



Dark tetrad of personality, cyberbullying, and cybertrolling among young adults

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Abstract

Communication applications and social media sites serve as a platform for users to distribute information and connect to other users, potentially allowing perpetrators to perform antisocial behaviors. The current study examined the relationship between Dark Tetrad of personality (i.e., Machiavellianism, narcissism, psychopathy, sadism) and antisocial cyber-behaviors (i.e., cyberbullying, cybertrolling) by surveying young Malaysians (n=323) aged from 18 to 26. Partial least squares structural equation modelling (PLS-SEM) revealed that Machiavellianism was not related to cyberbullying and cybertrolling, while narcissism was positively related to cyberbullying but not related to cybertrolling. Meanwhile, psychopathy and sadism were positively related to cyberbullying and cybertrolling. The results of this study contribute to the cyber-behaviors literature, knowledge about the antisocial cyber-behaviors in Malaysia, supports sadism as a dark personality and the study acts as a reference to minimize these behaviors.

Keywords Machiavellianism · Narcissism · Psychopathy · Sadism · Cyberbullying · Cybertrolling

Introduction

The Internet is an integral tool in modern society for social interaction, consumption of information, and entertainment. According to the Malaysian Communications and Multimedia Commission (MCMC), 88.7% of the Malaysian population are users of the Internet, where the main activities involve text communication (98%), followed by surfing social networking sites (89.3%) (MCMC, 2018). These

means of communication serve as avenues for users to distribute information and socially connect to other users. This also enables antisocial behaviors performed by users who may be engaging in trolling, sockpuppeting, vandalizing, cyberbullying, creating fake accounts, botting, and spamming over the Internet (Kumar et al., 2017). It was suggested that users who spend more time on certain social networking platforms are more likely to behave in uncivil manners due to being more familiar with the platform conventions (Koban et al., 2018). In light of such tendencies, recent literature has started to explore these antisocial cyber-behaviors through the lens of personality and individual differences (Zhu & Jin, 2021; Brown et al., 2019; Chabrol et al., 2017; Craker & March, 2016; Duncan & March, 2019; Gibb & Devereux, 2014; Kircaburun et al., 2018; Kurek et al., 2019; March et al., 2017; Masui, 2019; Pabian et al., 2015).

Initially, Paulhus and Williams (2002) identified three socially aversive personalities collectively known as the Dark Triad – Machiavellianism, narcissism, and psychopathy. Machiavellianism refers to the aspect of personality that is manipulative, cold, calculating, and strategic; narcissism refers to one that is grandiose, entitlement, dominance, superiority, and egotistical; and psychopathy refers to one that is impulsive, thrill-seeking, and antisocial. Despite these differences, these personalities share a common core

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of disagreeability, manipulateness, and callousness (Jones & Figueredo, 2013; Paulhus & Williams, 2002). Later on, researchers Buckels et al. (2013) and Meere & Egan (2017) suggested one further addition to dark personalities: sadism. They reasoned that sadism, defined as the tendency to derive pleasure out of hurting others, shares some defining characteristics of other constructs under the Dark Triad, such as subclinical, socially aversive behaviours that can be adaptive to social demands. Buckels et al., (2013) and Book et al., (2016) studied the construct of sadism and supported the forming of “Dark Tetrad of Personality” by taking everyday sadism as one of the dark personalities. Book et al. (2016) even found that sadism is a better fit than narcissism in the Dark Tetrad model.

The association of dark personality traits and cyber-aggressive behaviors has recently grabbed the attention of researchers. For instance, Pabian et al. (2015) showed that only psychopathy trait is linked to cyber-aggression, while Machiavellianism and narcissism did not predict cyber-aggression. Meanwhile, Paulhus et al. (2018) found specifically psychopathy to be the strongest predictor of aggression, compared to Machiavellianism, narcissism, and sadism. Meta-analysis on Dark Triad and aggressive behaviours revealed that Machiavellianism and psychopathy have stronger links with aggression than narcissism, specifically, Machiavellianism is linked with indirect aggressive behaviours (Zhu & Jin, 2021). The present study is specifically interested in further investigating how cyberbullying and cybertrouling can be differentiated using the Dark Tetrad model.

Cyberbullying

Problematic social behaviors manifest themselves in various ways as individuals expand social activities onto the Internet. Cyberbullying is one of these behaviors and defined as repeated hostile or aggressive behavior conducted by individuals or groups through digital media with the purpose of causing hurt or distress to the victims (Tokunaga, 2010). According to the Malay Mail, Malaysia was ranked sixth out of 28 countries in terms of cyberbullying and 23 per cent of Malaysian parents voted that their child has been a victim of cyberbullying in 2018 (Rosli, 2018).

A study among young adults in Malaysia showed that respondents who spent 2 to 5 h a day on the Internet were more likely to commit cyberbullying than those who spent less than an hour (Balakrishnan, 2015). Additionally, a study among students in Malaysian higher learning institutions found that 66% of the students were victims of cyberbullying (Lai et al., 2017). Furthermore, Cyberbullying has been shown to increase detrimental behaviors such as heightened suicidality and a tendency to smoke or consume alcohol

(Nikolaou, 2017; Wiguna et al., 2018). Cyberbullying was even shown to have a greater effect on suicidal ideation than traditional bullying (Van Geel et al., 2014).

The Dark Tetrad of personality, as antisocial personality, has been shown to be strongly linked with cyberbullying. Traditional bullying behaviors have been linked with callous-unemotional traits and, in turn, the Dark Triad (Goodboy & Martin, 2015; Baughman et al., 2012). It is suggested that the lack of empathy and regard for others' feelings about the dark personalities predisposes individuals to engage in bullying behavior and, in turn, cyberbullying. Cyberbullying is said to allow perpetrators to gain a feeling of power as they feel powerless with their real-life pursuits (Kircaburun et al., 2018), while others view it as a means to cause distress towards the victims (Gibb & Devereux, 2014). Previous studies supported the association between Machiavellianism and cyberbullying (Baughman et al., 2012; Brown et al., 2019; Goodboy & Martin, 2015; Kircaburun et al., 2018), while other studies did not find the same result (Gibb & Devereux, 2014; Van Geel et al., 2017). In particular, Kircaburun et al. (2018) argued that people with high Machiavellianism tend to have lack of remorse and moral values, which are unique contributors to antisocial online behaviors. To further investigate this relationship, the following hypothesis is proposed: H1. There is a significant relationship between Machiavellianism and cyberbullying.

Inconsistent findings on the relationship between narcissism and cyberbullying were shown in previous research too, but most studies supported the relationship (Baughman et al., 2012; Goodboy & Martin, 2015; Van Geel et al., 2017) indicated that people with high narcissism were more likely to engage in indirect bullying than physical bullying due to higher perceived cost than their social class. However, Gibb and Devereux (2014) and Kircaburun et al. (2018) found no significant relationship between narcissism with cyberbullying. To gather more evidence for this relationship, the following hypothesis is proposed: H2. There is a significant relationship between narcissism and cyberbullying.

Most studies that examined the relationship between Dark Triad of personality and cyberbullying generally agree that psychopathy is the strongest predictor of cyberbullying as compared to Machiavellianism and narcissism (Balakrishnan et al., 2019; Baughman et al., 2012; Gibb & Devereux, 2014; Goodboy & Martin, 2015). It is said that individuals high in psychopathy are more impulsive and less likely to display empathy towards others (Gibb & Devereux, 2014), which can manifest as cyberbullying on the Internet. To confirm this relationship among young adults, the following hypothesis is proposed: H3. There is a significant relationship between psychopathy and cyberbullying.

Since most past conceptualizations of dark personalities did not include sadism, it is not well understood how sadism

interacts with cyberbullying. Some studies found that when sadism is incorporated into the models, it becomes the strongest predictor of cyberbullying (Kircaburun et al., 2018; Van Geel et al., 2017) expounded that perpetrators of cyberbullying may enjoy seeing the victims in distress to gain pleasure. To gather more evidence regarding this relationship, the following hypothesis is proposed: H4. There is a significant relationship between sadism and cyberbullying.

Cybertrolling

Cybertrolling is a deceptive, pernicious, and disruptive behavior conducted through digital media without a clear intention other than to antagonize other users (Buckels et al., 2014). According to Griffiths (2014), the term originated from a fishing method, but it is more aptly described with the analogy of the mythical creature that waits under bridges for opportunities to pounce. Cyber trolls seek to provoke or ‘bait’ other users to get into emotional, time-consuming discussions (Herring et al., 2002). Cyber trolling can be effectively differentiated from cyberbullying as it is deceptive, mischievous, and disruptive in nature (instead of being deliberately harmful), does not create a power imbalance between the perpetrator and the target, is generally incognito, and can be one-off (Golf-Papez & Veer, 2017). Cyberbullying and cybertrolling have also been shown to have different Big Five correlates, with the former being correlated with higher neuroticism and the latter being correlated with higher openness to experience (Zezulka & Siegfried-Spellar, 2016). This shows that not only cyberbullying and cybertrolling are different behaviourally, they may also be explained by different traits and personality patterns. This makes sense as trolling is a phenomenon exclusive to the incognito nature of cyberspaces which attracts individuals who desire to avoid the consequences of their behaviors (Widyanto & Griffiths, 2011), while bullying can happen in both real life and cyberspaces. Trolling can also be defined as sexist, homophobic, physically violating, obscene, nonsensical, or offensive comments made on digital media (Klempka & Stimson, 2013). Trolls manifest the darker, perilous, and transgressive digital media, where vituperation and vitriol exist (Bishop, 2014). Like any other culture, digital media users have their own culture, language, and humor that include being unconcerned about other people’s feelings from ridicule and contempt (Klempka & Stimson, 2013). Boredom, attention seeking, and revenge are some of the motivations behind trolling (Shachaf & Hara, 2010). Besides that, negative mood and exposure to troll posts tend to increase the risk of trolling (Cheng et al., 2017; Thacker & Griffiths, 2012) suggested that seeing cybertrolling will increase self-esteem, but being trolled will decrease self-esteem. According to a survey by the Tenel Group, trolling

(51%) was the top annoying behavior that Malaysians performed in cyberspace, followed by disseminating fake rumors (47%) and using profanity (39%) (Kugan, 2015).

Dark Tetrad of personality, as antisocial personality, also has a strong relationship with cybertrolling. Buckels et al. (2014) reasoned that the trolling culture embraces sadistic pleasure and merciless amusement. Thus, the lack of empathy and regard for others inherent in the dark personalities may predispose users to engage in cybertrolling, not unlike cyberbullying. Although there was a prior study that found a significant relationship between Machiavellianism and cybertrolling (Kircaburun et al., 2018), but the majority of prior studies stated an insignificant relationship between Machiavellianism and cybertrolling (Buckel et al. 2014; Craker & March, 2016; March et al., 2017). A study by Craker and March (2016) that focuses on Facebook trolling behavior pointed out that Machiavellianism is not a predictor of cybertrolling because of its unique characteristics, such as calculating, tactical, and restricted impulse. Due to its characteristics, people’s manipulative and deceptive behaviors with high Machiavellianism trait, such as a rapid and responsive communicational setting, are inappropriate to be performed on Facebook. March et al. (2017) also justified an insignificant relationship between Machiavellianism and cybertrolling as a result of manipulative characteristic of Machiavellianism that is against the impulsive and disruptive characteristics of cybertrolling. On the other hand, Kircaburun et al. (2018) stated that Machiavellianism is a trait with high moral disengagement and antisocial behavior that predisposes people with high Machiavellianism to cybertrolling. As contradicting opinions are stated in prior studies, the following hypothesis is proposed: H5. There is a significant relationship between Machiavellianism and cybertrolling.

Narcissism, as one of the dark personalities, is an insignificant predictor of cybertrolling (Buckels et al., 2014; Craker & March, 2016; Kircaburun et al., 2018; Lopes & Yu, 2017; March et al., 2017). Individuals with high narcissism are known as self-absorption, in which they have more interest in themselves, so they will not engage in impulsive and disruptive behaviors by trolling other people (Craker & March, 2016; March et al., 2017). According to Buckels et al. (2014), individuals with high narcissism less enjoy cybertrolling. Furthermore, Lopes and Yu (2017) suggested that narcissism predicts downward social comparison instead of cybertrolling behaviors. To confirm this relationship among young adults in Malaysia, the following hypothesis is proposed: H6. There is a significant relationship between narcissism and cybertrolling.

Psychopathy appears to be a significant predictor of cybertrolling as investigated by previous studies (Buckels et al., 2014; Craker & March, 2016; Kircaburun et al., 2018;

Lopes & Yu, 2017; March et al., 2017; Sest & March, 2017). Individuals with a high tendency of cybertrouling lack empathy, are fulfilled by predatory impulses, and express brazen regardless of hardships they bring to other people (Craker & March, 2016; March et al., 2017). Motivations that drive individuals with high psychopathy trait to engage in cybertrouling include seeking thrill by creating chaos on digital media (Sest & March, 2017), destroying the social status of popular people on social media, bullying weaker people to take advantage on their low self-esteem and attention-seeking tendency (Lopes & Yu, 2017). In light of this, the following hypothesis is proposed: H7. There is a significant relationship between psychopathy and cybertrouling.

Sadism is a robust predictor of cybertrouling (Buckels et al., 2014; Craker & March, 2016; Kircaburun et al., 2018; March et al., 2017; Sest & March, 2017). In the study of Buckels et al. (2014), the influence of sadism on cybertrouling was halved when enjoyment was controlled, indicating that individuals with high sadism tend to troll for enjoyment. They will seek occasion to troll for the sake of ridiculing and insulting people (March et al., 2017). Sadists also gain enjoyment and pleasure from hurting or distressing people, so trolls are ruthless and cruel (Craker & March, 2016; Sest & March, 2017). To increase the research knowledge about this relationship, the following hypothesis is proposed: H8. There is a significant relationship between sadism and cybertrouling.

Current study

As Dark Tetrad of personality is regarded as antisocial personality and cyberbullying and cybertrouling are regarded as antisocial cyber-behaviors, the relationships between these variables hence grabbing the attention of researchers in recent years (Buckel et al. 2014; Craker & March, 2016; Gibb & Devereux, 2014; Goodboy & Martin, 2015; March et al., 2017; Kircaburun et al., 2018; Lopes & Yu, 2017; Sest & March, 2017; Van Geel et al., 2017). It can be argued that these personality traits may be predisposed to antisocial cyber-behaviors such as cyberbullying and cybertrouling. Although a few studies were conducted on this topic, it is still lacking in Malaysia. Since Malaysians have increasingly easier access to the Internet and spend much time on communication and social networking platforms (MCMC, 2018), it has increased the risk of users performing antisocial cyber-behaviours or becoming victims of such behaviors. Additionally, Malaysia is said to have an alarming rate of cyberbullying (Rosli, 2018). Hence, to comprehensively understand the antisocial cyber-behaviors among Malaysians, the current study intends to examine the relationship between Dark Tetrad of personality and cyberbullying and cybertrouling. The findings of the study should provide more

theoretical insight of the role of Dark Tetrad as a possible predictor of antisocial online behaviors, and in turn, provide practical implications for policymakers and moderators of online communities. If sadism as a trait was found to be significantly correlated with both cyberbullying and cybertrouling alongside the Dark Triad, future researchers should consider investigating online behaviors from the lens of the Dark Tetrad as a whole.

Methodology

Participants

A total of 323 young Malaysian adults with a mean age of 22 participated in the study. The sample size supported by PLS-SEM rule of thumb, which estimates a minimum sample size of 10 times the most complex relationship within the research model. Also, power analysis using the G*Power software showed that with an effect size of 0.15, an alpha value of 0.05, and a power of 0.80, a minimum sample size of 85 participants is required. The participants were recruited using purposive sampling through social media platforms such as Facebook and Twitter. Participation was open to Malaysians, 18 to 26 years old and fluent in English. They participated in this study by completing an English version of a Google form questionnaire. The informed written consent that outlines the anonymity and confidentiality matters was obtained from the participants. Approval for the study protocol was obtained through the University Human Research Ethics Committee. Of 323 participants, 150 were males, and the remaining were females. There were 93 Malays, 132 Chinese, and 37 Indians. From the data, 13 participants used Internet for less than 1 h a day, 144 from 2 to 5 h a day, and 166 for more than 6 h a day.

Measures

Cyberbullying

The Revised Adolescent Peer Relations Instrument (RAPRI) developed by Griezel et al. (2012) was used to measure cyberbullying. It has cyberbullying and cyber victims' items, but only cyberbullying items were used in the current study. The RAPRI – Bully consists 5 items of bully visual and 8 items of bully text, rated on a 6-point Likert-type scale that ranged from 1 (never) to 6 (every day). Bully visual refers to bullying using video or photograph (e.g., Used a mobile phone to forward a video to a student I knew they wouldn't like), while bully text refers to bullying using emails, text messages, or instant chat messages (e.g., Sent a student an email with a message I knew would hurt their feelings). The

reliability of the RAPRI for cyberbullying was in agreement with Cronbach's α of 0.88. In correlation with traditional bullying, bully visual and text ($r=0.75$) were correlated higher than the correlation between cyberbullying and traditional bullying factors. Additionally, bully visual and text had factor loadings of 0.80 and 0.95, respectively (Griezel et al., 2012).

Cybertrolling

The Global Assessment of Internet Trolling (GAIT) developed by Buckels et al. (2014) was used to measure cybertrolling. It consisted of 4 items (e.g., I like to troll people in forums or the comments section of websites), rated on a 5-point Likert scales that ranged from 1 (strongly disagree) to 5 (strongly agree). The reliability of GAIT was in agreement with Cronbach's α of 0.82 (Buckels et al., 2014).

Dark Tetrad of personality

The Short Dark Triad (SD3) developed by Jones and Paulhus (2014) measured Machiavellianism, narcissism, and psychopathy. It consisted of 9 items for each subscale of Machiavellianism (e.g., I like to use clever manipulation to get my way), narcissism (e.g., Many group activities tend to be dull without me.) and psychopathy (e.g., People who mess with me always regret it). The measure rated on a 5-point Likert scale that ranged from 1 (strongly disagree) to 5 (strongly agree). For the concurrent validities, each subscale has correlations ranging from 0.82 to 0.92. The reliability of SD3 was in agreement with Cronbach's α , which ranged from 0.68 to 0.74 (Jones & Paulhus, 2014).

The Short Sadistic Impulse Scale (SSIS) developed by O'Meara et al. (2011) was used to measure sadism. It consisted of 10 items, rated on a dichotomous form with categories "like me" and "unlike me" e.g., I have hurt people because I could. The internal consistency of SSIS was adequate with Cronbach's α of 0.74 (Kircaburun et al., 2018).

Data Analysis

The data was analyzed with partial least squares structural equation modeling (PLS-SEM) by using SmartPLS 3.3.8. The PLS-SEM allows multivariate analysis to test measurement and structural models. This method was applied due to its advantages, such as (a) assessment of complex conceptual models with many variables, (b) flexibility of theoretical development in testing and validating exploratory models, and (c) suitability for prediction-oriented analysis (Hair et al., 2017; Henseler et al., 2009).

Results

Structured equation modeling (SEM) was applied to test the hypotheses. Firstly, the measurement model was examined to assess the indicator reliability, construct reliability, convergent validity, and discriminant validity of the scales used in the current study. Secondly, the structural model was examined to test the predictive relationships between the Dark Tetrad of personality and cyberbullying and cybertrolling.

Measurement model

Indicator reliability assesses the indicator loadings for exogenous construct according to the endogenous constructs' prediction (Hair et al., 2011). To determine indicator reliability, the item loadings should be higher than 0.7. However, item loadings from 0.4 to 0.7 can remain if the loadings raise composite reliability (CR) more than 0.7 and the average variance extracted (AVE) more than 0.5 (Hair et al., 2011). As a result, items loaded below 0.7 with CR lower than 0.7 and AVE lower than 0.5 were removed. Out of the remaining items, all loadings that ranged from 0.55 to 0.87 (Table 1) indicated acceptable indicator reliability.

Construct reliability assesses the internal consistency of constructs (Hair et al., 2011). To determine construct reliability, the composite reliability (CR) should be higher than 0.7 (Chin, 2010; Henseler et al., 2009). In the current model, the CR of all constructs ranged from 0.84 to 0.94 (Table 1), indicating acceptable construct reliability.

Convergent validity assesses the underlying construct of indicators, as demonstrated by unidimensionality (Henseler et al., 2009). To assess convergent validity, the average variance extracted (AVE), a criterion suggested by Fornell and Larcker (1981) was used. The AVE should be higher than 0.5 to explain more than half of the construct (Hair et al., 2017; Henseler et al., 2009). Based on the results, the AVE for all constructs ranged from 0.50 to 0.57 (Table 1); indicating satisfactory convergent validity.

Discriminant validity assesses that the indicators is conceptually different and not unidimensional (Henseler et al., 2009). To assess the discriminant validity, Henseler et al. (2015) suggested the Hetrotrait-Monotrait ratio (HTMT) as a new assessment approach of discriminant validity. All the HTMT values should be lower than 0.85 (Henseler et al., 2015). As shown in Table 2, all values were below the threshold of 0.85, which indicated that the discriminant validity was established.

After removing items with low loading, all indicator reliability, construct reliability, convergent validity, and discriminant validity demonstrated satisfactory results. Hence, the constructs can be used to test the structural model.

Table 1 Measurement model

Construct	Item	Loading	CR	AVE
Cyberbullying (CB)	TB1	0.815	0.939	0.544
	TB2	0.744		
	TB3	0.674		
	TB4	0.813		
	TB5	0.749		
	TB6	0.720		
	TB7	0.748		
	TB8	0.752		
	VB1	0.550		
	VB2	0.720		
Machiavellianism (M)	M2	0.556	0.878	0.513
	M3	0.781		
	M4	0.810		
	M5	0.797		
	M6	0.818		
	M7	0.580		
	M8	0.556		
	Narcissism (N)	N1		
N3		0.848		
N4		0.639		
N5		0.853		
N7		0.664		
N8r		0.706		
N9		0.622		
Psychopathy (P)		P1	0.846	0.891
	P3	0.774		
	P4	0.865		
	P5	0.835		
	P6	0.639		
	P8	0.777		
Sadism (S)	S1	0.685	0.898	0.500
	S2	0.681		
	S3	0.675		
	S5	0.673		
	S6	0.784		
	S7	0.651		
	S8	0.751		
	S9	0.814		
	S10	0.608		
	Cybertrolling (CT)	CT1		
CT2		0.739		
CT3		0.763		
CT4		0.799		

Structural model

In the structural model, coefficient of determination (R^2), predictive relevance (Q^2), and path coefficient (β -values) were analyzed to determine the explanatory power of the

constructs. The results of the structural model hypotheses are illustrated in Table 3; Fig. 1.

The coefficient of determination (R^2) is a criterion of predictive accuracy. R^2 value of 0.67 is considered a substantial predictive relationship, 0.33 is considered a moderate predictive relationship, and 0.19 is considered a weak predictive relationship (Chin, 2010). As merely R^2 is insufficient to support a model (Hair et al., 2017), the Stone-Geisser's Q^2 (Stone, 1974; Geisser, 1974) value was used as criterion of predictive relevance. The Q^2 value should be higher than zero to support the predictive relevance for latent endogenous constructs (Chin, 2010; Hair et al., 2017). In addition, the effect size (f^2) is suggested to report and to determine the effect of predictor latent variable in the structural model, where f^2 of 0.02 is considered a weak effect, 0.15 is considered a medium effect, and 0.35 is considered a large effect (Chin, 2010; Henseler et al., 2009).

The R^2 for cyberbullying was 0.352, indicating that this model moderately explained 35.2% of the variance in cyberbullying. Cyberbullying had a Q^2 value of 0.085, suggesting that cyberbullying had a strong predictive relevance in the current model. As shown in Table 3, the relationship between Machiavellianism and cyberbullying ($\beta = -0.088$; t -value = 0.926; $f^2 = 0.005$) was not statistically significant, so H1 was rejected. However, the relationship between narcissism and cyberbullying ($\beta = 0.175$; t -value = 3.274; $f^2 = 0.030$), psychopathy and cyberbullying ($\beta = 0.233$; t -value = 2.428; $f^2 = 0.038$), and sadism and cyberbullying ($\beta = 0.208$; t -value = 1.984; $f^2 = 0.043$) were positive and statistically significant, hence, H2, H3, and H4 were supported. Moreover, narcissism, psychopathy and sadism had some effect sizes, whereas Machiavellianism had no effect.

The R^2 for cybertrolling was 0.387, indicating that 38.7% of the variance of cybertrolling was moderately explained by this model. Additionally, cybertrolling had a Q^2 value of 0.118, suggesting that cybertrolling had a strong predictive relevance in the current model. The relationship between Machiavellianism and cybertrolling ($\beta = 0.040$; t -value = 0.647; $f^2 = 0.001$) and narcissism and cybertrolling ($\beta = 0.101$; t -value = 1.767; $f^2 = 0.011$) are not statistically significant, so H5 and H6 were rejected. However, the relationship between psychopathy and cybertrolling ($\beta = 0.252$; t -value = 3.495; $f^2 = 0.049$) and sadism and cybertrolling ($\beta = 0.317$; t -value = 5.157; $f^2 = 0.112$) were positive and statistically significant, hence, H7 and H8 were supported. Table 3 also shows that psychopathy had a weak effect size and sadism had a medium effect size, whereas Machiavellianism and narcissism had no effect.

Table 2 Discriminant validity (Heterotrait-Monotrait Ratio (HTMT))

	CB	M	N	P	S	CT
Cyberbullying (CB)						
Machiavellianism (M)	0.179					
Narcissism (N)	0.255	0.449				
Psychopathy (P)	0.329	0.712	0.452			
Sadism (S)	0.255	0.256	0.131	0.311		
Cybertrolling (CT)	0.605	0.338	0.272	0.462	0.432	

Fig. 1 Structural model results

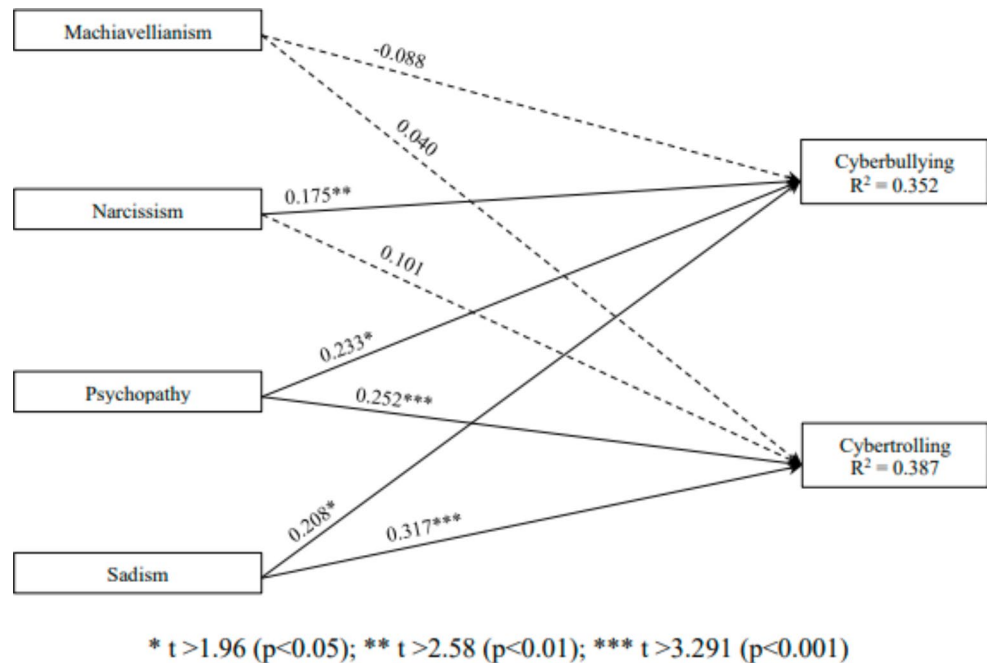


Table 3 Structural model (Hypotheses testing)

Hypotheses	Beta	T value	Decision	f Square
H1: Machiavellianism → Cyberbullying	-0.088	0.926	Not Supported	0.005
H2: Narcissism → Cyberbullying	0.175	3.274	Supported	0.130
H3: Psychopathy → Cyberbullying	0.233	2.428	Supported	0.138
H4: Sadism → Cyberbullying	0.208	1.984	Supported	0.143
H5: Machiavellianism → Cybertrrolling	0.040	0.647	Not Supported	0.001
H6: Narcissism → Cybertrrolling	0.101	1.567	Not Supported	0.011
H7: Psychopathy → Cybertrrolling	0.252	3.495	Supported	0.149
H8: Sadism → Cybertrrolling	0.317	5.157	Supported	0.212

Discussion

Cyberbullying and cybertrrolling are two of the antisocial behaviors on the Internet. These issues are important in Malaysia as Internet use is steadily growing (MCMC, 2018), while awareness of socially aversive behaviors that can take place on the Internet is not keeping up. Serious consequences of cyberbullying and cybertrrolling on the physical, mental, and psychological aspects signal that these issues should be the concerns of society, especially since Malaysia has an alarming rate of cyberbullying (Rosli, 2018). More than half (51.4%) of participants in the current study

reported that they spent more than 6 h a day on the Internet, followed by 2 to 5 h (44.6%) and less than 1 h (4%). Therefore, this study aimed to examine the influence of antisocial personalities (i.e., Machiavellianism, narcissism, psychopathy, sadism) on antisocial cyber-behaviors (i.e., cyberbullying and cybertrrolling), particularly in the Malaysian context using structured equation modeling (SEM), SmartPLS. The findings revealed that Machiavellianism had no relationship with cyberbullying and cybertrrolling, narcissism had a positive relationship with cyberbullying but no relationship with cybertrrolling, and psychopathy and sadism had a positive relationship with cyberbullying and cybertrrolling.

Certain prior studies were consistent with the current studies about the insignificant relationship between Machiavellianism and cyberbullying (Gibb & Devereux, 2014; Van Geel et al., 2017) and Machiavellianism and cybertrrolling (Buckel et al. 2014; Craker & March, 2016; Duncan & March, 2019; March et al., 2017). Machiavellianism is a manipulative, cold, calculating, and strategic personality (Jones & Paulhus, 2009; Paulhus & Williams, 2002), hence the Internet might not be an ideal condition for people with high Machiavellianism to perform such disruptive and impulsive behaviors. This is likely because of the rapid, open, interactive, and responsive characteristics of the Internet, which will make it conducive for them to manipulate the situation.

As supported by prior studies, narcissism has a significant relationship with cyberbullying (Baughman et al., 2012; Goodboy & Martin, 2015; Van Geel et al., 2017). The Internet serves as an ideal place for narcissistic people to bully others because it could have less risky compared to face-to-face bullying. On the other hand, similar to most previous studies, narcissism does not predict cybertrrolling behaviors (Buckels et al., 2014; Craker & March, 2016; Kircaburun et al., 2018; Lopes & Yu, 2017; March et al., 2017). People with high narcissism tend to be absorbed in themselves and practice egocentric communication pattern (Morf & Rhodewalt, 2001). Due to their characteristics, it is reasonable to suggest that they are not likely to enjoy trolling people in cyberspace by intentionally planning such deceptive and disruptive behaviors.

For the influence of psychopathy on cyberbullying and cybertrrolling, the current findings showed that psychopathy significantly predicted cyberbullying and cybertrrolling, in line with previous studies on cyberbullying (Gibb & Devereux, 2014; Goodboy & Martin, 2015) and cybertrrolling (Buckels et al., 2014; Craker & March, 2016; Duncan & March, 2019; Kircaburun et al., 2018; Lopes & Yu, 2017; March et al., 2017; Masui, 2019; Sest & March, 2017). Individuals with higher psychopathy have a higher tendency to cyberbullying and cybertrrolling because these behaviors can bring them immediate satisfaction and pleasure by putting people in distress, creating chaos on cyberspace, lowering the social status of others, and seeking attention (Gibb & Devereux, 2014; Lopes & Yu, 2017; Sest & March, 2017). Besides that, their malicious communication patterns could also contribute to their cyberbullying and cybertrrolling behaviors (Brown et al., 2019).

Sadism is also a significant predictor of cyberbullying and cybertrrolling. The current findings are consistent with previous studies on the relationship between sadism and cyberbullying (Craker & March, 2016; Duncan & March, 2019; Kircaburun et al., 2018; March et al., 2017; Masui, 2019; Sest & March, 2017). People with high levels of

sadism enjoy hurting people (Buckels et al., 2013; Jones & Figueredo, 2013). Therefore, they have a high tendency to perform cyberbullying and cybertrrolling behaviors as they bring personal enjoyment and pleasure from attacking others. In addition, it is worth noting that sadism had the strongest relationship with cybertrrolling compared to the other Dark Triad, which lends further support for sadism to be considered an integral part of the dark personalities as the Dark Tetrad (instead of just the Triad).

The main theoretical implication of the current study is that it further supports the Dark Tetrad to be used in studies on personality and antisocial cyber-behaviors over the Dark Triad. In line with past studies involving sadism as a variable (Buckels et al., 2014; Craker & March, 2016; Duncan & March, 2019; Kircaburun et al., 2018; March et al., 2017; Masui, 2019; Sest & March, 2017), the present study found sadism to be an essential predictor of both cyberbullying and cybertrrolling behaviors. Therefore, theoretically, researchers should find Dark Tetrad to be a more useful and complete model of personality traits as the role of sadism may prove integral as an explanatory mechanism for antisocial behaviors in cyberspace. The present study also offers some practical implications from a policymaking perspective, as it is able to identify the traits of sadism, psychopathy, and narcissism as possible predictors of antisocial cyber-behaviors. Policymakers and cyberspace moderators interested in curbing the prevalence of cyberbullying and cyber trolling in a given online community could look into methods that can identify and selectively monitor users high in the aforementioned Dark Tetrad traits and prepare appropriate measures.

There are several limitations in the current study. Firstly, the survey was mainly responded by Facebook and Twitter users, who serve as the platforms for our data collection, so other Internet users had no chance to participate in the current survey who may also potentially be the perpetrators or victims of cyberbullying and cybertrrolling. Future studies can diversify the survey distribution to reach people from different cyberspace to enhance the generalization of findings. Secondly, this study examined dark personalities in relation to cyberbullying and cybertrrolling without considering their motives. Future studies might want to operationalize and include the motivation of such antisocial cyber-behaviors in case there are interaction effects between motivation and personality. Third, the current data were collected on a self-reported basis, which might be obscured by the halo effect. Future research can collect data from peer-reported or parent-reported basis to minimize biases.

This study contributes to the cyber-behaviors' literature by examining the influence of Dark Tetrad personality on cyberbullying and cybertrrolling, particularly in the Malaysian context. This also alerts the Malaysians about

the antisocial cyber-behaviors resulting from antisocial personalities. Moreover, some dark personalities were revealed as significant predictors of cyberbullying and cybertrouling. These findings could assist in minimizing such cyberbullying and cybertrouling by detecting these patterns from a personality lens.

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Data availability The data that support the findings of this study are available from the corresponding author upon reasonable request.

Code availability Not applicable.

Declarations

Conflict of interest None.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent Informed consent was obtained from all individual participants included in the study.

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