

WHAT IS THE MISSING? COGNITIVE DISTORTIONS AND ADOLESCENT CYBER DELINQUENCY BEHAVIOUR: PLS-SEM ANALYSIS

FAHAD NEDA ALENEZI^{1*}, SHAHABUDDIN BIN HASHIM², JAMALSAFRI BIN SAIBON³,
MASHAIL ALANEZY⁴

¹Ministry of Education, Riyadh, Saudi Arabia

^{2,3}School of Educational Studies, Universiti Sains Malaysia, Penang, Malaysia

⁴School of Social Sciences, Universiti Sains Malaysia, Penang, Malaysia

E-mail: ¹fahad.k.s.a@hotmail.com; ²shah@usm.my; ³jamalsafri@usm.my; ⁴mashail.s@student.usm.my

ABSTRACT

Cyber delinquency among school adolescents has become a significant concern associated with negative classroom social climates. However, understanding the cognitive distortions contributing to their involvement in electronic delinquency remains limited. While previous research has linked cognitive distortions to anti-social behaviour, such as delinquency, few studies have explicitly examined this association in the context of cyber delinquency among school-delinquent adolescents. Drawing on Beck's cognitive theory, this study aims to fill this gap by investigating the relationships between specific self-serving cognitive distortions (blaming others, self-centeredness, minimising/mislabeling, assuming the worst) and cyber delinquency behaviour. The measurement of cyber delinquency includes three dimensions: cyberbullying, harassment, and impersonation. The How I Think Questionnaire (HIT) is used to assess cognitive distortions. The data was collected from 386 adolescent delinquents aged 18, in grade 12, from secondary schools in Saudi Arabia. The study utilises PLS-SEM as an advanced statistical approach to test the hypotheses. The model demonstrated a proper fit and revealed significant positive relationships between self-centeredness, blaming others, assuming the worst, and cyber delinquency behaviours. These findings contribute to enhancing the understanding of the underlying mechanisms that drive engagement in cyber delinquency among school adolescents. By investigating specific cognitive distortions, this research sheds light on adolescents' inclination to disengage and provides insights into the occurrence of delinquency behaviours in the online environment.

Keywords: *Cyber delinquency, Cognitive distortions, Adolescent, delinquent, Secondary Schools, Saudi Arabia.*

1. INTRODUCTION

Internet resources and information and communication technology (ICT) devices have become essential to all adolescents' lives and experiences [1]. Effective use of Internet resources can lead to many positive opportunities, such as effective communication with peers, obtaining more information, and using online learning platforms [2], [3]. Ideally, the Internet is expected to improve adolescents' academic performance [4]. However, the Internet can also be used for electronic negativity [5], online harassment, bullying, and texting [6]. Spending by teens using online activity with positive or negative outcomes is a growing concern for many academics [2], [7]. Cyber delinquency is described as acts of delinquency in cyberspace conducted by adolescents [8]. It is a form of conventional deviant behaviour carried out by computer or the Internet and operates in an understandable name over the

format it contains [8]. Adolescents' time spent on online engagements unassociated with learning might benefit them but is harmful to others because cyber delinquency is a crime against academic achievement and school participation and attendance [9]–[11].

Cyber delinquency is a global issue as a survey report showed that 37.8% of adolescents had used the Internet to cyber delinquent [12]. Various reports displayed consistent results of the prevalence of cyber delinquency among adolescents, around 20–40%. The research involving 4662 Korean adolescents by KCC & NIA 2019 showed that 20% of the respondents reported being involved in cyber violence. Marret and Choo (2017)[13] reported that 52% of students from public secondary schools had experienced online victimisation, and about 30% were engaging in some form of perpetration online. Anecdotal evidence in Saudi Arabia suggested that

3.6 million people have fallen victim to cybercrime in recent years [9]. These statistics might be under-reported, and the actual figures might be higher. It was found that 75% of cyberbullying occurs via social media.

Previous studies have investigated the antecedents of cyber delinquency through different theoretical perspectives, such as social bonding theory [8], general strain theory [14], social control theory [10], Akers's social learning theory [15], and Gottfredson theory [3]. However, several scholars [3], [14] have highlighted that research on cyber delinquency is still in its infancy stage, which warrants more research to examine its potential antecedents. Meanwhile, the results obtained by the literature review suggest that previous studies on cognitive distortions are fragmented. For example, some provided evidence for a link between cognitive distortions and aggressive behaviours among isolated adolescents [16], [17]. In support of this view, empirical findings have also demonstrated that physical, hostility and violent delinquency display unique cognitive distortions related to offending behaviour [18], [19]. Furthermore, several studies have reported different results on the importance of cognitive distortions in influencing the general forms of delinquent behaviours [19], [20].

This study aims to understand cyber delinquency from the theoretical viewpoint of Beck's cognitive theory (BCT), focusing on the influence of cognitive distortions on cyber delinquency because the theory posits the relationship between cognitive distortions and externalising problems [21].

2. LITERATURE REVIEW

2.1 Beck's Cognitive Theory and Gibbs' (1993) typology of cognitive distortions

[22] describes negative thoughts and errors of reasoning in adults that cause depression but have since been applied to many other mental health and externalising problems. The basic principle of the theory assumes that perception leads to feelings, and the other is that individuals' subjective beliefs about depression are distorted. Beck believes that people with depression have negative views of themselves and their future and that these negative views are the natural causes of their depression. Beck found that their psychological difficulties were automatic thoughts, dysfunctional assumptions, and negative self-statement. Automatic thoughts often precede feelings but occur very quickly with little awareness. Hence, individuals do not value it very much. For example, depressed people address themselves

critically, blaming themselves for everything that happens [23].

BCT theory offers another possible explanation to link cognitive distortions and cyber delinquency, which has not been previously investigated. BCT theory describes cognitive distortions, which assume that everything teens think and say to themselves and their attitudes and ideas are fundamental to their negative or positive behaviour [24]. Cognitive distortions are often seen as errors in thinking that arise from individual perseverance during adolescence leading to the development of psychological tendencies, including internal behaviour problems such as depression, as well as external behaviour problems such as deviance [20], [21], [25]. As a result, cognitive distortions allow individuals to justify their behaviours before, during, and after a crime commission [26]. This argument is consistent with Owens et al. (2014) and Koolen et al. (2012), who found that cognitive distortions protect the individual from developing a negative concept of self and blaming himself/herself, which leads to anti-social behaviour, such as aggression. Consequently, adolescents who have self-centred and blame others attempt to protect their self-image by engaging in cyber delinquency.

Gibbs (1993) lists four cognitive distortions in individuals' thinking processes with anti-social behaviour [28]. According to Gibbs (1993), young offenders' social cognitive distortions are inaccurate and meant to neutralise or rationalise attitudes or beliefs concerning themselves and others. The four typologies of cognitive distortions fall into two categories: primary cognitive distortions, such as self-centred feelings and secondary cognitive distortions, such as blaming others, minimising/mislabeling, and assuming the worst [29]–[31]. To evaluate self-serving cognitive distortions, the How I Think Questionnaire was developed based on the four categories of cognitive distortions, namely, assuming the worst, self-centred, blaming others, and minimising/mislabeling [28]. This study may extend the theoretical work of Barriga et al. (2001) to a more representative sample of delinquent adolescents in high secondary schools. Table 1 presents descriptions of Gibbs et al. (1995) four categories of self-serving cognitive distortions [29].

Table 1 A classification of four categories of self-serving cognitive distortions

Self-centred	Has immediate views, feelings, and desires.
Blaming others	Misattributes blame to innocent others.

Minimising/ mislabeled	Underestimates responsibility or consequences of actions.
Assuming the worst	Assumes that the worst-case scenario is inevitable.

Wallinius et al. (2011) and Bacchini et al. (2015) found that cognitive distortions can predict individuals' tendencies toward deviant behaviours in adolescents and adults. In other words, individuals suffering from cognitive distortions cannot judge their actions, which in turn, issue an appropriate judgment of their behaviours, subsequently pushing them to engage in cyber delinquency. Predicated on BCT, we also argue that adolescents more committed to cyber delinquency are more likely to justify their actions by blaming others, being self-centred, minimising/mislabeled, and assuming the worst [18], [32].

2.2 Cyber Delinquency

Cyber delinquency behaviour refers to all types of delinquent acts committed by adolescents in cyberspace that conflict with the law [3], [8]. Cyber delinquency includes cyberbullying, hacking, false information, violent cyber-harassment, and illegal chatting software copying [3], [8], [9]. Wan (2012) termed it as offensive behaviour as every act harmful to others through the Internet. Wan (2012) classified cyber delinquency into three dimensions, i.e., cyberbullying, harassment, and hacking [33].

Unlike traditional offline delinquency, many teens prefer electronic delinquency to harm others or their property because it conceals identity and does not reveal it to others quickly, and thus they feel free to violate social norms, unlike the real world [8], [14]. Cyber delinquent allows adolescents to use the Internet without thinking about the implications their behaviours can have on victims [34], and most importantly, they do not realise the results of dealing with that environment [35]. Table 2 illustrates the typology of cyber delinquency behaviour.

Table 2 Typology of Cyber Delinquency Behaviour

Cyberbullying (Verbal and Exclusion)	Posts ill-motivated messages, creates fake accounts, to post images and videos online about a person.
Cyber Sexual Harassment	Posting sexual material (pictures or videos) on a digital platform is considered sexual violence.
Impersonation	Posts personally identifiable information, such as a name or credit card number, without permission.

2.3 Self-Centred and Cyber-Delinquent Behaviour

According to Gibbs et al. (1995), individuals who display high self-centeredness rarely consider or respect others' views. They are more likely to ignore

others' legitimate views and think only of themselves, thus allowing them to engage in anti-social behaviour. For instance, self-centred individuals are characterised by an egoistic bias that reflects further immature moral judgment stages stemming from self-centred attitudes, ideas, and beliefs [36], [37]. Furthermore, individuals with high self-centeredness are likelier to have less empathy, moral judgment, low self-esteem, proactive aggression, and external problems [28], [31]. That is, the relationship between self-centred and cyber delinquency could be congruent with BCT theory to advance that self-centred can take the form of justifying aggressive behaviours. As a result, this study could hypothesise that cyber delinquency can be derived from self-centeredness. In other words, adolescents with high self-centeredness may be tempted to show delinquent behaviour to justify their actions or misconstrue the consequences. Past studies discovered that self-centeredness positively impacts proactive aggression and crime delinquents [38], [39]. Thus, a hypothesis is suggested as follows:

H1. Self-centeredness has a significant positive influence on cyber delinquency behaviour.

2.4 Blaming Others and Cyber Delinquent Behaviour

According to BCT, individuals who suffer from blaming others are more likely to commit criminal or anti-social acts. In other words, adolescents whose level of blaming others can be involved in cyber delinquency is faultless, and their actions and attitudes are justified reactions. It has been found that individuals with higher levels of blame tend to show a higher level of deviance [18], aggressive behaviour [16], and bullying [20]. Moreover, Oostermeijer et al. (2017) found that adolescents with higher levels of blame for others were likely to display a tendency to be involved in aggressive behaviour. Hence, we argue that adolescents who show blaming others are more likely to engage in delinquent behaviours online to direct others' direct expression [17]. Therefore, a hypothesis is formulated below:

H2. Blaming others has a significant positive influence on cyber delinquency behaviour.

2.5 Minimising/Mislabeled and Cyber Delinquent Behaviour

Gibbs et al. (1995) reported that individuals with higher levels of minimising/mislabeled would probably downplay the responsibility or consequences of actions by belittling others [21]. When applying BCT, minimisation/mislabeled occurs when adolescents view their wrong actions or

even deviant behaviours as appropriate and, in some cases, even admirable [19]. Meanwhile, individuals with a high level of minimising/mislabeling are expected to have a high level of anti-social behaviour because they may underestimate their position to justify these actions [40]. An adolescent who has a high level of mislabeling mechanisms has a greater tendency to engage in external behaviours to be excluded from self-evaluation [41]. Likewise, this research could hypothesise that adolescents who are minimising/mislabeling others in daily life could also contribute to cyber delinquency to achieve specific goals and feel good about themselves. Hence, we assume:

H3. Minimising/mislabeling has a significant positive influence on cyber delinquency behaviour.

2.6 Assuming the Worst and Cyber Delinquent Behaviour

In line with BCT's principle, individuals who suffer from the worst assumption are likely to neutralise empathy or negative emotions [42]. This can lead to high bullying behaviours [43], reactive aggression (Koolen & Poorthuis, 2012), and anticipatory aggression [37]. That is an increase in assuming the worst, which continues to heighten proactive aggression levels [39] and likely leads to cyber delinquency involvement. In other words, an adolescent whose level of assuming the worst is high is more likely to engage in delinquent behaviour online as unavoidable or to perceive their behaviour as something that cannot be improved. These arguments lead to the following hypothesis:

H4. Assuming the worst has a significant positive influence on cyber delinquency behaviour. The research model is presented in Figure 1.

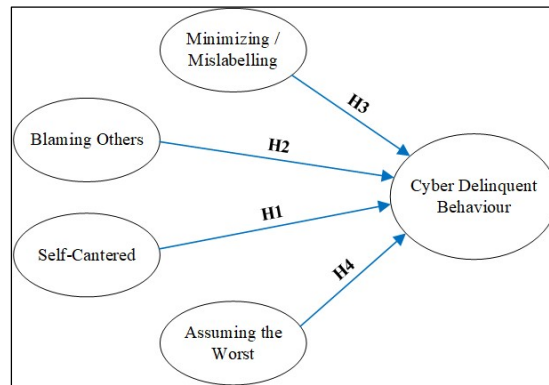


Figure 1 Hypothesised Model

3. METHOD

3.1 Sample and Procedure

The survey method was used to collect data to achieve the research objectives. This study's target population was adolescent secondary school students in Hafr Al-Batin in the Eastern province of Saudi Arabia. However, students must meet specific criteria to be eligible to be our participants. First, they must have had at least three months of experience with deviant behaviours on the Internet. We were only interested in those students who engaged in cyber delinquent behaviours in the past three months. The rationale behind choosing this group of students was that they are more likely to develop cyber aggression associated with excessive technology use [1]. Second, all participants must be enrolled in grade 12 of high school for both genders. This criterion is because students in grade 12 are more likely to engage in online deviant behaviours than those in another grade setting, thus producing a higher engagement in cyber delinquency behaviour.

Before distributing the questionnaires to the target population, the survey was pilot tested by two academic experts in psychology and cybercrime patterns to ensure the face validity of all the scales under study. Moreover, 31 questionnaires were pilot tested (16 male and 15 female students) in different schools to receive feedback from the respondents on the survey structure and wording. The pre-test sample results showed that all measures were reliable, as the Cronbach alpha values for all variables were greater than 0.7. A survey package was sent to 650 students in the twelfth grade in 42 secondary schools in Hafar Al-Batin in Saudi Arabia through personal contacts. However, we have explicitly stated that students must meet the abovementioned criteria to be our targets. Based on the purposive sample method, out of 650 questionnaires distributed to the target participants,

386 were returned. The respondents include 186 (48.19%) females and 200 (51.81%) males.

3.2 Measures

3.2.1 Cyber Delinquent Behaviour (CYBA)

In this study, adolescent cyber delinquency refers to adolescents' aggressive behaviour, mainly in cyberspace, to harm others or their property. The participants were asked to indicate the extent to which they typically engaged in cyber delinquency behaviours on 12 items adapted from Alvarez-Garcia et al. (2016) cyber-aggression questionnaire for adolescents (CYBA) scale. Based on the CYBA, the cyber delinquency scale encompassed three dimensions, which were (1) cyberbullying as verbal and exclusion (6 items), (2) cyber sexual harassment (3 items), and (3) impersonation (3 items). Using multi-dimension constructs was to ensure a comprehensive evaluation of cyber delinquency and simultaneously avoid the drawbacks of previous studies using a single-dimension measure [3], [8], [10], [14].

3.2.2 The How I Think Questionnaire (HIT)

This study used the How I Think Questionnaire (HIT-Q) scale developed by Barriga et al. (2001) to assess self-serving cognitive distortions level. Based on this scale, five items were used for each blaming others and assuming the worst, self-centeredness, and minimising/mislabeling levels of cognitive distortions. Blaming others is operationalised as adolescents blaming anti-social behaviour on external sources, especially another person or group. Self-centeredness refers to the adolescent's belief that his opinions and needs are essential to the extent that they do not consider others' opinions. Minimising/mislabeling refers to the adolescent's belief that anti-social behaviour causes no harm, while assuming the worst refers to the adolescent's attributing hostile intentions to others and the

expectation of worst-case scenarios. Finally, we asked respondents to provide their answers based on a 5-point Likert scale ranging from 1 - strongly disagree to 5 - strongly agree.

3.3 Data Analysis

This paper used PLS-SEM instead of other multivariate methods for several reasons that are: (1) it can be used with smaller samples, (2) the absence of distribution assumptions, (3) a high degree of statistical power method, and (4) it is very suitable for exploratory research. PLS-SEM path modelling was employed using Smart PLS 3.0 software to test the theoretical model using a two-step process to evaluate the results. We first evaluate the measurement model, followed by the structural model [44].

4. RESULTS

4.1 Measurement Model

Examining the measurement model includes indicator loading, internal consistency reliability, converging validity, and discriminative validity [44]. Table 3 validated convergent validity as the factor loadings had relatively high values of 0.7 and above. Items with a loading value ranging from 0.4 to 0.7 can be omitted if removing them from the model would lead to a significant improvement in composite reliability (CR) and average variance extracted values (AVE) value (Hair et al., 2019). CR values ranged between 0.923 and 0.957, with each exceeding an acceptable threshold of .70, indicating a reliable internal consistency of the measurements [44]. The AVE for all reflective constructs were above 0.5; therefore, convergent validity was acceptable. Moreover, as CR and AVE exceeded the threshold, we concluded that removing the model's indicators with a 0.4-0.7 load was unnecessary.

Table 3 Measurement Model

Construct	Item	Factor Loadings	Cronbach's Alpha	Composite Reliability (CR)	Average variance extracted (AVE)
Assuming the worst (ASW)	ASW1	0.906	0.943	0.957	0.815
	ASW2	0.937			
	ASW3	0.931			
	ASW4	0.871			
	ASW5	0.867			
Blaming others (BMO)	BMO1	0.943	0.92	0.940	0.758
	BMO2	0.88			
	BMO3	0.874			
	BMO4	0.882			
	BMO5	0.766			
Cyberbullying (CYB)	CYB1	0.575	0.92	0.928	0.523
	CYB2	0.628			
	CYB3	0.696			
	CYB4	0.661			

Construct	Item	Factor Loadings	Cronbach's Alpha	Composite Reliability (CR)	Average variance extracted (AVE)
Cyber sexual harassment (CYH)	CYB5	0.659	0.896	0.923	0.706
	CYB6	0.647			
	CYH1	0.766			
Impersonation	CYH2	0.771	0.896	0.923	0.706
	CYH3	0.772			
	IMP1	0.809			
Minimising/ Mislabeled (MIN)	IMP2	0.834	0.91	0.933	0.736
	IMP3	0.804			
	MIN1	0.906			
	MIN2	0.837			
	MIN3	0.882			
Self-centred (SCF)	MIN4	0.79	0.91	0.933	0.736
	MIN5	0.781			
	SCF1	0.873			
	SCF2	0.846			
	SCF3	0.883			
	SCF4	0.822			
	SCF5	0.862			

The discriminant validity was evaluated with the Heterotrait-Monotrait ratio (HTMT) criterion. As shown in Table 4, the AVE's square root was more significant than the correlations between the latent constructs. Table 4 also shows that all HTMT values have an HTMT of less than 0.85 or less than 0.90, indicating that discriminant validity is not a serious problem in this study [45].

Table 4 HTMT Criterion

	1	2	3	4	5
1. Assuming the worst	0.308				
2. Blaming others	0.27	0.317			
3. Cyber delinquent behaviour	0.268	0.231	0.227		
4. Minimising/ mislabeling	0.320	0.386	0.353	0.420	
5. Self-centred					

4.2 Structural Model

This study evaluated the structural model by examining the significance of path coefficients, effect size (f2), coefficient of determination (R2), and predictive relevance (Q2). Table 5 shows the full structural model results. The model fit was assessed using the Standardised Root Mean Square Residual (SRMR), a measure of the approximate suitability of a study's model [45]. Table 5 shows that the model had an SRMR value equal to 0.10, which yields an acceptable fit [46]. Besides, R2 and Q2 parameters were used to evaluate the structural model. R2 value indicated

that the constructs' exogenous variables explain approximately 18% of cyber delinquency variances. The value of Q2 for cyber delinquent behaviour (0.88) was greater than zero, thus indicating predictive relevance and the ability to explain the endogenous latent variable [47].

The procedure of 5,000 re-samples was used to generate the standard error to compute the t-value [47]. H1 was supported, indicating that self-centred has a significant and positive influence on cyber delinquent behaviour ($\beta = 0.210, t = 4.073, p < 0.01; f2 = 0.041$). This means that adolescents suffering from self-centeredness tend to involve in cyber delinquency behaviours. Blaming others also significantly positively influences cyber delinquent behaviour ($\beta = 0.199, t = 4.005, p < 0.01; f2 = 0.040$); thus, H2 was supported. This shows that adolescents who reported higher levels of blame for others were more likely to engage in cyber delinquency. Next, no support was found for H3 as minimising/mislabeled had no significant influence on cyber delinquent behaviour ($\beta = 0.049, t = 0.845, p > 0.05; f2 = 0.002$). In other words, adolescents with minimising/mislabeled tend not to exhibit high online delinquent behaviour levels. Furthermore, H4 was supported by assuming the worst was found to influence cyber delinquent behaviour significantly ($\beta = 0.134, t = 2.530, p < 0.01; f2 = 0.019$). Thus, adolescents with higher levels of assuming the worst tended to show cyber delinquency.

Table 5 Structural Model Assessment

		Std. Beta	Std. Error	t-value	p-value	Support ?	f ²
H1.	Self-centred -> Cyber delinquent behaviour	0.210	0.052	4.073**	0.000	Yes	0.041
H2.	Blaming others -> Cyber delinquent behaviour	0.199	0.05	4.005**	0.000	Yes	0.040
H3.	Minimising/mislabeling -> Cyber delinquent behaviour	0.049	0.058	0.845 ns	0.398	No	0.002
H4.	Assuming the worst -> Cyber delinquent behaviour	0.134	0.053	2.530**	0.011	Yes	0.019

R². Coefficient of determination= 0.181

Q². Predictive relevance= 0.088

SRMR. Standardised Root Mean Residual =0.10

Note: **p < 0.01 (t-value: 2.33); *p < 0.05 (t-value: 1.96); ns 5 not significant (two-tailed test)

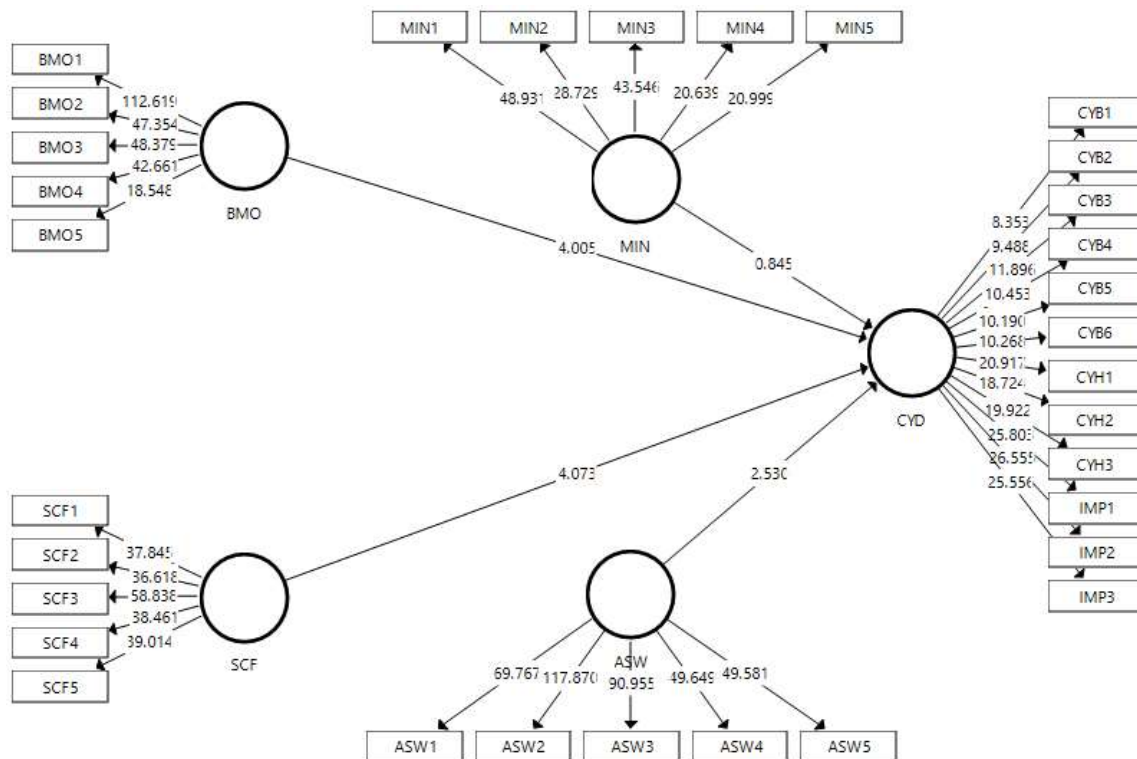


Figure 2 Structural Model

5. DISCUSSION

Despite investigating the positive link between cognitive distortions and delinquent behaviour, significant gaps remain in the literature. Thus, neglecting to examine specific cognitive distortions on cyber delinquency behaviour could lead to an overly simplistic model of external problems that affect adolescents. In line with this, the study's findings contribute to bridging the knowledge gap by discovering the relationship between four specific cognitive distortions and cyber delinquency among adolescents. Such findings of this study hold the potential to identify

factors associated with cyber delinquent behaviour that various types were considered, which can inform prevention intervention programs.

The first result of the study revealed a significant positive relationship between self-centred and cyber delinquency behaviour. This finding suggests that self-centred adolescents were most probably to perpetrate delinquent behaviours online. Self-centred adolescents will likely engage in online offending [16], [18], [20]. In line with the framework of [27], one can assume that adolescents who reported higher

levels of self-centred are more likely to justify their actions by focusing on their own opinions rather than the opinions of others, which could lead to engaging in cyber delinquency compared to those low in a self-centred. This is also in line with the BCT, which suggests that the self-centred individual, which may result in a high level of irrational thoughts, plays a significant role in engaging in cyber delinquency behaviour [48].

Besides, the current study revealed that blaming others was found to have a significant positive effect on cyber delinquency behaviour, indicating that those adolescents who blame others are more likely to experience delinquent behaviours online. This result is consistent with BCT that individuals who blame others engage in negative behaviour and delinquency behaviour [18], [49]. Besides, while previous studies have focused on blaming others for a specific type of anti-social behaviour, such as reactive aggressive behaviour [16], bullying [20], and externalising problem behaviour [31], this study supported the applicability of BCT in cyber delinquency by demonstrating that blaming others highly predicted delinquent online behaviours. This finding provides theoretical implications by showing that blaming others should be seen as a significant predictor of cyber delinquency.

Moreover, minimising/mislabeling was found to have no significant influence on cyber delinquency behaviour contradicting previous works [37], [41]. The results indicated that adolescents with higher levels of minimising/mislabeling do not tend to show delinquent behaviours online in a way that suits them best and makes them feel good about themselves. This aligns with Koolen et al. (2012), who reported that minimising/mislabeling did not predict aggression proactively. This result is also supported by Demeter (2019), who argued that minimising/mislabeling does not affect different levels of offences. The insignificant result can be explained by minimising/mislabeling adolescents' tendency to downplay the consequences or responsibility for their cyber delinquency over time, leading to emotional exhaustion. Esposito et al. (2020) reported that cognitive distortions develop and persist over time. According to [50], the persistence of thinking errors during adolescence can depend on individual failure to moderate emotional response and delay impulsive behaviour.

Finally, a positive and significant relationship was found between the assumption of the worst

and cyber delinquency. Consistent with BCT, this finding indicates that adolescent cyber-delinquent behaviour is greatly influenced by attributing hostile intentions to others and the expectation of worst-case scenarios. This finding appears to be consistent with the hypothesis that adolescents with higher levels of assuming the worst is more likely to engage in delinquent behaviours online [38], as well as with other previous findings that highlight the link between assuming the worst and developing aggressive intentions [18], [19], anti-social behaviour [21] or cybercrime [51]. Despite the relatively large number of studies that examined single indicators of cognitive distortions, this study's results expand previous findings by assessing the worst assumption on cyber delinquency.

5.1 Theoretical and Managerial Implications

First, this study has several theoretical and managerial contributions to the current cyber delinquent behaviour literature. One of the literature's contributions is examining the specific self-serving cognitive distortions in predicting adolescent cyber delinquency behaviour. Until now, few attempts have reported which specific cognitive distortions such as blaming others, assuming the worst, self-centeredness, and minimising/mislabeling predict cyber delinquency behaviour. PLS-SME, as an advanced statistical approach in this area, provided an intuitive result to examine every four cognitive distortions on cyber delinquency behaviour in a Saudi context, comparing the results of past studies [12], [16], [19], [32]. By applying PLS-SEM, this research demonstrated the specific effect of cognitive distortions on cyber delinquency behaviour. PLS-SEM provides a method for simultaneously testing relationships in the hypothetical model, but this method also controls measurement error in scales that measure cognitive distortions and dimensions of cyber delinquency behaviour in the model. Moreover, this study was unique. It refined and tested the cyber delinquency behaviour scale, including three mechanisms of bullying, harassment, and impersonation in Saudi Arabia, which is culturally different from when this measure was initially performed.

Second, this study gives additional empirical evidence in the domain of BCT. The theory posits that individuals with positive cognitive distortions lead to higher delinquency behaviour. Instead of focusing on the relationship between general

cognitive distortions and delinquent behaviour, this study has extended the theory by examining four types of self-serving cognitive distortions: self-centeredness, blaming others, minimising/mislabeling, and assuming the worst among adolescents in secondary schools. This is crucial because focusing on general cognitive distortions provides an incomplete view of their effect on deviant behaviours [16]. The findings support a claim by Gibbs (1993) that self-serving cognitive distortions affect school adolescents' anti-social behaviour regarding fidelity to their underlying theories.

From a management perspective, the study examined four cognitive distortions and their relationship to cyber delinquency behaviour among male and female adolescents in grade 12 in secondary schools; so far, it has received very little empirical attention. Hence, including adolescents in cognitive distortions is essential for high schools when dealing with adolescents' cyber delinquency behaviour. Secondary school interventions should first focus on identifying the specific cognitive distortion that is being adopted, causing cyber delinquency behaviour, then focus on dealing with the distortions unique to this individual during this period. This is because high school students are the most appropriate target group to apply for intervention programs. To do this, schools should provide preventive programs for cognitive distortions and cyber delinquency training to students. Finally, the current study may be the cornerstone of developing effective school programs to combat cyber delinquency in developing countries, especially Saudi Arabia, which seeks to address cyber delinquency and reduce the complexity of cognitive distortions among adolescent delinquents.

5.2 Limitations and Future Research

First, this study collected data from adolescents in high schools located in Hafer Albatin, Saudi Arabia, limiting the generalizability of the results to the entire working population. Additional work is needed to include other school adolescent students to generalise the findings. Second, the cyber delinquency behaviour Scale was valid and reliable in the current study, but further study is needed to examine the validity of sub-measures across different adolescent groups. Moreover, these adolescents' cyber delinquency behaviour should be evaluated through objective measures (e.g., school counsellor reports) or qualitative methods (e.g., semi-structured interviews) to increase the scale's validity. A semi-structured

interview with teachers at school may lead to a better knowledge of their students' cyber delinquency behaviour problems. Third, future research may explore other potential moderators to explain the insignificant relationship between minimising/mislabeling and cyber delinquent behaviour. Lastly, Owens et al. (2014) found a significant difference in cognitive distortions between genders regarding adolescent bullying behaviour. Still, this study did not include gender as a moderator variable in the path modelling analysis. Therefore, future studies should include gender as a moderator variable to get spurious findings.

6. CONCLUSION

In conclusion, this study fills a significant theoretical gap by investigating the relationship between cognitive distortions and cyber delinquency behaviour among delinquent adolescents in a school setting in Saudi Arabia. The findings highlight the role of specific cognitive distortions in driving cyber delinquent behaviours, such as blaming others, being self-centered, and assuming the worst. These results provide valuable insights into the underlying mechanisms contributing to cyber delinquency in this context.

The practical implications of these findings are noteworthy, as they inform the development of targeted intervention programs aimed at combating cyber delinquency among high school students. By incorporating activities and training that specifically address cognitive distortions related to blaming others, self-centeredness, and negative assumptions, educational institutions can effectively equip students with the necessary cognitive skills to navigate online environments responsibly. Further research is needed to generalise these findings to other populations and cultural contexts. However, the present study lays a foundation for future studies in this area, advancing our understanding of cyber delinquency and offering strategies to promote a safer online environment for adolescents.

REFERENCES

- [1] D. Álvarez-García, A. Barreiro-Collazo, and J.-C. Núñez, "Ciberagresión entre adolescentes: prevalencia y diferencias de género= Cyberaggression among adolescents: prevalence and gender differences," *Ciberagresión entre adolescentes: prevalencia y diferencias de género= Cyberaggression among*

- adolescents: prevalence and gender differences, pp. 89–97, 2017.
- [2] S. V Joshi, D. Stubbe, S.-T. T. Li, and D. M. Hilty, "The use of technology by youth: Implications for psychiatric educators," *Academic Psychiatry*, vol. 43, pp. 101–109, 2019.
- [3] S.-J. Nam, "The longitudinal relationships between cyber delinquency, aggression, and offline delinquency: An autoregressive cross-lagged model," *J Early Adolesc*, vol. 41, no. 4, pp. 634–652, 2021.
- [4] B. Colombo, A. Antonietti, R. Sala, and S. C. S. Caravita, "Blog content and structure, cognitive style and metacognition," *International Journal of Technology and Human Interaction (IJTHI)*, vol. 9, no. 3, pp. 1–17, 2013.
- [5] G. D. Moody and M. Siponen, "Using the theory of interpersonal behaviour to explain non-work-related personal use of the Internet at work," *Information & Management*, vol. 50, no. 6, pp. 322–335, 2013.
- [6] G. S. O'Keeffe, K. Clarke-Pearson, and C. on C. and Media, "The impact of social media on children, adolescents, and families," *Pediatrics*, vol. 127, no. 4, pp. 800–804, 2011.
- [7] M. Näsi, P. Räsänen, A. Oksanen, J. Hawdon, T. Keipi, and E. Holkeri, "Association between online harassment and exposure to harmful online content: A cross-national comparison between the United States and Finland," *Comput Human Behav*, vol. 41, pp. 137–145, 2014.
- [8] J. Kong and J. Lim, "The longitudinal influence of parent–child relationships and depression on cyber delinquency in South Korean adolescents: A latent growth curve model," *Child Youth Serv Rev*, vol. 34, no. 5, pp. 908–913, 2012.
- [9] N. B. Alotaibi, "Cyber bullying and the expected consequences on the students' academic achievement," *IEEE Access*, vol. 7, pp. 153417–153431, 2019.
- [10] S. M. Bae, "The influence of strain factors, social control factors, self-control and computer use on adolescent cyber delinquency: Korean National Panel Study," *Child Youth Serv Rev*, vol. 78, pp. 74–80, 2017.
- [11] J. Ortega Barón, S. Buelga Vázquez, and M. J. Cava Caballero, "The Influence of School Climate and Family Climate among Adolescents Victims of Cyberbullying," *Comunicar*, vol. 46, no. 24, p.: 57-65, 2016.
- [12] J. J. Rokven, G. Weijters, M. G. C. J. Beerthuis, and A. M. van der Laan, "Juvenile Delinquency in the Virtual World: Similarities and Differences between Cyber-Enabled, Cyber-Dependent and Offline Delinquents in the Netherlands.," *International Journal of cyber criminology*, vol. 12, no. 1, pp. 27–46, 2018.
- [13] M. J. Marret and W. Y. Choo, "Factors associated with online victimisation among Malaysian adolescents who use social networking sites: a cross-sectional study," *BMJ Open*, vol. 7, no. 6, p. e014959, 2017.
- [14] S. Kim, "How Daily Strain Leads to Cyber Delinquency: a Focus on the Role of Self-Esteem and Anger," *Current Psychology*, vol. 40, no. 12, pp. 5996–6005, 2021.
- [15] T. J. Holt, A. M. Bossler, and D. C. May, "Low self-control, deviant peer associations, and juvenile cyber deviance," *American Journal of criminal justice*, vol. 37, pp. 378–395, 2012.
- [16] S. Koolen, A. Poorthuis, and M. A. G. van Aken, "Cognitive distortions and self-regulatory personality traits associated with proactive and reactive aggression in early adolescence," *Cognit Ther Res*, vol. 36, pp. 776–787, 2012.
- [17] U. Pace, G. D'Urso, and C. Zappulla, "Hating among adolescents: Common contributions of cognitive distortions and maladaptive personality traits," *Current Psychology*, vol. 40, pp. 3326–3331, 2021.
- [18] D. Bacchini, G. Affuso, and S. Aquilar, "Multiple forms and settings of exposure to violence and values: Unique and interactive relationships with anti-social behaviour in adolescence," *J Interpers Violence*, vol. 30, no. 17, pp. 3065–3088, 2015.
- [19] A. Capuano, "Examining empathy, cognitive distortions, and social and physical aggression in delinquent and non-delinquent adolescents," Doctoral

- dissertation, Bowling Green State University, 2011.
- [20] L. Owens, G. Skrzypiec, and B. Wadham, "Thinking patterns, victimisation and bullying among adolescents in a South Australian metropolitan secondary school," *Int J Adolesc Youth*, vol. 19, no. 2, pp. 190–202, 2014.
- [21] A. Q. Barriga, J. R. Landau, B. L. Stinson, A. K. Liau, and J. C. Gibbs, "Cognitive distortion and problem behaviours in adolescents," *Crim Justice Behav*, vol. 27, no. 1, pp. 36–56, 2000.
- [22] A. T. Beck, *Depression: Causes and treatment*. Philadelphia: University of Pennsylvania Press, 1967.
- [23] C. Bröer and B. Besseling, "Sadness or depression: Making sense of low mood and the medicalisation of everyday life," *Soc Sci Med*, vol. 183, pp. 28–36, 2017.
- [24] B. Berg, "Cognitive-behavioural interventions for bullies, victims, and bystanders," *Play therapy with adolescents*, pp. 267–286, 2005.
- [25] C. Esposito, G. Affuso, M. Dragone, and D. Bacchini, "Effortful control and community violence exposure as predictors of developmental trajectories of self-serving cognitive distortions in adolescence: a growth mixture modelling approach," *J Youth Adolesc*, vol. 49, pp. 2358–2371, 2020.
- [26] F. Szumski, R. M. Bartels, A. R. Beech, and D. Fisher, "Distorted cognition related to male sexual offending: The multi-mechanism theory of cognitive distortions (MMT-CD)," *Aggress Violent Behav*, vol. 39, pp. 139–151, 2018.
- [27] J. C. Gibbs, *Moral-cognitive interventions: The gang intervention handbook*, no. 159–185. Champaign, IL: Research Press, 1993.
- [28] A. Q. Barriga, J. C. Gibbs, G. B. Potter, and A. Liau, *How I Think (HIT) questionnaire manual*. Champaign, IL, USA: Research Press, 2001.
- [29] J. C. Gibbs, G. B. Potter, and A. P. Goldstein, *The EQUIP program: Teaching youth to think and act responsibly through a peer-helping approach*. Champaign, IL: Research Press, 1995.
- [30] A. Q. Barriga and J. C. Gibbs, "Measuring cognitive distortion in anti-social youth: Development and preliminary validation of the 'How I Think' questionnaire," *Aggressive Behaviour: Official Journal of the International Society for Research on Aggression*, vol. 22, no. 5, pp. 333–343, 1996.
- [31] P. Helmond, G. Overbeek, D. Brugman, and J. C. Gibbs, "A meta-analysis on cognitive distortions and externalising problem behaviour: Associations, moderators, and treatment effectiveness," *Crim Justice Behav*, vol. 42, no. 3, pp. 245–262, 2015.
- [32] M. Wallinius, P. Johansson, M. Larden, and M. Dernevik, "Self-serving cognitive distortions and anti-social behaviour among adults and adolescents," *Crim Justice Behav*, vol. 38, no. 3, pp. 286–301, 2011.
- [33] Y. T. Y. Wan, "Cognitive and emotional determinants of delinquent behaviour," *Depression (MV)*, vol. 86, p. 309, 2012.
- [34] N. Chetty and S. Alathur, "Hate speech review in the context of online social networks," *Aggress Violent Behav*, vol. 40, pp. 108–118, 2018.
- [35] M. Aiken, J. Davidson, and P. Amann, "Youth Pathways into Cybercrime," 2016.
- [36] M. Dragone, C. Esposito, G. De Angelis, G. Affuso, and D. Bacchini, "Pathways linking exposure to community violence, self-serving cognitive distortions and school bullying perpetration: A three-wave study," *Int J Environ Res Public Health*, vol. 17, no. 1, p. 188, 2020.
- [37] S. Oostermeijer *et al.*, "The role of self-serving cognitive distortions in reactive and proactive aggression," *Criminal behaviour and mental health*, vol. 27, no. 5, pp. 395–408, 2017.
- [38] E. Demeter, "The relationship between the criminal offence and self-serving cognitive distortions," *Educația Plus*, vol. 23, no. SP IS, pp. 81–86, 2019.
- [39] H. M. Muhammad, "The venerable cognitive distortions of the self and its relationship to both proactive and reactive aggression in juvenile delinquents and non-delinquents of both sexes. 6(5)," *Egyptian Journal of Clinical and Counseling*

- Psychology*, vol. 6, no. 5, pp. 299–257, 2018.
- [40] M. A. Harris, "Managing Corporate Computer Crime and the Insider Threat: The Role of Cognitive Distortion Theory.," *Journal of Information System Security*, vol. 8, no. 2, pp. 19–41, 2012.
- [41] L. J. Fischback, "Exploring the Moderating Effect of Cognitive Autonomy on the Relationship Between Cognitive Distortions and Youth's Externalizing Behaviours," Doctoral dissertation, Utah State University, 2018.
- [42] A. Gorden and G. Seshadri, "Institute for Family and Sexuality Studies, Leuven," *Encyclopedia of Couple and Family Therapy*, pp. 1496–1499, 2019.
- [43] C. J. Ferguson and C. K. Olson, "Video game violence use among 'vulnerable' populations: The impact of violent games on delinquency and bullying among children with clinically elevated depression or attention deficit symptoms," *J Youth Adolesc*, vol. 43, no. 1, pp. 127–136, 2014.
- [44] J. F. Hair, J. J. Risher, M. Sarstedt, and C. M. Ringle, "When to use and how to report the results of PLS-SEM," *European business review*, vol. 31, no. 1, pp. 2–24, 2019.
- [45] J. Henseler, C. M. Ringle, and M. Sarstedt, "A new criterion for assessing discriminant validity in variance-based structural equation modeling," *J Acad Mark Sci*, vol. 43, pp. 115–135, 2015.
- [46] C. M. Ringle, "Advanced PLS-SEM topics: PLS multigroup analysis," working paper, University of Seville, November 2016.
- [47] J. F. Hair, M. Sarstedt, C. M. Ringle, and S. P. Gudergan, *Advanced Issues in Partial Least Squares Structural Equation Modeling*. SAGE Publications, 2017.
- [48] A. T. Beck, "Cognitive therapy: past, present, and future.," *J Consult Clin Psychol*, vol. 61, no. 2, pp. 194–198, 1993.
- [49] S. D. Hollon, "The cognitive revolution in theory and therapy," in *Bringing Psychotherapy Research to Life: Understanding Change Through the Work of Leading Clinical Researchers*, A. T. Beck, L. G. Castonguay, J. Muran, L. Angus, J. A. Hayes, N. Ladany, and T. Anderson, Eds., Washington, DC: American Psychological Association, 2010, pp. 63–74.
- [50] P. O. H. Wikstrom and K. Treiber, "The Dynamics of Change: Criminogenic Interactions and Life-Course Patterns in Crime," in *The Oxford Handbook of Developmental and life-course criminology*, D. P. Farrington, L. Kazemian, and A. R. Piquero, Eds., Oxford: University of Oxford Press, 2018, pp. 272–294.
- [51] S. E. Goldstein, "Adolescents' disclosure and secrecy about peer behaviour: Links with cyber aggression, relational aggression, and overt aggression," *J Child Fam Stud*, vol. 25, pp. 1430–1440, 2016.