upon conceptual frameworks and empirical evidence that suggest that interrelated factors such as dispositional, environmental, and behavioural reinforcement systems interact with each other to influence problem behaviour development, the potential role of dark personality traits as determinants of social media addiction was explored in the current study.

In an effort to provide a more comprehensive examination of predictors of social media addiction, the construct of impulsivity was taken into consideration in the current investigation. Impulsivity, disinhibition, or the failure to self-regulate are often said to underlie a host of maladaptive outcomes and multiple forms of psychopathology, such as substance abuse, antisocial personality disorder, suicide, and aggression (e.g., American Psychiatric Association, 2013; Bernstein et al., 2015; Gvion & Apte, 2011). Trait impulsivity has also been identified as a salient dispositional risk factor for non-substance-dependent addictive behaviours such as pathological gambling (Kräplin et al., 2014), overeating (Murphy, Stojek, & MacKillop, 2014), and online gaming (Argyriou, Davison, & Lee, 2017).

Among the Dark Tetrad, psychopathy and narcissism in particular have shown positive associations with impulsivity, but Machiavellianism, on the other hand, seems to be unrelated to impulsivity (Crysel, Crosier, & Webster, 2013; Jones & Paulhus, 2011; Vazire & Funder, 2006; Woodworth & Porter, 2002). The only study to date that has examined the role of all four Dark Tetrad traits and impulsivity is by March, Grieve, Marrington, and Jonason (2017); they found that Machiavellianism, psychopathy, and sadism are positively linked with dysfunctional impulsivity, and that trait psychopathy moderates the relationship between dysfunctional impulsivity and trolling behaviours on online dating applications, but only if the person has medium or high levels of psychopathy. In view of the associations among aversive personality traits and impulsivity, there is a need for further empirical research to investigate the patterns among these risk factors and their contribution to the development of social media addiction.

Common impulsivity measurement approaches include self-report questionnaires, which assesses one's self-perception of their own behaviours, and laboratory behavioural tasks, which measures overt behaviour associated with specific dimensions of impulsivity. While self-report measures are inexpensive and easy to administer, they are dependent on the

honesty and insight from the respondents. Given the greater propensity of people high in the Dark Tetrad to lie or portray themselves in a socially desirable light, behavioural measures have the potential to offer greater sensitivity and reliability over self-report ratings.

1.3. The present study

In light of the above, data originating from a university student sample in Malaysia were analysed to examine whether dispositional traits are associated with addictive use of social media. The following hypotheses were posited:

H1. Social media usage, as assessed through data obtained from users' smartphone device, is positively associated with social media addiction.

H2. The Dark Tetrad personality traits are positively associated with social media addiction.

H3. Impulsivity, using impulsive performance on a behavioural task as a proxy measure, is positively associated with social media addiction.

The current study contributes to the existing literature in several significant ways. It extends previous research by using a laboratory index of impulsivity and a more objective measure of social media usage. Furthermore, as the prevalence of Internet and smartphone addiction appears to be particularly high in Asia (Mak et al., 2014), this study responds to the current call to include empirical data from an Asian country.

2. Methods

2.1. Participants

Power analysis using the G*Power 3.1.9.2 software showed that with an effect size of 0.15, an alpha value of 0.05, and power of 0.80, a minimum sample size of 118 participants is required. One hundred and twenty-nine smartphone users were recruited using convenience sampling. Participants must be over 18 years of age, fluent in English, have had their

smartphones for at least one month by the time of recruitment and must possess an account for at least one of the 23 most popular social media applications in year 2017 according to We Are Social (n.d.). One participant withdrew from the study hence there were data for a total of 128 participants, 61 males and 67 females, aged 18 to 29 (M = 19.73, SD = 1.99). The majority of the sample were ethnic Chinese (72.7%), followed by ethnic Indian (11.7%), ethnic Malay (10.9%), and other ethnicities (4.7%).

2.2. Measures

2.2.1. Social media usage

To obtain participants' actual time spent on social media applications, Android 5.0+ smartphone users were asked to install the Social Tracker mobile application developed by PopCornBox Games. For iPhone users, this information was retrieved using the built-in Battery Usage feature. A Social Media Usage form was developed to record the applications' on-screen duration for the past two to seven days (the available data varied depending on whether or not the smartphone has been powered down and restarted prior to the time of retrieval, causing the settings to be reset). The average screen-time per day, in minutes, was calculated.

Information about the number of applications participants used was also obtained. The form also contained a list of the top 23 social media applications in year 2017 based on statistical data by We Are Social (n.d.), in which participants ticked the applications that they had a registered account for. The 23 applications were Facebook, YouTube, WhatsApp, Facebook Messenger, WeChat, QQ, Instagram, Qzone, Tumblr, Twitter, Sina Weibo, Baidu Tieba, Skype, Viber, Snapchat, LINE, Pinterest, YY, LinkedIn, Telegram, VKontakte, Blackberry Messenger, and KakaoTalk.

2.2.2. Social media addiction

The Bergen Social Media Addiction Scale (BSMAS; Andreassen, Pallesen, & Griffiths, 2017) was used to measure addictive use of social media. This 6-item self-report questionnaire is underpinned by Griffiths's (2005) general addiction theory, and operationalises addiction according to six components, namely salience, tolerance, mood modification, relapse, withdrawal, and conflict. All questions concerned experiences occurring over the past year (e.g., *How often during the last year have you used social media to forget about personal problems*), and were rated on a 5-point Likert scale ranging from 1 (*very rarely*) to 5 (*very often*). The sum of all items was calculated, with higher scores reflecting more severe levels of social media addiction.

2.2.3. Dark Tetrad

The Short Dark Triad (SD3; Jones & Paulhus, 2014) is a brief 27-item self-report measure that was used to assess subclinical Machiavellianism (e.g., *Make sure your plans benefit you, not others*), narcissism (e.g., *People see me as a natural leader*), and psychopathy (e.g., *People often say I'm out of control*). Statements were rated on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*), and the average of all items in each subscale was calculated. The three subscales contained 9 items each.

The Assessment of Sadistic Personality (ASP; Plouffe, Saklofske, & Smith, 2017) was used to assess everyday sadism (e.g., *Watching people get into fights excites me*). Items were responded to on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). After reverse-scoring the necessary items, the mean of all nine items was obtained.

2.2.4. Impulsivity

The GoStop Impulsivity Paradigm (Dougherty, Mathias, Marsh, & Jagar, 2005) is a response inhibition procedure designed to assess the capacity to inhibit/withhold an already initiated response. Each trial starts with a fixation cross (+) appearing on the computer screen for 500-ms. A visual stimulus in the form of five-digit numbers appears for 500-ms, followed by a 1500-ms inter-stimulus interval consisting of a blank white screen. There are three trial types: no-stop, stop, and novel trials. A no-stop trial presents only the go signal, that is, a number identical to the preceding number presented in black (e.g., 94853…94853). A stop trial comprises a number that matches the one presented previously, but changes from black to red at specified intervals of 50-, 150-, 250-, and 350-ms after stimulus onset (e.g., 94853…94853→94853 turns red). A novel trial consists of a non-matching, randomly generated number (e.g., 94853...23614). Participants are required to respond by pressing the space bar before the black matching number that appears second disappears from the screen (i.e., no-stop trials), but to withhold response if the matching number that appears second turns red (i.e., stop trials) or if the number that appears second is a non-matching number (i.e., novel trials). The numbers in all trials are generated randomly. For the current study, there were a total of 160 trials, with 40 no-stop trials, 40 stop trials, and 80 novel trials. The variable of interest was inhibition failures, computed from the number of responses made during stop trials divided by the total number of stop trials (i.e., 40).

2.3. Procedure

The sessions were conducted in a laboratory at the [University] Malaysia campus. After informed consent was obtained, participants completed the GoStop task. Following that, they completed the BSMAS, SD3, ASP, and Social Media Usage Form. Participants were debriefed upon completion.

3. Results

Preliminary analyses showed that there were no major violations of the assumptions of normality, linearity, homoscedasticity, and multicollinearity. Table 1 shows reliabilities, means, standard deviations, and intercorrelations for all measures. The number of applications that participants had a registered account with was positively associated with impulsivity scores~~, $r(126) = 0.17$, $p = 0.05$~~. The average screen-time per day was positively associated with social media addiction~~, $r(126) = 0.19$, $p = 0.03$~~. There was also a statistically significant positive association between the psychopathic personality trait and social media addiction~~, $r(126) = 0.21$, $p = 0.02$~~.

Table 1
Descriptive data and Pearson's correlations among variables of interest

Variable	Mean (SD)	α	Correlation matrix							
			1	2	3	4	5	6	7	8
1. Usage	228.76 (166.61)		–	.12	.15	–.06	.05	.03	.14	.19*
2. Number of apps	7.23 (2.54)			–	.17*	.08	.04	.16	.17	.02
3. Impulsivity	0.41 (0.23)				–	–.04	–.01	.01	.11	–.02
4. Machiavellianism	3.32 (0.53)	.61				–	.16	.38**	.30*	–.01
5. Narcissism	2.83 (0.49)	.61					–	.25**	.18*	.04
6. Psychopathy	2.40 (0.51)	.61						–	.48**	.21*
7. Sadism	2.02 (0.60)	.75							–	.08
8. Addiction	16.74 (4.16)	.66								–

*$p < .05$
**$p < .01$

A hierarchical multiple regression analysis was conducted to predict social media addiction from demographics, social media usage, impulsivity, and the Dark Tetrad traits. Age and gender were entered in Block 1, average time spent on social media was entered in Block 2, impulsivity was entered in Block 3, and the four Dark Tetrad traits were entered in

Block 4. The results of incremental validity are presented in Table 2. The full model that included all variables to predict social media addiction scores was statistically significant, R^2 = .14, $F(8,116) = 2.33$, $p = .02$, *adj*. $R^2 = .08$. Gender, time spent using social media, and trait psychopathy were significant predictors of addiction.

Table 2
Hierarchical multiple regression predicting social media addiction from age, gender, time spent on social media platforms, impulsivity, and the Dark Tetrad traits.

	B	*β*	*t*	R^2
Step 1				
Age	– .16	– .08	– .86	.03
Gender[a]	1.21	.15	1.64	
Step 2				
Age	– .15	– .07	– .81	.07*
Gender[a]	–1.18	– .14	–1.63	
Social media usage[b]	.01	.20	2.22*	
Step 3				
Age	– .14	– .07	– .78	.07
Gender[a]	–1.18	– .14	–1.62	
Social media usage[b]	.01	.20	2.24*	
Impulsivity	– .54	– .03	– .34	
Step 4				
Age	– .15	– .07	– .77	.14*
Gender[a]	–1.51	– .18	–2.07*	
Social media usage[b]	.01	.19	2.10*	
Impulsivity	– .66	– .04	– .42	
Machiavellianism	– .75	– .10	– .97	
Narcissism	– .11	– .01	– .14	
Psychopathy	2.30	.28	2.74**	
Sadism	.17	.03	.24	

[a] Dummy coded as 1 = male, 0 = female
[b] Average number of minutes per day
*$p < .05$
**$p < .01$

4. Discussion

The present study sought to examine the role of aversive personality traits and impulsivity in social media addiction, within a Malaysian, primarily student population. The data complemented existing findings on individual differences in social media usage and addictive use.

First, there was a significant positive association between screen-time and social media addiction, consistent with H1 and previous studies that have utilised self-report measures of

usage (e.g., Bányai et al., 2017; Wu, Cheung, Ku, & Hung, 2013). Given the shortcomings of self-report, the inclusion of behavioural outcome variables is arguably more informative than such previous studies.

Psychopathy was the only Dark Tetrad trait that had a positive association with the addictive use of social media, indicating partial support for H2. This finding is consistent with evidence of a relationship between the core features of psychopathy and addiction (e.g., Stenason & Vernon, 2016; Quednow et al., 2017), and the very limited studies investigating the links between psychopathy and social media addiction (e.g., Demircioğlu & Göncü Köse, 2018). For instance, in Fox and Rooney's (2015) study, psychopathy predicted time spent on social networking site and the number of selfies posted, but not photo-editing behaviour. It was put forward that the key characteristics of psychopathy, impulsivity and lack of self-control, may explain why psychopathic individuals are unlikely to filter their photos before posting them. This requires corroboration, as impulsivity was not shown to be correlated with psychopathy in the current study~~, as expected in H3~~. One possible interpretation of the positive psychopathy–addiction association is that social networking sites may provide a venue for aggressive online behaviours that people high in psychopathy are prone to engage in (Bogolyubova, Panicheva, Tikhonov, Ivanov, & Ledovaya, 2018). In other words, psychopathic individuals may be motivated to use social media extensively to express their dark traits.

Behavioural inhibition on the GoStop task, taken as an indication of impulsive responding, was not associated with social media addiction, as expected in H3. In fact, impulsivity was not associated with any of the variables of interest, apart from number of social media applications users had on their smartphones. This is in line with findings that have found self-report and behavioural measures of impulsivity to be unrelated, as they assess different underlying processes. Self-report measures, such as the Barratt Impulsiveness Scale (BIS-11;

Patton, Stanford, & Barratt, 1995), are said to assess more general impulsive behaviour (i.e., tendencies to act impulsively in a variety of contexts); respondents typically answer questions about whether they frequently act without planning in advance, or whether they have a tendency to make decisions without forethought. On the other hand, the GoStop task assesses more specific impulsive behaviour (i.e., the ability to inhibit a response that has already been initiated or reaction time), which may possess limited generalisability to wider behavioural contexts. Other computerised tasks such as the Balloon Analogue Risk Task, Immediate and Delayed Memory Task (IMT/DMT), or Two Choice Impulsivity Paradigm may be useful for measuring other aspects of impulsivity, including risk-taking, response initiation, and consequence sensitivity (Dougherty et al., 2009). Taken together, based on the current findings, while it cannot be concluded that response inhibition impulsivity is positively associated with social media addiction and the Dark Tetrad traits, it is testament that the multifaceted nature of impulsivity requires the construct to be measured using multiple approaches.

In a similar vein, although psychopathy has generally been construed as a unitary construct, seminal studies theorise that it is heterogeneous (see Skeem, Poythress, Edens, Lilienfeld, & Cale, 2003). The key theories distinguish between two variants of psychopathy, primary and secondary, and both are differentially associated with addictive disorders. Impulsivity and related behaviours have been found to be associated with secondary, rather than primary psychopathy (e.g., Snowden & Gray, 2011). Due to the brevity of the SD3, one may argue that it is unable to capture the complexities and subtleties of the multidimensional psychopathy construct; in other words, it may not be clear whether what is measured are the interpersonal and affective characteristics of primary psychopathy, or the lifestyle and antisocial behaviour aspects of secondary psychopathy. That said, the conception of the psychopathy component in the SD3 is said to be closer to secondary psychopathy than to

primary psychopathy, due to the emphasis on the impulsivity element (Jones & Paulhus, 2014). Perhaps the use of more protracted measures may disentangle the relationships between the variants of psychopathy, impulsivity, and social media addiction.

In terms of gender, females appeared more prone to being addicted to social media. Indeed, there has been evidence showing that excessive use of social media is more common in females rather than males (Andreassen et al., 2017; Wolniewicz, Tiamiyu, Weeks, & Elhai, 2018). It has been suggested that women are more socially-oriented and therefore more susceptible to develop addiction towards activities that involve elements of social interaction (van Deursen, Bolle, Hegner, & Kommers, 2015). Having said that, it should be noted that the predictive relationship between gender and social media addiction could be complicated by other variables such as personality and cultural backgrounds, which may influence motivations for usage and usage patterns. For example, according to Takao, Takahashi, and Kitamura (2009), Japanese women are often under societal pressure to behave modestly, impelling them to spend most of their time on their smartphones for social purposes (see van Deursen et al., 2015), which may potentially actuate problematic social media use. In addition, females have been found to be more likely than males to share selfies on social media platforms (Dhir, Pallesen, Torsheim, & Andreassen, 2016), but little is known about how such social media usage patterns vary between genders as a function of relevant personality traits such as narcissism. This suggests that psycho-socio-demographic variations exist in social media addiction, but future research is required to elucidate the relative contributions of the different variables.

5. Limitations

The current study did not measure social media platform use across the different channels in which it can be accessed, such as computers, tablets, or even through web browsers (aside

from through the corresponding apps). Arguably, the actual time spent on social media might be greater than the duration information as per obtained from participants' smartphones.

Moreover, as highlighted in the discussion above, this single investigation did not include other types of behavioural impulsivity assessments. It is therefore unclear whether there are correlations among the various measures, and whether the different dimensions of impulsivity reflect similar kinds of psychopathology in conditions in which impulsivity is implicated.

It should also be made clear that Malaysia is one of the Southeast Asian countries that has a complex multiracial Asian population, consisting of three main ethnic groups, namely Malay, Chinese, and Indian, as well as other indigenous groups. Social networking patterns may very well be influenced by such factors. According to an early study by Hargittai (2007), race, ethnicity, and parents' education background are variables predictive of which social networking sites college students prefer. While race and ethnicity have not been considered as explanatory variables of interest in the current study, future research in racially or ethnically diverse population may need to control for such possible confounding factors.

6. Conclusions and future directions

The current study offers an insight into the relationships among the Dark Tetrad traits, impulsivity, and social media addiction. This is one of the few studies that was not based on samples drawn from Western, educated, industrialised, rich, and democratic (WEIRD) societies (Henrich, Heine, & Norenzayan, 2010). This, together with the use of behavioural indices of social media usage and impulsivity, are key strengths of the current study.

Most users in the current study spent at least three hours on social media, which can be cause for concern, as greater users of social networking sites (i.e., more than two hours a day) have reported poorer mental health (Sampasa-Kanyinga & Lewis, 2015). That said, one should be cautious not to pathologise habitual use of social media platforms. Kuss and

Griffiths (2017) contended that the use of social media platforms has become a way of being and is context-dependent. There is a fine line between non-problematic habitual use and addictive and/or deviant use of social media platforms. Screen-time is not necessarily an accurate indicator of whether an individual is using social media platforms problematically. The contextual and situational factors are also important moderators in determining whether dispositional traits will play a positive or negative role in interpersonal relationship outcomes. Given that users' social media activities, including interaction with others, are dynamic in nature, a fruitful line of research in the future is to examine how the Dark Tetrad traits and impulsivity play out in computer-mediated communications. Assessing dispositional risk factors associated with problematic social media use using a longitudinal study design would also aid our understanding of developmental aetiology, which will allow for the design of prevention and intervention programmes.

While the present data is in line with many studies that have noted a comorbidity between psychopathy and addictive behaviours, the specific component of psychopathy that may confer a unique risk for social media addiction is unclear. Features such as callousness or lack of empathy, irresponsibility, and parasitic lifestyle that are fairly central to the psychopathy construct, as well as cross-cultural differences in the phenotypic expression of psychopathy (see Verschuere et al., 2018) may contribute to both substance-related and non-substance-related addictions in unique ways. Extending research to different samples and using different measures may shed further light on how, and potentially why certain personality attributes are linked with vulnerability for the initiation, development, and maintenance of social media addiction, or other addictive behaviours.

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