Do Social Networking Sites Behaviour and Self-esteem Predict Young People's Delinquent Behaviour in Their Actual Lives?

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Abstract

This study attempted to investigate the predictive effects of self-concept, social networking site (SNS) intensity on delinquency. A total of 216 secondary school students from Hong Kong completed the Chinese Adolescent Self-Esteem Scales (CASES), the Facebook Intensity Scale and a daily behaviour checklist. Findings revealed that usage of Social Network Sites (SNS) and some facets of self-esteem had direct and moderating effects on predicting delinquency and minor deviant behaviour, but global self-esteem did not have significant predictive effects on delinquency. Different effects were found between domain-specific self-concepts and delinquency, such that intellectual, moral and family self-concepts had linear negative relationship with delinquent behavior, whereas engaging in delinquent behaviour were associated with higher appearance self. Use of SNS contributed to higher rates of both delinquent behaviour and minor deviant behaviour. In particular, time spent in SNS was a very strong predictor of delinquent behaviour, and moderated the effect of appearance self-concept. Discussion of findings were enlightened by the notion of "threatened ego" and the "self-derogation theory".

Keywords: Self-esteem; Delinquency; Social network sites

Introduction

Like most cities in the world, the use of smartphones or tablets is very popular among young people in Hong Kong. According to the Census and Statistics Department [1], 84.9% of persons aged 10 and above had used internet service. It also reported that 98.2% of young people aged 15-24 and 93.8% of children or adolescents aged 10-14 had used internet services. The ease of gaining access to internet services through smartphones or tablets has greatly promoted the flourishing of social networking sites. Social networking sites (SNS) are online platforms which allow one to create his/her own account and to have social networking through the internet or smartphone, usually free of charge. Users can interact with others (friends or strangers) and share their views, messages and photos instantly.

Use of social network sites and delinquency

Using SNS has become an integral part of adolescents' daily lives and its impact on adolescents is unprecedented. SNS has opened up a new channel for people to meet new and old friends, and human interactions in the online sphere have been drastically elevated. The activities on SNS are covering not only personal but also social and entertainment domains, and on this virtual platform people indulge largely in self-presentations [2]. According to Valkenburg et al. friendship networking sites provide adolescents with more opportunities than face-to-face situations, which would in turn enhance their social self-worth [3]. Shaw and Gant also reported that participants who were engaged in online chat sessions [4], which were mostly available in SNS, showed higher social support and self-esteem and were lower in loneliness and depression. Overall, the use of SNS has indeed made positive impact on the young person's social self-concept; and the impact is perhaps more salient for young people thirsting for social acceptance. This is because SNS may facilitate communication and reduce communication barriers which adolescents with low self-esteem often experience in the real-world social settings [5]. Similar findings were also reported by Wilson et al. that people with low self-esteem preferred online social interaction over face-to-face meeting because the internet can relieve their social anxiety [6]. Low-esteem individuals may establish rewarding group relationships online while they may not have positive relationships with others in their everyday lives.

Research also suggests that there is a significant connection between SNS use and adolescents' delinquency [7-9]. The use of internet is found to have a close relationship with delinquency among adolescents. With the use of temporary accounts and/or pseudo-names in social networking sites, people could display deviant behaviour online anonymously. Researchers have pointed out that the internet is a "dreamland" for deviant behaviour as people often believe that the risk of being caught is low [8]. The same study also found that individuals who made frequent use of SNS had higher risk-taking attitudes than non-users did. Similarly, Fogel and Nehmad reported that individuals having personal profiles on SNS had greater risk taking attitudes than those who did not have personal profiles [9]. Therefore, we predicted that intensive users of SNS would have a higher tendency in committing negative or delinquent behaviour than those who did not use SNS so intensively.

Self-esteem and delinquency

It is widely postulated that delinquency is negatively associated with self-esteem, that is to say, high delinquency is believed to be associated with low self-esteem. Kaplan's explained the mechanism of this notion in terms of "self-derogation theory" (or called "self-enhancement theory") [10,11]. The self-derogation theory was based on the human motive to "maximize the experience of positive self-attitudes and to minimize the experience of negative self-attitudes" [11]. According to

the self-derogation theory, when adolescents felt that they have failed in conventional standards, they would be motivated to seek alternative response patterns which would function to achieve conventional values (say, being accepted by others), avoid further failure and rejection by others, and would substitute with new (deviant) standards which were more easily achievable and that would evoke rewarding attitudes of approval from others in the deviant groups. Hence, engaging in deviant behaviour could be an alternative way for adolescents to restore their hampered self-esteem.

To date, empirical findings regarding the relationship between self-esteem and anti-social or deviant behavior are not consensual. Some findings have been reported to support the notion that low self-esteem is associated with high levels of delinquency [12-14], while some other research findings are contradictory to the notion [15-17]. In line with the notion, Donnellan et al. found significant relationship between low self-esteem and delinquency [12], which was consistently found across age groups and different measurement methods. Similarly, in a study on Korean adolescents, Shin and Yu found that young people could have their self-esteem enhanced when their problem behaviour received peer support [14], which would in turn promote further engagement in problem behaviour. Aunola et al. also found that low self-esteem increased individuals' use of maladaptive achievement strategies, such as failure expectations, task-irrelevant behaviour and passivity, and school maladjustment like non-involvement in school activities, which then increased externalizing problem behaviour [18].

On the other hand, some studies found evidence inconsistent with the notion of a negative correlation between self-esteem and delinquency. Instead of a negative linear relationship, Lo et al. found a curvilinear nature of the relationship between self-esteem and delinquency, such that adolescents' self-concept was low when they began to engage in deviant behaviour, and gradually accentuated when they frequently engaged in more delinquent behaviour [17]. Similar phenomenon was reported in other studies individuals of both high and low self-concepts were found to have highest levels of delinquency [16,19,20]. Cheng found that both low self-esteem and high self-esteem individuals frequently engaged in deviant behaviour such as gambling, drug offence, and sexual misconduct [16]. After reviewing extensive evidence, Baumeister et al. noted that many people low in self-esteem are not aggressive while others are highly aggressive [19]. After tackling various limitations of prior studies attempting to delineate the relationship between self-esteem and delinquency, Boden et al. concluded that low self-esteem could hardly be one of the most predictive factors of violence and aggression [20]. To summarize, the empirical evidence supporting the notion of a negative relationship between self-esteem and delinquency is rather mixed and inconsistent. Low self-esteem can be conducive of delinquency, while continuing engaging in delinquent behaviour may in turn "rebuild" one's self-esteem. Due to this curvilinear (or reciprocal) characteristic of self-esteem's effect on delinquency, we predicted that the effect of global self-esteem on delinquency would be low or non-significant.

Lastly, the linkage between self-esteem and delinquency becomes more salient when the domain of self-esteem is specific and relevant to the context. In general, the linkage between self-concept and delinquency is stronger when the domain of the self-esteem construct being measured is specific and relevant to the respondent. For young people, the sense of self-worthiness reflected in their physical attractiveness, social and family relationships is most salient and relevant; hence, hampered self-concept in these domains should be more predictive of students' deviant behaviour. Leung and Lau found that higher levels of delinquent behavior was related to a more positive self-concept in social ability and physical ability [21]. Therefore, it should be prudent to understand self-concept from a multidimensional perspective than a unidimensional global self-esteem.

The present study

As discussed above, notable studies have investigated the bivariate relationships between self-esteem and delinquency, self-esteem and SNS use, or SNS use and delinquency [8,9,18,21-24]. However, very little is known how the three variables are related to each other, and whether the effect of self-esteem on delinquency would be moderated by individuals' use of SNS. The above review has demonstrated that some elusive relationships among self-esteem, delinquency and SNS behaviour exist. Therefore, the present study was to investigate the direct effects of self-esteem and SNS, and their interaction effects on delinquency. Hence, it was predicted that global self-esteem would have negligible influence on delinquency in general, but self-esteem on some domains (or called domain specific self-concept) such as social, physical, appearance self-concepts would show a positive relationship with delinquency; Individuals who had higher intensity of SNS use (spent more time, had more friends) would exhibit higher levels of delinquency; and the intensity of SNS use would moderate the effect of self-concept on delinquency, especially on domains which have salient relevance to young people (such as physical and appearance self-concepts).

Method

Participants

Subsequent to ethics approval obtained from the relevant committee, a total of 216 students from three secondary schools were randomly drawn for the study using purposive sampling. Two secondary schools from Band Two (i.e., medium level of academic performance) and one from Band Three (i.e., low academic performance) were purposively drawn. Among the participants, 109 were females and 107 were males, with female's age ranging 12 to 20 (Mean=15.87, SD=1.66), and male's age ranging 13 to 20 (Mean=16.25, SD=1.48).

Materials

The self-administered questionnaire was comprised of a demographic section including gender, age, and educational level, and scales measuring multidimensional self-esteem, social network sites behaviour and attitudes, and delinquent behaviour. It took about twenty minutes to complete the questionnaire, which was printed in Chinese.

Multidimensional self-concepts: Self-concept was measured on the Chinese Adolescent Self-Esteem Scales (CASES) [25], which was designed to measure Hong Kong adolescents' global self-esteem and domain-specific self-esteem, covering intellectual, social, moral, family, physical, appearance domains. Respondents responded to statements on a 5-point Likert scale from 1 (Totally disagree) to 5 (Totally agree). Some statements were negatively worded to control for response set biases. The CASES showed strong reliability and construct validity in various studies [25,26]. The reliability in this study was high, with Cronbach's alpha coefficients ranging from 0.83 to 0.89.

Social networking sites (SNS) usage: Three aspects of SNS usage were measured, namely, number of friends in SNS, time spent on SNS, and attitudes towards using SNS. The Facebook Intensity Scale [5] was adopted to measure the respondents' attitudes such as emotional

connectedness and integration into daily activities of using Facebook [27]. The SNS Intensity (Attitude) score was indicated by means of six items, such as "I feel out of touch when I haven't logged onto Facebook/Whatsapp for a while", "Facebook/Whatsapp has become part of my daily routine". The response format was on a 5-point Likert scale from 1 (Totally disagree) to 5 (Totally agree). Regarding SNS Intensity (Time Spent), respondents were asked how much time they spent in Whatsapp and in Facebook each week, i.e., less than 10 minutes, 10 to 30 minutes, 31 minutes to 1 hour, 1 to 2 hours, 2 to 3 hours, more than 3 hours. Regarding SNS Intensity (Number of Friends), they were to report the number of friends they had on Facebook and the number of group chats they were engaged in on Whatsapp.

Daily behaviour scale: Thirty-nine items describing daily behaviour including normative neutral behaviour (e.g., do homework, join recreational activities), minor deviant or antisocial behaviour (e.g., speak foul language, verbally attack parents, cheating in school), and delinquent behaviour including criminal offenses (e.g., taking illegal drugs, theft or shop lifting) and aggression (e.g., vandalism, fighting) were adopted from related studies [28,29]. Respondents were asked to rate their frequency of behaviour over the past three months on a 5-point Likert scale, from 1 (Never) to 5 (Always). Totally there were eighteen items on "delinquent behaviour" and six items on "minor deviant or antisocial behaviour". Internal consistency reliability of the delinquency subscales and the minor deviant behavior subscale was acceptable with Cronbach alphas equal to 0.82 and 0.71, respectively.

Procedure

Upon approval of the relevant research ethics committee, invitation letters were sent to principals of the targeted schools to ask for their permission to participate in this research. Questionnaires were distributed to students by teacher in classroom. Students were to sign on the informed consent form printed on the front page and then completed the questionnaire individually where discussion was not permitted. The questionnaire was anonymous and students were encouraged to give honest response as confidentiality was ensured.

Results

Self-esteem and multidimensional self-concepts

Male and female respondents reported similar levels of global self-esteem and domain specific self-concepts, there was no significant gender difference in all self-concept measures, t-values ranging from 0.06 to 1.6, all p>0.05.

Intensity of SNS use

The mean scores of SNS intensity (number of friends, time spent, attitude) were 1.02 (SD=0.43), 1.10 (SD=0.50) and 14.56 (SD=5.92) respectively. Significant gender difference was found only in the number of friends (t=-3.74, p<0.01, Cohen's d=-0.510), showing that females had more friends on SNS than males did, but no gender difference was found on time spent and on the attitude of using SNS.

Prevalence of adolescents' delinquent behaviour and daily activities

For the prevalence of respondents' daily activities, the most common daily activity was watching television and using Apps on smart phones or tablets. Regarding delinquent behaviour, 22.3% of the respondents often or always used foul language, 22.2% of them often or always cheated on homework and 17.13% attacked their parents verbally. Over 29% of the respondents sometimes or always bought or downloaded

pirated goods, around 25% of them bullied others verbally, and more than 20% of them violated school rules. Furthermore, approximately 18% of the respondents sometimes or always participated in gambling games, attacked teachers verbally and watched pornography.

Gender differences were found in some daily behaviour

Female respondents indicated higher prevalence in most types of neutral activities such as shopping, reading books or magazines and learning music, arts or sports (p<0.01, effect size Cohen's d ranging from 0.37 to 0.46), joining volunteer work, using apps on smart phones or tablets and forming coteries (p<0.05, Cohen's d ranging from 0.28 to 0.29). Males significantly played more online games than females (p<0.01, Cohen's d=0.55). There were significantly more male respondents reporting deviant behaviour such as hanging out with gangsters, joining gambling games, involving in fights, watching pornography, physical bullying, boycotting classmates or schoolmates, cyber bullying, buying cigarettes, verbal bullying, and buying or downloading pirated goods (p<0.01, effect size Cohen's d ranging from 0.37 to 0.62). Males also reported higher levels of using foul language, verbally attacking teachers, gambling, committing thefts, smoking, vandalism, and drinking alcohol (p<0.05, Cohen's d ranging 0.30 to 0.38). Overall, male adolescents tended to display more delinquent behaviour (especially serious deviant behaviour) than female adolescents did.

Correlations between self-concept, SNS intensity and delinquency

Bivariate correlation among the variables was checked to give an overall picture of the relationship between self-concept, delinquency, and the intensity of SNS use. The relationship between self-concept and minor delinquency was more extensive than that between self-concept and general delinquency. No significant correlation was found between self-esteem and general delinquency, which was negatively correlated with moral self (r=-0.179, p<0.01), meaning that adolescents of lower moral self-concept tended to display higher levels of delinquent behaviour. Interestingly, delinquency was positively correlated with physical self (r=0.14, p<0.05); meaning that adolescents who had higher self-evaluations on physical abilities tended to display more delinquent acts. As predicted, minor deviant behavior was correlated negatively with intellectual self (r=-0.24, p<0.01), family self (r=0-.26, p<0.01), moral self (r=0-.14, p<0.05), and global self-esteem (r =-0.18, p<0.01). That is to say, adolescents who displayed more antisocial or minor deviant behaviour would also have lower self-esteem and lower self-concepts in the academic, family, and moral domains.

Regarding the relationship between SNS use and delinquent behaviour, the relationship was more extensive when the delinquent behaviour were non-serious or mild. All the three dimensions of SNS usage intensity (i.e., number of friends on SNS, time spent on SNS, and attitude towards SNS usage) were found to have significant positive correlation with minor deviant behaviour (r=0.391,0.521,0.260, respectively, p<0.01). That is to say, adolescents who had more friends and spent more time on SNS, and had positive attitudes towards SNS tended to perform more antisocial or minor deviant behaviour (such as verbally attacking parents, using foul language, etc.). For more serious delinquent behaviour, they were (positively) correlated only with "time spent" but not with other dimensions of SNS Intensity (r=0.296, p<.01). Results indicated that adolescents who spent more time on SNS had higher tendency to commit delinquent behaviour, especially more serious delinquent behaviour (such as vandalism, taking illegal drugs, fights, etc.).

Lastly, among the relationships between multidimensional self-concepts and SNS intensity, only the Social Self subscale was found to correlate positively with the number of friends, time spent, and attitude dimensions of SNS Intensity (r=0.239,0.189,0.197 respectively, p<0.01). Other domain specific self-concepts and the global self-esteem did not have significant correlation with any dimension of SNS use. This suggested that social self-concept was positively associated with SNS use, which were also associated with minor deviant behaviour.

Hierarchical regression analysis of delinquent behaviour

In order to analyse the predictive effects and moderation effects of SNS use and self-concept variables on delinquency, hierarchical regression analysis was conducted with age and gender being controlled. The control variables (sex, age) were entered in the first step of the regression model, followed by adding the self-concept variables in Step Two and the SNS intensity factors in Step Three; the interaction terms (combined effects) of self-concept and SNS factors were entered in the final step. General delinquency and minor deviant behaviour were predicted separately as outcome variables.

As a result, self-concept was significantly predictive of general delinquent behaviour as well as mild delinquent behaviour, with sex and age being controlled (Tables 1 and 2). First, gender was considerably predictive of delinquency, β =-0.32, p<0.01, showing that boys were more prone to commit delinquent behaviour than girls. By adding the self-concept factors, the regression model (M2) has explained 18% of variance in accounting for delinquent behaviour when sex and gender was controlled. However, among the self-concept factors, only Appearance Self was statistically significant in predicting delinquent behaviour β=0.19, p<0.05; other domain specific self-concepts and global self-esteem were not significantly associated with delinquency. Interestingly, Appearance Self was positively predictive of delinquency, meaning that adolescents who had higher self-evaluation of their physical appearance tended to display more delinquent behaviour. The

addition of the SNS factors (M3) significantly increased the explained variance to 26%, ΔR^2 change=0.08, F(12, 203)=7.51, p<.01. Among the SNS Intensity factors, time spent on SNS was significantly predictive of delinquency, β=0.32, p<.01, suggesting that adolescents who spent more time on SNS tended to have more delinquent behaviour in general. Model 4 analyzed the interaction (moderating) effects of the self-concept and SNS factors. Among all computable interactions, only SNS (number of friends) x Appearance Self was significant, β=0.26, p<.05. The interaction effect was plotted on graph for easy interpretation (Figure 1). It showed that adolescents who had high self-regard in their physical appearance and had many friends on SNS would tend to display more delinquent behaviour. Oppositely, adolescents who had few friends on SNS and low esteem in their physical appearance would also have high levels of delinquency. The lowest level of delinquency was reported by those young people who had many friends on SNS, despite the fact that they had low appearance self-concept. People who had few friends on SNS but had medium level of appearance self also reported low level of delinquency. To summarize, young people who were both high in their appearance self and had many friends on SNS, or those who were both low in their appearance self and had few friends on SNS were most vulnerable to delinquency. Others who were high in one dimension (e.g., many SNS friends) but low in another dimension (e.g., low appearance self) or vice versa were less vulnerable to commit delinquent behaviour.

For the regression of minor deviant behaviour, self-concept contributed significant additional variance (13%) in accounting for delinquent behaviour even when sex and gender was controlled, ΔR^2=0.13, F(9, 206)=4.57, p<001; however, among the self-concept factors, only Social Self and Family Self were statistically significant in predicting mild delinquency. Moreover, Social Self was positively predictive of delinquency, whereas Family Self was negatively predictive of delinquency, which meant that higher social self-concept but lower family self-concept were related to more delinquent behavior. The

Delinquent Behaviors								
	Model 1		**Model 2**		**Model 3**		**Model 4**	
Variable	B	Beta	B	Beta	B	Beta	B	Beta
Constant	1.365		1.597		1.494		1.562	
Gender	-0.234	-.319**	-0.214	-.292**	-0.218	-.297**	-0.236	-0.322**
Age	0.021	0.088	0.014	0.061	0.01	0.044	0.007	
Intellectual self			-0.004	-0.069	-0.003	-0.059	-0.008	
Social self			0.001	0.027	-0.004	-0.064	-0.004	
Moral self			-0.011	-0.155	-0.01	-0.134	-0.01	
Family self			-0.004	-0.066	-0.002	-0.03	0.001	
Physical self			0.005	0.106	0.005	0.105	0.003	
Appearance self			0.013	.190*	0.011	0.157	0.013	0.188*
General self			-0.003	-0.054	-0.001	-0.012	0.005	
SNS intensity								
(no. of friends)					0.02	0.023	-0.014	
SNS intensity								
(time spent)					0.234	.318**	0.272	0.37**
SNS intensity (attitude)					-0.006	-0.091	-0.008	
†SNS intensity (no. of friends) × appearance self							0.04	0.260*
R^2	0.116		0.176		0.258		0.339	
F	13.98**		4.89**		5.89**		2.82**	
R^2 change	0.116		0.06		0.082		0.08	
F change	13.98**		2.14*		7.51**		1.051	

*p<.05; **p<.01.
†Non-significant interactions were not displayed for clarity.

**Table 1:** Hierarchical regression analysis of general delinquent behaviors.

Minor Deviant Behaviors								
	Model 1		**Model 2**		**Model 3**		**Model 4**	
Variable	B	Beta	B	Beta	B	Beta	B	Beta
Constant	2.927		3.601		2.927		3.002	
Gender	0.02	0.019	0.024	0.022	-0.026	-0.024	-0.015	-0.014
Age	0.001	0.002	-0.003	-0.009	0.006	0.017	0.003	0.009
Intellectual self			-0.015	-0.185	-0.012	-0.142	-0.011	-0.132
Social self			0.021	0.26*	0.006	0.07	0.004	0.053
Moral self			-0.005	-0.051	0.001	0.006	0.001	0.012
Family self			-0.02	-0.209*	-0.017	-0.175*	-0.017	-0.183*
Physical self			-0.003	-0.046	-0.003	-0.038	-0.005	-0.069
Appearance self			0.015	0.149	0.009	0.093	0.01	0.1
General self			-0.014	-0.161	-0.01	-0.118	-0.01	-0.111
SNS intensity (no. of friends)					0.249	0.202*	0.247	0.2*
SNS intensity (time spent)					0.39	0.37*	0.383	0.363*
SNS intensity (attitude)					0.004	0.048	0.004	0.049
†SNS intensity (time spent) × appearance self							0.026	0.121*
R^2	0		0.135		0.382		0.396	
F	0.039		3.566**		10.479**		10.174**	
R^2 change	0		0.134		0.248		0.013	
F change	0.039		4.573**		27.142**		4.41*	

*p<.05; **p<.01.
†Non-significant interactions were not displayed for clarity.

Table 2: Hierarchical multiple regression analysis of mild deviant behaviors.
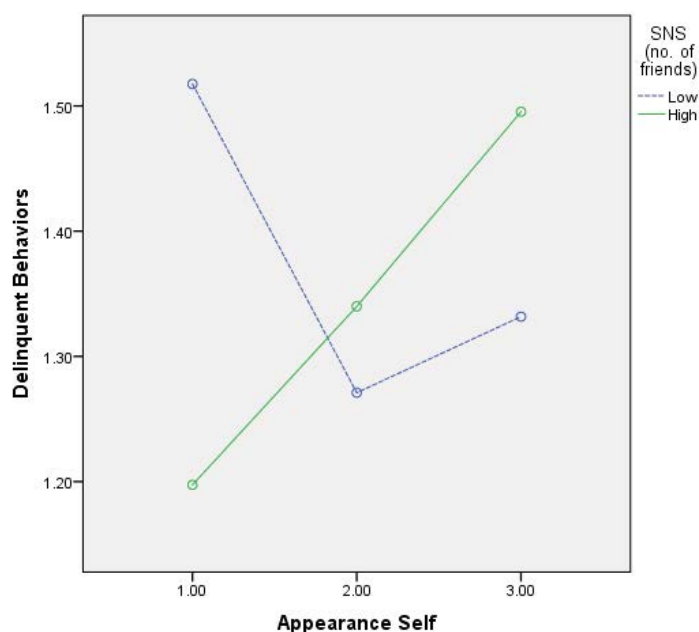
Figure 1: The moderating effect between appearance self-concept and SNS intensity (number of friends) on delinquent behaviours.

addition of the SNS factors (M3) significantly increased the explained variance to 38%, ΔR^2 change=0.25, F(12, 203)=27.14, p<0.001. Number of friends on SNS and Time Spent on SNS both positively predicted the level of mild delinquency, β=0.20 and 0.37 respectively, p<0.05, suggesting that adolescents who spent more time and had more friends on SNS tended to display more mild delinquent behaviour. Model 4 analysed the interaction (moderating) effects of the self-concept and SNS factors on mild delinquency. It was found that, among all computable interactions, only SNS (time spent) x Appearance Self

was significant, β=0.12, p<0.05. The interaction effect was plotted on graph for easy interpretation (Figure 2). It showed that young people who spent more time on SNS tended to commit more antisocial or minor deviant behaviour than those spent less time on SNS. This phenomenon was consistent across different levels of appearance self-concept. However, it was interesting to note that adolescents who had high appearance self and spent less time on SNS had very little minor deviant behavior; such drop in minor delinquency was not found among those who spent more time on SNS.
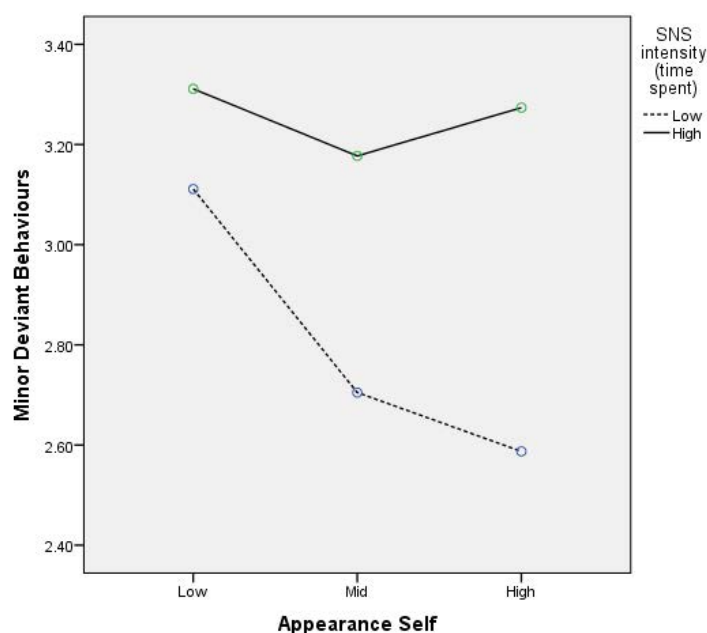
Figure 2: The moderating effect between appearance self-concept and SNS intensity (time spent) on minor deviant behaviours.

To conclude, young people who had many friends and/or spent long time on SNS and at the same time had high self-regard in their physical attractiveness were the most vulnerable to general delinquency as well as minor delinquency. While appearance self-concept was predictive of general delinquency, young people who spent less time would have less minor delinquency, those who had fewer friends on SNS would also have less delinquency in general (Figures 1 and 2).

Discussion and Conclusion

The present study confirmed some current research findings, for example, males had higher prevalence in committing delinquent behaviour than female adolescents [30]; SNS use positively associated with delinquency [8], and so on. Furthermore, the present study adopted the multidimensional self-esteem construct in investigating its relationships with delinquent behaviour and SNS use. The adoption of multidimensional self-esteem instead of a unidimensional global self-esteem allowed us to delineate the complex relationships between different facets (dimensions) of self-esteem and other variables. Predictions improve when self-esteem is measured for the domain of interest and among people who consider this domain to be personally important [31]. The present study has showed that global self-esteem might not be explicitly linked with delinquent behaviour, but different dimensions of the self (e.g., social, family, appearance) had significant direct effects on delinquency; and the effect of appearance self-concept (but not global self-esteem) could be moderated by SNS use.

Direct effects of social, physical and appearance self-concepts on delinquency

Bivariate correlational analyses suggested that intellectual self, moral self, family self, and global self-esteem were negatively correlated with minor deviant behaviour. This finding concurred with the study of Shek et al. that high family functioning and academic competence were associated with lower likelihood of delinquent acts such as cheating and speaking foul language [32]. Our regression analysis also suggested

that family and social self-concepts had direct effects on minor delinquency. The interesting finding was that social self was positively but family self was negatively predictive of minor delinquency. As pointed out by Leung and Lau , adolescents who had difficulties in establishing self-worth in family would try to seek approval in deviant groups by committing delinquency behaviour [21]. As reported by Davis et al. peer influence was the most important predictor of negative behaviour among adolescents [33]. This explained why adolescents who committed minor delinquency were found to have higher social self-concept but lower family self-concept. Low family self-concept and high social self-concept were found to be significant predictors of minor deviant behaviour but not serious delinquent behaviour. This might be due to the nature of the minor deviant behaviour, which was largely comprised of negative behaviour displayed at home or school. Hence, committing the minor deviant behaviour could enhance the social relationship with deviant peers, but would deteriorate the relationship with parents and family members.

Regarding more serious delinquent behaviour (e.g., criminal offenses such as stealing, taking illegal drugs), bivariate correlational analysis suggested that moral self was negatively correlated but physical self was positively correlated with delinquency. However, regression analysis revealed that both factors did not have significant direct effects on delinquency. Rather, appearance self-concept was positively predictive of delinquency, even when the effects of age and gender were being controlled. First, gender effect was found on predicting "more serious" delinquent behaviour but not minor deviant behaviour. Males were found to display much more delinquent behaviour than females, especially those serious delinquent behaviour. When this effect (gender) was controlled, appearance self-concept was still predictive of delinquent behaviour, and was even accentuated by having many friends on SNS. The effect of appearance self on delinquency was shown to be curvilinear instead of a simple linear relationship. Young people who committed more delinquent acts came from both the high and low appearance self-concept groups; the curvilinear nature was more

apparent for those who did not have many friends on SNS (Figure 1). This finding was consistent with other research that both high and low self-esteem was found to have high levels of delinquent or violent behaviours [20].

Direct effects and moderating effects of SNS use

Among the three dimensions of SNS intensity, time spent and number of friends on SNS had direct positive effects on delinquency, but attitude towards using SNS had no association with delinquency at all. Adolescents who spent more time on SNS would display more delinquent and minor delinquent behaviour, whereas adolescents who had more friends on SNS would display more minor antisocial behaviour (but not more "serious" delinquent behaviour). However, when combined with "high level of appearance self-concept", number of friends on SNS would accentuate the effect of appearance self on "more serious" delinquent behaviour, that is to say, adolescents who had many friends on SNS and highly regarded of their physical appearance would commit more serious delinquent behaviour than those who had few friends on SNS.

Obviously, SNS had both direct and moderating effects on delinquent behaviour. Adolescents who used SNS more and/or had more SNS friends would commit more delinquent behaviour. Engelberg and Sjoberg explained that frequent internet users tended to have deviant values and they might lack emotional and social skills which were essential in meeting the demands of their actual daily lives [34]. It should be noted that, however, higher delinquency rates were associated with time spent or number of friends on SNS, but not with the respondents' attitudes towards using SNS. Therefore, the higher tendency in committing delinquency could be due to high usage of SNS but not due to the value or attitude one held. Cao et al. revealed that higher internet use would lead to diminished control of impulsivity, which was a significant predictor of delinquency [35].

Not only did SNS use have direct effects on delinquency, it also moderated the effect of appearance self-concept on delinquency. Number of friends on SNS moderated the effect of appearance self on delinquency, whereas time spent on SNS moderated the effect of appearance self on minor deviant behaviour. For young people who did not spend much time on SNS, appearance self-esteem showed a negative relationship with minor antisocial behavior, i.e., low appearance self-esteem was seen to display more delinquency, and vice versa (Figure 2). This phenomenon was in agreement with the notion of negative relationship between self-esteem and delinquency [12,14]. For those who spent much time on SNS, their minor deviant behaviour was consistently on higher levels regardless of their self-esteem level. The interaction effects of SNS intensity and appearance self on "serious" delinquency and minor deviant behaviour were slightly different in the way that the moderation effect on "serious" delinquency was related to the number of friends on SNS not the time spent on SNS. For young people who had many friends on SNS, their appearance self-esteem had a U-shape curvilinear relationship with delinquency; that is, people displaying high level of delinquency were those who had lowest appearance self-esteem and had many friends on SNS, the delinquency of medium appearance self-esteem was lowest and ascended with higher appearance self-esteem (Figure 1). For young people who had few friends on SNS, their appearance self-esteem was positively associated with delinquency, i.e., higher level of delinquent behaviour was displayed by those with higher appearance self-esteem.

These interaction effects between SNS use and appearance self-concept on delinquency could be explained by Kaplan's self-derogation theory and the notion of "threatened ego" [10,15,36]. Adolescents who had low self-esteem often experience failure in conventional, normative context (e.g., school and family). They might think they were not born to be socially competent. Therefore, they would look for alternative (deviant) ways to avoid further negative feelings, to gain approval from available groups and hence to rebuild their self-esteem. This explained why minor antisocial behaviour was at high levels when appearance self-concept was low. Young people who have low self-esteem in their physical appearance may look for alternate means to enhance their attractiveness. The internet and SNS provide an ideal platform for them to actualize their self-enhancing motive without actual contacts with other people in the real world. SNS, especially Facebook, have provided young people a platform to post their photos or portraits and to receive feedback from friends. The function of 'likes' on Facebook has actually enhanced positive evaluations from peers. The increase of SNS usage and the inflated self-esteem allowed young people to be seen as more popular, and hence to identify with deviant subculture and deviant groups more readily. For instance, they might follow their deviant peers to have body piercing, tattoos, tinted hair or committing antisocial or even criminal acts. Through engaging in delinquent or antisocial behaviour, the threatened ego can be restored.

Limitations and suggestions

The present study has some limitations in its design and measurement. First, when considering SNS usage intensity, we have only measured the amount of time spent, number of friends on SNS, and the attitude towards using SNS. We have not measured the content nature of SNS activities involved, which may provide important information for the analysis of correlates of delinquent behaviour. Future research may analyze the nature of SNS involved, e.g., types of activities being conducted in SNS (e.g., games, selfie posting, etc.), behavioural or personality variables in SNS (such as antisocial behaviour in SNS, narcissism). Another weakness of the present study is its lack of addressing the heterogeneity of high or low self-esteem. The complexity and heterogeneity of self-esteem may obstruct our analysis of different psychological processes that contribute to high or low self-esteem [19]. It should be prudent to differentiate the constructs of genuine high self-esteem and defensive (high) self-esteem such as narcissism and self-enhancing deception, as these constructs have been found to covariate with each other and often masked the genuine relationship between self-esteem and other outcomes [15,37]. Another weakness of the study was the use of self-report method in reporting SNS behaviour. A more reliable method is to directly extract information from mobile devices, perhaps with the advancement of Apps technology. Lastly, like most studies on delinquency the present study was based on cross-sectional survey method, which may provide rich information for correlational analyses but has the inherent limitation of delineating causation factors. A more effective method would be using experimental designs that manipulate the predictive factors.

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