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Dark Triad Personality and Cyber-Aggression: The Mediation of Antisocial Behaviour

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Abstract

The present study aims to investigate the mediating effect of antisocial behaviour on the relationship between the dark triad personality and cyber-aggression. The study has three research objectives which it to investigate the mediating effects of antisocial behaviour on the relationship between (1) Machiavellianism, (2) Psychopathy, and (3) Narcissism on the different types of cyber-aggression (impulsive-appetitive, impulsive-aversive, controlled-appetitive, controlled-aversive). A cross-sectional research design was employed to collect data from Malaysians undergraduate students who are currently enrolled in a university in Malaysia, at least 18 years old, and actively uses social media daily. The present study employed the Dirty Dozen Scale, Subtypes of Antisocial Behaviour Scale, and Cyber-Aggression Typology Questionnaire which were distributed using the online survey method. In total, 266 responses were analyzed using Structural Equation Modelling. The results show that there were no mediation effects of antisocial behaviour on the relationships between Machiavellianism and narcissism with all forms of cyber-aggression. However, mediating effects of antisocial behaviour have been found on the relationship between psychopathy and all forms of cyber-aggressive acts if they are involved in antisocial behaviours, effectively making it a potential risk factor.

Keywords: Dark Triad Personality; Cyber-Aggression; Antisocial Behaviour; Mediation; Quadripartite Violence Typology.

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1. Introduction

The current generation of Malaysian university students are well-versed with the usage of computer and internet due to universities in Malaysia incorporating these technologies in the delivery of curriculum through free to use computing facilities and the use of web-based learning environment [1]. The internet platform allows users to engage in social activities such as sharing text, videos, pictures with other individuals, either privately or publicly, through social media [2]. As much benefits as these technological advancements bring, it also acts as a gateway to a new form of aggression, known as cyber-aggression [3]. Cyber-aggression occurs when threats of harm or actual harm towards another individual are made using internet while having the option to remain anonymous [4]. One of the most common forms of cyber-aggression is cyberbullying [5] while also encompassing cyber harassment and other methods of online aggression [6]. Cyber-aggression includes verbal aggression, impersonation of others, boycotting others in an online context, or the use of compromising or contemptuous images [7].

Cyber-aggression can be linked to the personality traits from the dark triad of personalities [8]. The dark triad is a term use to describe three distinct undesirable personality traits [9]. The dark triad of personality includes Machiavellianism, narcissism, and psychopathy [10]. Machiavellianism refers to the extent to which an individual is willing to employ deceit, emotional detachment, and flattery to manipulate others [11]. A person with high Machiavellianism is more likely to exploit others for their own benefit while reserving minimal concern on others' wellbeing [12]. Narcissists are found to have a sense of grandiosity, entitlement, inflated self-worth, and arrogance [10]. Narcissists are expected to thrive in an online environment as they would have more control over on to present their image online and the relationships online are often shallower [13]. Although narcissists may try to put on a formidable exterior, what lies beneath the inflated exterior is a vulnerable ego [14]. When a narcissist's self-view is challenged, it will lead to a hostile and aggressive response [15]. Subclinical psychopathy, the focus on the study, is characterized by a lack of empathy and remorse, impulsivity, a tendency to seek thrills, being carefree, and getting bored easily [16]. Impulsivity has been found to be a risk factor for cyber-aggression [17].

Traits of the dark triad of personality such as impulsivity, sensation-seeking, and lack of self-control has been linked to antisocial behavior such as delinquency [18]. The relationship between impulsivity and antisocial behaviors has also been repeatedly proven in adolescents [19]-[21]. Studies among undergraduate students have also repeatedly highlighted the relationship between impulsivity and antisocial behavior such as aggression [22]-[24]. Individuals who score higher on the dark triad of personality tend to use a myriad of tactics to achieve their social and interpersonal goals, despite their antisocial personality [25].

Cyber-aggression activities are also related to a general pattern of antisocial behavior [26]. For example, antisocial behavior in an academic institution such as physical aggression against peers has been identified as an important risk factor that increases the likelihood of an individual participating in cyber-aggression [27]. Different forms of antisocial behavior such as animal abuse, larceny, damage of private properties, and consumption of alcohol, illegal drugs, and tobacco aggression has also been found to have a strong positive correlation with cyber-aggression [28,29]. As previous literatures have shown that the dark triad of personalities,

antisocial behavior, and cyber-aggression are related to each other, the present study aims to investigate whether antisocial behavior plays a mediating role in the relationship between the dark triad of personality and cyberaggression.

1.1. Quadripartite Violence Typology

The quadripartite violence typology (refer to Figure 1) is proposed by Howard [30] based on two dimensions which are orthogonal. This model seeks to represent aggressive acts through motivation goals (aversive vs. appetitive) and regulatory control (controlled vs. impulsive). This model of aggression has also been adapted by Runions, Bak, and Shaw [31], to study cyber-aggression. Impulsive acts occur when minimal or subconscious is paid to environmental factors which subsequently prompt a strong tendency or urge to act and an affective response [32]. In this model, impulsive acts are often acted upon for immediate gratification without first considering the consequences [30]. Controlled acts on the other hand are conducted with self-control driven by a desire to reach a goal. Appetitive motivation is driven by a desire to obtain positive affect for the aggressor while aversive motivation is characterized by a desire to reduce negative affect such as guilt, sadness, fear, distress, threat, and shame. Aversive motives can also be seen as retaliatory as it may include painful experiences such as being harassed or victimized [31].

Impulsive-appetitive forms of aggression is motivated by a desire to increase one's own positive affect by harming or making others suffer [30]. In terms of an online context, impulsive-appetitive cyber-aggression may manifest itself as activities of making jokes of others without first considering their feelings to have fun. The other form of impulsive aggression in this model is impulsive-aversive aggression. The goal of this form of aggression is to reduce negative affect felt by removing the interpersonal threat [30]. This form of aggression is caused by a feeling of fear and distress and an immediate desire to eliminate the threat. Impulsive-reactive cyber-aggression may occur when an individual immediately employs the usage of internet technological resources, such as social media, to take revenge on others who they feel have wronged them. Lack of self-control, impulsivity and the disregard for future consequences are the main characteristics which embodies psychopathy [33] and neuroticism [34]. Therefore, it is possible that psychopathy and narcissism are more closely related to these forms of aggression.

Controlled-appetitive aggression is aimed to achieve some form of positive outcome desired by the aggressor [30]. It is stimulated by the positive feelings one feels when anticipating something desirable. In terms of the cyber context, controlled-appetitive cyber-aggression can be conducted when an individual seeks to proactively hurt someone or make someone look bad through the internet to fulfil a self-goal. Controlled-aversive aggression on the other hand is like impulsive-aversive aggression as it is also motivated by a desire to remove negative affect through the elimination of interpersonal threat [30]. However, with controlled-aversive aggression, it is done so through carefully planned and considered actions. This form of aggression is elicited by feelings of vengefulness and the desire to get-even with the target of aggression. Controlled-aversive cyber-aggression occurs when an individual carefully plans a revenge on someone and harms them through employing internet technology resources. Both controlled forms of aggression rely on premeditated planning to carry out the aggressive acts [30]. Hence, these forms of aggression might be more closely related to individuals with high

levels of Machiavellianism who are characterized by strategic manipulation, calculatedness, and instrumentality, when it comes to using others for their own agendas [35].

It has also been found by Duggan and Howard [36] that there is no clear causal relationship between personality disorders and aggressive acts. They have put forth the notion that a mediator will mediate the relationship between personality disorders and aggressive acts [36]. According to this notion, there should be a mediator between personalities from the Dark Triad and their tendency for aggression. Thus, the present study has examined antisocial behavior as a potential mediator on the relationship between the dark triad of personality and the four types of cyber-aggression. This is due to the close link between traits from the dark triad of personality with both antisocial behaviour [37] and cyber-aggression [8]. Antisocial behavior by itself has also been linked to the occurrence of cyber-aggression [38]. Through this, it is possible to shed light on the role antisocial behaviour plays on how the dark triad of personalities affect the channel of their aggression.



Figure 1: Quadripartite Violence Typology

2. Methods

The present study aims to determine if the antisocial behaviour plays a mediating role between the Dark Triad personality and Cyber-Aggression. Therefore, this study has three research objectives which it to investigate the mediating effects of antisocial behaviour on the relationship between (1) Machiavellianism, (2) Psychopathy, and (3) Narcissism on the different types of cyber-aggression (impulsive-appetitive, impulsive-aversive, controlled-appetitive, controlled-aversive). From these objectives, twelve hypotheses were proposed.

H1: Antisocial behaviour mediates the relationship between Machiavellianism and impulsive-appetitive cyberaggression.

H2: Antisocial behaviour mediates the relationship between psychopathy and impulsive-appetitive cyberaggression.

H3: Antisocial behaviour mediates the relationship between narcissism and impulsive-appetitive cyberaggression. H4: Antisocial behaviour mediates the relationship between Machiavellianism and impulsive-aversive cyberaggression.

H5: Antisocial behaviour mediates the relationship between psychopathy and impulsive-aversive cyberaggression.

H6: Antisocial behaviour mediates the relationship between narcissism and impulsive-aversive cyberaggression.

H7: Antisocial behaviour mediates the relationship between Machiavellianism and controlled-appetitive cyberaggression.

H8: Antisocial behaviour mediates the relationship between psychopathy and controlled-appetitive cyberaggression.

H9: Antisocial behaviour mediates the relationship between narcissism and controlled-appetitive cyberaggression.

H10: Antisocial behaviour mediates the relationship between Machiavellianism and controlled-aversive cyberaggression.

H11: Antisocial behaviour mediates the relationship between psychopathy and controlled-aversive cyberaggression.

H12: Antisocial behaviour mediates the relationship between narcissism and controlled-aversive cyberaggression.

2.1. Research Design

The present study is quantitative research. A quantitative research design is suitable for the present study as we can use questionnaires to quantify the Dark Triad of personality, antisocial behaviour, and cyber-aggression to easily analyze the relationship they have with each other. This study also uses a cross-sectional design by distributing questionnaire whereby all the data will be collected during a single time frame.

2.2. Participants

The targeted population for the current study is undergraduate students in West Malaysia. The inclusion criteria for the sample of the present study will be undergraduate students who are currently studying at either a public or private university in Malaysia who are at least 18 years of age and participate actively in the usage of social media platforms. Participants were recruited from Wilayah Persekutuan Kuala Lumpur, Perak, Johor, and Kelantan, which represents the four regions of West Malaysia. The exclusion criteria for the present study are individuals who are under 18 years old, are not currently enrolled at any tertiary institution as an undergraduate student, as well as not owning any social media account. In total, 309 responses were collected. After data

cleaning by removing incomplete responses and data from participants which do not meet the inclusion criteria, 266 responses were left to be analyzed, which consist of 77 (28.95%) males and 189 (71.05%) females. All the participants' age ranged from 18 to 21 years old, whereby 46 (17.29%) were 18 years old, 102 (38.35%) were 19 years old, 86 (32.33%) were 20 years old, and 32 (12.03%) were 21 years old.

2.3. Measures

2.3.1. Dark Triad Personality

Dark Triad Personality was measure with the Dirty Dozen scale by Jonason and Webster [39] which is created to measure Machiavellianism, psychopathy, and narcissism. This scale consists of 12 items measured on a seven-point Likert scale (1 = "Strongly disagree", 2 = "Disagree", 3 = "Slightly disagree", 4 = "Neither agree or disagree", 5 = "Slightly agree", 6 = "Agree", 7 = "Strongly agree"). There are four items measuring each subscale. Scores for each subscale are calculated by adding up all the responses on the participant in the subscales. A higher score in a particular subscale represents the individual has more of the particular trait. There is no composite score for the dark triad of personality from this subscale. The result from this scale should not be measured on a clinical level, but rather a sub-clinical level in this study. As for the reliability, the Machiavellianism subscale has a Cronbach alpha of .810, psychopathy subscale has a Cronbach alpha of .830, narcissism subscale has a Cronbach alpha of .890, and the Dirty Dozen scale has a Cronbach alpha of .887.

2.3.2. Antisocial Behaviour

Antisocial Behaviour was measured using The Subtypes of Antisocial Behaviour Scale by Burt and Donnellan [40]. This scale is built upon three subtypes of antisocial behaviour (rule breaking, social aggression, and physical aggression). This scale consists of 32 items measured on a five-point Likert scale (1 = "never", 2 = "hardly ever", 3 = "sometimes", 4 = "frequently", 5 = "nearly all the time"). Eleven of the items is used to measure rule breaking, 11 items used to measure social aggression, and 10 items is used to measure physical aggression. Although this scale can provide individual score on each dimension by summing up all the responses from the same dimension, a composite score for antisocial behaviour which will be used for the purpose of this study can be achieved by summing up the responses of all the items. A higher total score represents a higher level of antisocial behaviour. The Cronbach alpha for the Subtypes of Antisocial Behaviour scale in the present study is .951

2.3.3. Cyber-Aggression

The different forms of cyber-aggression were measured using the Cyber-aggression Typology Questionnaire, which was developed by Runions, Bak, and Shaw [31] to impulsive-appetitive cyber-aggression, impulsive-aversive cyber-aggression, controlled-appetitive cyber-aggression, and controlled-aversive cyber-aggression. This questionnaire is based on Howard's (2011) model of Quadripartite Violence Typology. This questionnaire consists of 29 items measured across a four-point Likert scale (1 = "Very Unlike Me", 2 = "Somewhat Unlike Me", 3 = "Somewhat Like Me", 4 = "Very Like Me"). Twelve items were used to measure the impulsive-aversive cyber-aggression subscale, six items were used to measure the controlled-aversive cyber-aggression

subscale, six items were used to measure the controlled-appetitive cyber-aggression subscale, and 5 items were used to measure the impulsive-appetitive cyber-aggression subscale. To get a total score for each subscale, sum up all the responses of the item from each scale. A higher score in a subscale signifies a higher attribution an individual has towards that form of cyber-aggression. This scale does not provide a composite score for cyber-aggression. As for the reliability, the Cronbach alpha for the Impulsive-Appetitive subscale is .831, the Cronbach alpha for the Controlled-Appetitive subscale is .883, the Cronbach Alpha for the controlled aversive subscale is .878, the Cronbach alpha for the Impulsive-Aversive subscale is .926, and the Cronbach alpha for the Cyber-Aggression Typology Questionnaire is .956.

2.4. Procedure

The faculty offices of universities from Wilayah Persekutuan Kuala Lumpur, Perak, Johor, and Kelantan, were first contacted to seek permission to send the questionnaires to the participants through their student emails. The questionnaires were then distributed to the participants through their student emails. The participants were then briefed about the purpose of this study through the informed consent form provided at the beginning of the questionnaires. The participants were then given a chance to clarify any confusion by contacting the researcher through the provided email or phone number. The participants were required to answer all the questions after signing the informed consent form.

3. Data Analysis

Statistical Package for the Social Sciences (SPSS) version 23, together with analysis of moment structure (AMOS), an added SPSS module was used to conduct mediation analysis through structural equation modeling (SEM) for the present study.

3.1. Confirmatory Factor Analysis

Before testing the hypothesis with structural equation modelling, a confirmatory factor analysis (CFA) is conducted. The first CFA model tested (refer to Figure 2) has shown that several items have low factor loadings. As a rule of thumb, items with factor loadings lower than 0.5 should be removed [41]. To start with, the item with the lowest factor loading would be deleted. Therefore, Q13_13, the thirteenth item of the Subtypes of Antisocial Behaviour Scale, with a factor loading of 0.382, has been deleted. The analysis is run again and the item with the lowest factor loading is continually deleted one at a time until all items show a factor loading of at least 0.5. In total, 6 items from the Subtypes of Antisocial Behaviour Scale were removed due to low factor loadings.



Figure 2: First CFA Model

Note: N=266. M = Machiavellianism. P = Psychopathy. N = Narcissism. ATSC = Antisocial Behaviour. IAVE = Impulsive-aversive Cyber-Aggression. CAVE = Controlled-aversive Cyber-aggression. CAPP = Controlled-appetitive Cyber-Aggression. IAPP = Impulsive-appetitive Cyber-Aggression

The next step is to strive for a good model fit by referring to model fit indexes. In order to improve the model fit, reference to Modification Indices (M.I) have been made. The modification based on the M.I with the highest score will be conducted if it is a viable option such as drawing covariation between two items within the same construct. The covariance drawn based on M.I are as shown in the second CFA model (refer to Figure 3). After making modifications, Figure 3 shows the model with good model fit. Cmin/df value is 2.123 which is lower than 3.0 which represents a good fit [42]. RMSEA is 0.065 and SRMR is 0.064 whereby both are below 0.08, hence is a good fit [43]. The value of CFI is 0.816. While the common guideline for CFI should be above 0.9 for a good fit, it has been stated that a CFI value of 0.8 < CFI < 0.9 is an acceptable fit as well [42].



Figure 3: Second CFA Model

Note: N=266. M = Machiavellianism. P = Psychopathy. N = Narcissism. ATSC = Antisocial Behaviour. IAVE = Impulsive-aversive Cyber-Aggression. CAVE = Controlled-aversive Cyber-aggression. CAPP = Controlled-appetitive Cyber-Aggression. IAPP = Impulsive-appetitive Cyber-Aggression

After making sure that model fit was achieved, the reliability and validity test of the model is conducted with the master validity plugin for AMOS 24. Results of the first validity analysis shows that all factors have reached the composite reliability threshold of >0.8 [44]. According to Table 1, the composite reliability (CR) value of all factors ranges from 0.806 to 0.958. Referring to Table 2, results of heterotrait-monotrait ratio of correlations (HTMT) analysis also showed that discriminant validity is met as no value exceeds the threshold of 0.9 [45]. However, the average variance extracted (AVE) value for Antisocial Behaviour and Controlled-Appetitive Cyber-Aggression is lower than the threshold of 0.5 [46] hence convergent validity for these two factors is not met. To solve this issue, the item with the lowest factor loading was removed and the reliability and validity analysis was conducted again. Two items with the lowest factor loading from the Subtypes of Antisocial Behaviour scale and one item with the lowest factor loading from the impulsive-appetitive cyber-aggression subscale were removed.

Factor		Composite Reliability (CR)	Average Variance Extracted (AVE)
Machiavellianism		0.806	0.511
Psychopathy		0.812	0.521
Narcissism		0.891	0.672
Antisocial Behaviour		0.958	0.482
Impulsive-aversive	Cyber-	0.028	0.501
Aggression		0.928	0.521
Controlled-aversive	Cyber-	0 979	0.546
Aggression		0.878	0.546
Controlled-appetitive	Cyber-	0.894	0.500
Aggression		0.884	0.360
Impulsive-appetitive	Cyber-	0.821	0.407
Aggression		0.831	0.497

Table 1: Composite Reliability and Average Variance Extracted 1

Table 2:	HTMT	Analysis	1
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	М	Р	Ν	ATSC	IAVE	CAVE	CAPP	IAPP
М	-							
Р	0.646	-						
Ν	0.603	0.466	-					
ATSC	0.413	0.576	0.340	-				
IAVE	0.336	0.407	0.385	0.663	-			
CAVE	0.463	0.406	0.435	0.638	0.880	-		
CAPP	0.500	0.570	0.367	0.746	0.736	0.785	-	
IAPP	0.452	0.530	0.443	0.688	0.638	0.626	0.835	-

Note: N=266. M = Machiavellianism. P = Psychopathy. N = Narcissism. ATSC = Antisocial Behaviour. IAVE = Impulsive-aversive Cyber-Aggression. CAVE = Controlled-aversive Cyber-aggression. CAPP = Controlled-appetitive Cyber-Aggression. IAPP = Impulsive-appetitive Cyber-Aggression

According to Table 3, the final reliability and validity analysis shows that all factors have reached composite reliability with a CR of >0.6 [44] and the values ranges from 0.806 to 0.957. The AVE for all factors ranges from 0.503 to 0.672 which exceeds the threshold of 0.5, hence convergent validity is met [46]. Table 4 also shows that discriminant validity is met as HTMT analysis shows that no value exceeds 0.9 [45].

Factor		Composite Reliability (CR)	Average Variance Extracted (AVE)
Machiavellianism		0.806	0.511
Psychopathy		0.811	0.520
Narcissism		0.891	0.672
Antisocial Behaviour		0.957	0.508
Impulsive-aversive	Cyber-	0.029	0.521
Aggression		0.928	0.521
Controlled-aversive	Cyber-	0 070	0.545
Aggression		0.878	0.545
Controlled-appetitive	Cyber-	0.994	0.560
Aggression		0.884	0.560
Impulsive-appetitive	Cyber-	0.801	0.502
Aggression		0.001	0.505

Table 3: Composite Reliability and Average Variance Extracted 2

Table 4: HTMT Analysis 2

	М	Р	Ν	ATSC	IAVE	CAVE	CAPP	IAPP
М	-							
Р	0.646	-						
Ν	0.603	0.466	-					
ATSC	0.394	0.579	0.328	-				
IAVE	0.336	0.407	0.385	0.652	-			
CAVE	0.463	0.406	0.435	0.625	0.880	-		
CAPP	0.500	0.570	0.367	0.745	0.736	0.785	-	
IAPP	0.465	0.549	0.446	0.723	0.664	0.633	0.857	-

Note: N=266. M = Machiavellianism. P = Psychopathy. N = Narcissism. ATSC = Antisocial Behaviour. IAVE = Impulsive-aversive Cyber-Aggression. CAVE = Controlled-aversive Cyber-aggression. CAPP = Controlled-appetitive Cyber-Aggression. IAPP = Impulsive-appetitive Cyber-Aggression

The test of model of fit was conducted again to ensure that the model still retains a good fit. The final model (refer to Figure 4) showed that the model has achieved a good model fit (cmin/df= 2.106, RMSEA=0.065, SRMR=0.063, CFI=0.831).



Figure 4: Final CFA Model

Note: N=266. M = Machiavellianism. P = Psychopathy. N = Narcissism. ATSC = Antisocial Behaviour. IAVE = Impulsive-aversive Cyber-Aggression. CAVE = Controlled-aversive Cyber-aggression. CAPP = Controlled-appetitive Cyber-Aggression. IAPP = Impulsive-appetitive Cyber-Aggression

3.2. Structural Equation Modeling

After achieving a good model fit, SEM was conducted to achieve the research objectives. After getting a good model fit, reliability and validity during Confirmatory Factor Analysis, the hypothesis will be tested using Structural Equation Modeling. To build the structural model used for structural equation modelling, data imputation using the regression imputation function in Amos 24 was conducted on the tested measurement model [47,48]. This will create composites of the factors based on the factor scores in the measurement model. Figure 5 shows the imputed model which was used to conduct Structural Equation Modelling to test the hypothesis.



Figure 5: SEM Model 1

Note: N=266. M = Machiavellianism. P = Psychopathy. N = Narcissism. ATSC = Antisocial Behaviour. IAVE = Impulsive-aversive Cyber-Aggression. CAVE = Controlled-aversive Cyber-aggression. CAPP = Controlled-appetitive Cyber-Aggression. IAPP = Impulsive-appetitive Cyber-Aggression

To conduct SEM, several assumptions were checked. The assumption of linearity was met as all the relationships between all the variables have a significant linear relationship. Next, collinearity amongst all the predictor variables were checked and the VIF values were less than 3 which indicates that there is no collinearity amongst the variables. The assumption of multivariate normality was then tested. According to Bentler [49], a multivariate kurtosis value of >5 may indicate multivariate non-normality. The multivariate kurtosis in the tested model is 62.037 which does not meet the requirement of multivariate normality. However, it has been stated that in fields such as social sciences, data in real world practices will seldom adhere to a normal distribution [50-52]. It has also been advocated that multivariate non-normality within a data would not affect the application of the model in practice [52]. However, the present study will attempt to minimize the impact of multivariate normality. Therefore, bootstrapping will be conducted during the analysis process to overcome the issue of non-multivariate normality. 5000 bootstraps samples will be generated with 95% bias corrected confidence level [54].

After checking for the assumptions, the model fit is tested. The model fit for the first model is poor. Model fit indexes such as RMSEA, SRMR, and CFI have not reached the required threshold for an indicator of good model fit as shown in Table 5. Hence, modifications have been made based on the M.I by drawing covariance between error terms as shown in Figure 6. After modification, CMIN and RMSEA have still not reached an indication of good model fit. Chi-square indication of absolute fit is often difficult to achieve as it is extremely sensitive to sample size, hence in these situations, researchers often turn to other fit indexes to certain model fit. Sharif and Nia [55] have suggested that Chi-square, with its df and p value, together with RMSEA should be reported even though it is insignificant if there are at least three incremental fit indexes which exceeds 0.9 and

an SRMR value is below 0.08. According to Table 5, the modified structural model has three incremental fit indexes which suggest goodness of fit, Comparative Fit Index (CFI) = .957, Normed Fit Index (NFI) = .956, and Incremental Fit Index (IFI) = .957. The SRMR value in the modified model also has an SRMR value of 0.054. These indexes suggest a good model fit in accordance with Sharif and Nia [55]. According to Hooper, Coughlan, and Mullen [56], a GFI value of >.90 can be considered as a good model fit. The GFI index was initially developed to address the issues of Chi-square index and is independent of sample size. Based on these indexes, the structural model has achieved a good model fit. After the model is ascertained to have a good fit, the result of the analysis is presented.

Table 5: Summary of Model Fit Indexes (SEM)

Model	Modification	CMIN	df	р	RMSEA	SRMR	GFI	CFI	NFI	IFI
SEM1	-	968.569	6	<.001	.778	.109	.617	.611	.613	.614
SEM2	Based on M.I	110.051	3	<.001	.367	.054	.914	.957	.956	.957



Figure 6: Modified Structural Model

4. Results

To test for mediation, the total effect between the independent variable and dependent variable was first tested. Hence, the study will first test if there is a significant total effect between the two variables. Table 6 shows results of the variables with total effect significance based on the bias-corrected (BC) percentile method. If the total effect is insignificant, no mediation can occur as there were no significant effect to mediate [57]. H_1 , H_4 , H_7 , H_9 , and H_{10} have no significant total effect, hence were rejected. Meanwhile, H_2 , H_3 , H_5 , H_6 , H_8 , H_{11} , and H_{12} have a significant total effect, therefore, these hypotheses were tested for indirect and direct effect to test for mediation. If a significant indirect effect is present without a significant direct effect, full mediation was said to have occurred. However, if both significant indirect effect and significant direct effect are present, a partial mediation effect was said to have occurred.

Hypothesis	Significance (Standardized	Decision
H ₁ : Antisocial behaviour mediates the relationship between Machiavellianism and impulsive-appetitive cyber-aggression.	.525 (Standardized Total Effect = .066)	Standardized total effect is insignificant. H_1 is rejected
H ₂ : Antisocial behaviour mediates the relationship between psychopathy and impulsive-appetitive cyber-aggression.	<.001* (Standardized Total Effect = .474)	Standardized total effect is significant.
H ₃ : Antisocial behaviour mediates the relationship between narcissism and impulsive-appetitive cyberaggression.	.004* (Standardized Total Effect = .189)	Standardized total effect is significant.
H ₄ : Antisocial behaviour mediates the relationship between Machiavellianism and impulsive-aversive cyber-aggression.	.172 (Standardized Total Effect =138)	Standardized total effect is insignificant. H_4 is rejected
H ₅ : Antisocial behaviour mediates the relationship between psychopathy and impulsive-aversive cyberaggression.	<.001* (Standardized Total Effect = .463)	Standardized total effect is significant.
H ₆ : Antisocial behaviour mediates the relationship between narcissism and impulsive-aversive cyberaggression.	<.001* (Standardized Total Effect = .264)	Standardized total effect is significant.
H ₇ : Antisocial behaviour mediates the relationship between Machiavellianism and controlled-appetitive cyber-aggression.	.181 (Standardized Total Effect = .150)	Standardized total effect is insignificant. H ₇ is rejected
H ₈ : Antisocial behaviour mediates the relationship between psychopathy and controlled-appetitive cyber-aggression.	<.001* (Standardized Total Effect = .532)	Standardized total effect is significant.
H_{9} : Antisocial behaviour mediates the relationship between narcissism and controlled-appetitive cyber- aggression.	.699 (Standardized Total Effect = .023)	Standardized total effect is insignificant. H ₉ is rejected
H_{10} : Antisocial behaviour mediates the relationship between Machiavellianism and controlled-aversive cyber-aggression.	.051 (Standardized Total Effect = .203)	Standardized total effect is insignificant. H_{10} is rejected
H_{11} : Antisocial behaviour mediates the relationship between psychopathy and controlled-aversive cyberaggression.	.020* (Standardized Total Effect = .247)	Standardized total effect is significant.
H_{12} : Antisocial behaviour mediates the relationship between narcissism and controlled-aversive cyber- aggression.	.004* (Standardized Total Effect = .229)	Standardized total effect is significant.

Table 6:	Total Effects -	 Two Tailed 	1 Significance	(BC)

Hypothesis		Significance	Significance	Decision
	(Standa		Standardized (Standardized	
		Indirect Effect)	Direct Effect)	
H ₂ : Antisocial behaviour mediates th	ne	<.001*	.506 (Standardized	Full mediation
relationship between psychopathy an	nd	(Standardized	Direct Effect = -	has occurred.
impulsive-appetitive cyber-aggression.		Indirect Effect	.049)	Failed to reject
		= .524)		H _{2.}
H ₃ : Antisocial behaviour mediates th	ne	.064 (Standardized	.021*	No mediation
relationship between narcissism an	nd	Indirect Effect	(Standardized	effect. H ₃ is
impulsive-appetitive cyber-aggression.		= .064)	Direct Effect	rejected.
			= .126)	
H ₅ : Antisocial behaviour mediates th	ne	<.001*	.797 (Standardized	Full mediation
relationship between psychopathy an	nd	(Standardized	Direct Effect = -	has occurred.
impulsive-aversive cyber-aggression.		Indirect Effect	.026)	Failed to reject
		= .489)		H _{5.}
H ₆ : Antisocial behaviour mediates th	ne	.065 (Standardized	.001*	No mediation
relationship between narcissism an	nd	Indirect Effect	(Standardized	effect. H ₆ is
impulsive-aversive cyber-aggression.		= .059)	Direct Effect	rejected.
			= .205)	
H ₈ : Antisocial behaviour mediates th	ne	<.001*	.788 (Standardized	Full mediation
relationship between psychopathy an	nd	(Standardized	Direct Effect = -	has occurred.
controlled-appetitive cyber-aggression.		Indirect Effect	.020)	Failed to reject
		= .552)		H _{8.}
H ₁₁ : Antisocial behaviour mediates th	ne	<.001*	.002*	Partial
relationship between psychopathy an	nd	(Standardized	(Standardized	mediation has
controlled-aversive cyber-aggression.		Indirect Effect	Direct Effect = -	occurred. Failed
		= .519)	.273)	to reject H _{11.}
H ₁₂ : Antisocial behaviour mediates th	ne	.066 (Standardized	.015*	No mediation
relationship between narcissism an	nd	Indirect Effect	(Standardized	effect. H_{12} is
controlled-aversive cyber-aggression.		= .063)	Direct Effect	rejected.
			= .166)	

Table 7: Indirect and Direct Effects -Two Tailed Significance (BC)

Based on Table 7, it has been found that H3, H6 and H12 have no mediation effect as there were no statistically significant indirect effect. Hence, these hypotheses were rejected. Meanwhile, H2, H5, H8, H11, has failed to be rejected as it has been discovered that mediation has occurred amongst the variable. It has been found that antisocial behaviour fully mediates the relationship between psychopathy and impulsive-appetitive cyber-aggression, impulsive-aversive cyber-aggression, and controlled-appetitive cyber-aggression. The present study

also found that antisocial behaviour partially mediates the relationship between psychopathy and controlledaversive cyber-aggression.

5. Discussion

The present study has found that there was no mediating effect of antisocial behaviour on the relationship between Machiavellianism and all forms of cyber-aggression. The lack of relationship between Machiavellianism and the impulsive forms of cyber-aggression are expected. Multiple studies in the past have shown that Machiavellians have been shown to have low impulsive traits [58,59]. This implies that individuals with high levels of Machiavellianism are too cautious to act aggressively without any forethoughts. Instead, individuals with high levels of Machiavellianism may prefer to use their intelligence to plan out a way to express their expressive tendencies. This is inline with previous study which highlights that Machiavellians would usually prefer the instrumental approach to aggression [35]. Therefore, the present study found that there is a direct relationship between Machiavellianism and controlled-appetitive cyber-aggression without needing a mediator. This shows that individuals with high levels of Machiavellianism will prefer to engage in this form of aggression through the internet as they have more control over their actions which are in line with their characteristics. They are also able to manage the image they show others online while having the option to remain anonymous when needed to avoid damaging their reputation. These factors work together to encourage individuals with high levels of Machiavellianism to engage in controlled-appetitive cyber-aggression by default without needing a mediator such as antisocial behaviour as these behaviours would damage the reputation that Machiavellians highly value which would be counterproductive to their goals. However, the present study has found that individuals with high levels of Machiavellianism have no statistically sufficient relationship with controlled-aversive cyber-aggression which is marked by a desire to take revenge. Previous studies on these results have been mixed as Nathanson, Paulhus, and Williams [60] who states that Machiavellians would not be interested in taking revenge while Giammarco and Vernon [61] found that Machiavellians are able to use their emotional intelligence to effectively carry out revenge. Considering the findings of the present study and studies conducted in the past, it can be reasoned that individuals with high levels of Machiavellianism would not engage in revenge actions if doing said action does not benefit the individual in any way such as increasing their social standing and power.

The present study has found that antisocial behaviour has fully mediated the relationship between psychopathy and impulsive appetitive cyber-aggression as well as the relationship between psychopathy and impulsiveaversive cyber-aggression. This is consistent with previous study which highlights that individuals with high levels of psychopathy are often strongly linked with a trait of impulsivity [59]. Meanwhile, past reports show that impulsivity has been found to be related with aggression [62]. However, an interesting finding in this study is that there is no statistically significant direct relationship between psychopathy and impulsive appetitive cyber-aggression and impulsive aversive cyber-aggression. Psychopathy is only able to significantly predict these two forms of cyber-aggression under the mediation effect of antisocial behaviour. The present study posits that as the demographic of the present study were undergraduate students, not every individual who has high levels of psychopathy has exhibit negative characteristics. It is after these negative characteristics have manifested through antisocial behaviour acts that the individual will eventually participate in aggressive acts. Another possible explanation for the present study by looking at past research is that individuals who scored highly on psychopathy traits have been characterized by a trait of sensation seeking [63]. Physical acts of aggression such as fighting and physical confrontation would lead to a high level of immediate sensation which they could feel, such as physical pain and increased heart rate, which is more attractive to individuals with high levels of psychopathy trait. Therefore, it is possible that individuals with high levels of psychopathy gain interest in more sensation evoking experience after being exposed to antisocial behaviour which leads them to engage in cyber-aggression in their journey to seek out new and exciting experiences.

The present study has also found that antisocial behaviour fully mediates the relationship between psychopathy and controlled-appetitive cyber-aggression as well as partially mediates the relationship between psychopathy and controlled-aversive cyber-aggression. This is unexpected as previous studies have shown that individuals with high levels of psychopathy are usually highly impulsive and a lack of self-control [12] which heavily contrast it against the findings of the precent study which shows that individuals with high levels of psychopathy are related to controlled cyber-aggressions. However, this could be explained when we look at the direct relationship of psychopathy and the controlled forms of cyber-aggression without the effects of a mediator. It has been found that psychopathy has a statistically significant negative direct relationship with controlledaversive cyber-aggression. Even though it is not statistically significant, psychopathy also has a negative direct effect to control appetitive cyber-aggression. These findings show that results in the present study are in line with the previous study [12] which shows that psychopathy would normally have an inverse relationship with controlled aggression. The difference between the current study and previous studies is that the present study has studied the influence of psychopathy on cyber-aggression under the influence of antisocial behaviour as a mediator. This could mean that antisocial behaviour has increased the likelihood of individuals with high levels of psychopathy participating in more controlled forms of cyber-aggression. This could be due to individuals who were partaking in antisocial behaviour having gained a lot of immediate gratification which they seek dearly from acts such as physical aggression. Therefore, as they seek for more stimulating experiences in the form of cyber-aggression, they can have better control of their impulses which have been taken care of by antisocial behaviours.

Results showed that there is no mediation effect of antisocial behaviour on the relationship between narcissism and impulsive-appetitive cyber-aggression. However, the results also showed a statistically significant direct relationship between narcissism and impulsive-appetitive cyber-aggression. This is in line with and explained by previous study that narcissists have been strongly associated with a trait of impulsivity [64]. Therefore, individuals with high levels of narcissism who lack the necessary self-control to manage their aggressive impulses might naturally be drawn to this form of cyber-aggression without needing a mediator to direct them. As narcissists seek to better their social standing, impulsive-appetitive cyber-aggression is a natural tendency for them while they use technological means to impulsively improve their image through aggression towards others online. The present study has also found that antisocial behaviour has no mediating effects on the relationship between narcissism and impulsive-aversive cyber-aggression. This could be a result of narcissists trying to defend their ego from threats. This has been supported by previous study which found that narcissists are likely to engage in aggression when they feel that their ego is threatened, and the aggression is usually directed towards the source of ego threats [65]. This shows in addition to wanting to improve their social standing, narcissists might also react aggressively online to defend their ego which is the utmost important to them. Either for appetitive reasons or for aversive reasons, individuals with high levels of narcissism would only conduct aggressive acts impulsively and not in a controlled manner. This shows that narcissists' behaviours are directed by their emotions and aimed at the self which is consistent with their personality traits.

6. Conclusion

The findings of the present study have shed light on the mediating role antisocial behaviour plays on the relationship between the Dark Triad personality and cyber-aggression. The present study has also identified antisocial behaviour as a significant mediator to the relationship between psychopathy and all forms of cyberaggression. This means that antisocial behaviour is a potential gateway for individuals with high levels of psychopathy to engage in cyber-aggression. Mental health professionals can focus on antisocial behaviour when formulating prevention plans, strategies, or modules aimed at reducing cyber-aggression. In addition, the results of the present study could also have contributions to the community in Malaysia, especially towards the university students' populations. This study can help increase the community's understanding that despite the seemingly dark description of the personalities of Machiavellianism, psychopathy, and narcissism, they do not necessarily represent that the individual is evil. Studies like this helps the community to understand that these personality traits can manifests itself in various day to day interaction without breaking of rules or laws as evident by the results of the study which shows that there is no significant relationship between narcissism and antisocial behaviour. The results of the study have also shown that not everyone with high levels of Machiavellianism or psychopathy will have a high tendency to directly engage in cyber-aggressive acts. They are more likely to manifest aggressive tendencies through their participation in antisocial behaviour as shown by the mediation results. This can enlighten the community about their understanding of these 'dark' personalities and hopefully reduce any negative biases they might have towards individuals who exhibit high levels of these personality tendencies and create a more accepting and understanding community.

However, there are several limitations worth mentioning in the present study. First, the study only uses a single form of data collection. While the use of self-reported questionnaires will allow the researcher to collect larger amounts of data within a shorter period, it only measures the tested variables using the items within the questionnaires. It allows little opportunity for the researcher to get a better understanding of the relationship between the variables and how they interact with each other beyond the scope of statistical analysis. There could also be factors which are critical to measuring the variables tested which are not represented in the questionnaire used. To overcome this issue, future studies could attempt to incorporate an interview with the participants and utilize a mixed method research design to potentially uncover any other common factor which represents the variables in the present study. Next there is also the possibility of the influence of other extraneous variables in the present study by opting to collect the required data through an online platform. While this method allows for fast collection of responses from a wider geographical area of targeted respondents, it introduces several issues as well. One of which is the inability of the researcher in controlling the environment the respondents answer the questionnaire in, as well as the inability to identify the state of the respondents as they were answering the questionnaire. Therefore, the participants may have just experienced an event, or in a

particular state of mood or mind which may influence and change how they would respond to the items within the questionnaire. The participants could have just experienced a joyous event which influenced the response they would give in related to questions with negative themes and deviated from how they would normally respond most of the time. Future studies could also be conducted in a more controlled environment to limit the effects of extraneous variables such as by interviewing the participants beforehand to know more about their current state and giving them a period to adjust their state of mood.

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