



**Exploring the Associations of Youth Facebook Addiction
with Social Capital Perceptions**

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Manuscripts

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3 Reviewer(s)' Comments to Author:

4 Reviewer: 1

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6 Recommendation: Minor Revision

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8 **Comments:**

9 1. The Literature and hypotheses development section can be summarized by highlighting key issues. As
10 noted in the text some arguments are repeated more than once.

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12 *Reply: Thank you for your comments. We now revised the literature review and hypotheses*
13 *development sections and improved the flow of that section.*

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16 2. The methodology section need to include how ethical standards were observed.

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18 *Reply: Thanks for your comments. We now include the information about how ethical standards were*
19 *taken into account.*

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21 3. Provide details on how data was analyzed.

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23 *Reply: Thank you for your comments. We now provide more details about the data analysis and we*
24 *hope this can address your concern.*

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26 4. Include descriptively analyzed demographic variables of the respondent before presenting findings on
27 hypotheses testing. It will be more interesting to cross tabulate socio-demographics with the two variables
28 of social capital.

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30 *Reply: Thank you for your comments. We include cross-tabulation analyzes of the socio-demographics*
31 *variables and make some discussion on it.*

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34 Additional Questions:

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36 **Originality:** Does the paper make a significant theoretical, empirical and/or methodological contribution
37 to an area of importance, within the scope of the journal?

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39 **Comments:** The paper brings in new knowledge as it focuses on the taken for granted in Facebook and
40 social capital. It does so by focusing on face book addiction and social capital by incorporating a
41 gendered perspective. The paper also shows the relevance of theories in studying FB and social capital.

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43 *Reply: Thank you for your positive comments.*

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45 **Relationship to Literature:** Does the paper demonstrate an adequate understanding of the relevant
46 literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?
47 Is the literature review up-to-date? Has relevant material published in Online Information Review been
48 cited?

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51 **Comment:** The literature review is critically and thematically done in relation to study gap. The review is
52 incorporated with relevant theories. The sources of literature review are relevant and credible.

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54 *Reply: Thank you for your positive comments.*

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3 **Methodology:** Is the paper's argument built on an appropriate base of theory, concepts or other ideas?
4 Has the research on which the paper is based been well designed? Are the methods employed appropriate
5 and fully explained? Have issues of research ethics been adequately identified and addressed?
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7 **Comment:** The methodology used in the paper is adequate and fully explained. However, it does not
8 show how ethical standards were taken into account.
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10 **Reply:** *Thanks for your comments. We now include the information about how ethical standards were*
11 *taken into account.*
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14 **Results:** For empirical papers - are results presented clearly and analysed appropriately?
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16 **Comment:** The paper lacks socio-demographic analysis of the respondents. This would have formed the
17 basis of understanding who the respondents were. in terms of age, gender etc. The socio-demographic
18 variables need also to have been cross tabulated with main variable that is social capital.
19

20 **Reply:** *Thank you for your comments. We include cross-tabulation analyzes of the socio-demographics*
21 *variables and make some discussion on it.*
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23 **Discussion/Argument:** Is the relation between any empirical findings and previous work discussed?
24 Does the paper present a robust and coherent argument? To what extent does the paper engage critically
25 with the literature and findings? Are theoretical concepts articulated well and used appropriately? Do the
26 conclusions adequately tie together the other elements of the paper?
27

28 **Comment:** The paper to a large extent has collaboratively discussed empirical findings and secondary
29 data. It has shown how theory informed the interpretation of data and the conclusion arrived at.
30

31 **Reply:** *Thank you for your positive comments.*
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34 **Implications for research, practice and/or society:** Does the paper identify clearly any implications for
35 research, practice and/or society? Does the paper bridge the gap between theory and practice? How can
36 the research be used in practice (economic and commercial impact), in teaching, to influence public
37 policy, in research (contributing to the body of knowledge)? What is the impact upon society (influencing
38 public attitudes, affecting quality of life)? Are these implications consistent with the findings and
39 conclusions of the paper?
40

41 **Comment:** The paper brings new ideas on how to evaluate SNS in general for betterment of society. It
42 raises the importance of conceptualizing concepts in SNS studies.
43

44 **Reply:** *Thank you for your positive comments.*
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47 **Quality of Communication:** Does the paper clearly express its case, measured against the technical
48 language of the fields and the expected knowledge of the journal's readership? Has attention been paid to
49 the clarity of expression and readability, such as sentence structure, jargon use, acronyms, etc.
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51 **Comment:** The quality of communication is good and easy to follow.
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53 **Reply:** *Thank you for your positive comments.*
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55 **Reproducible Research:** If appropriate, is sufficient information, potentially including data and software,
56 provided to reproduce the results and are the corresponding datasets formally cited?
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Comment: There is sufficient information given regarding the process of research involved.

Reply: *Thank you for your positive comments.*

Online Information Review

Exploring the Associations of Youth Facebook Addiction with Social Capital

Perceptions

Abstract

Purpose: Although Facebook addiction has been found to be a key motive for using Facebook, scant research has explored the association of Facebook addiction with social capital. While researchers addressed how Facebook use strengthened social capital, they did not address the resultant excessive and uncontrollable Facebook use, which is a key sign of Facebook addiction. Therefore, we develop this project to study this research gap.

Design/methodology/approach: This research explores the motive of Facebook addiction by using a questionnaire to examine the relationships between Facebook addiction and two types of social capital: cognitive and bonding social capital. We recruited Hong Kong youth through Facebook and peer groups to complete a set of questionnaires on Facebook addiction, cognitive social capital, bonding social capital, and the degree of extraversion. Hierarchical regression is used for analyzing the data collected.

Findings: Hierarchical regression indicated that the more addicted one was to Facebook, the lower the cognitive social capital one perceived. Such a negative relationship was particularly significant for female participants. A similar but marginally significant effect is also found for bonding social capital.

Originality/value: Our research sheds light on the impact of Facebook addiction on how one perceives shared meanings and the sense of belongingness with other people on social networks.

Keywords: Facebook addiction; social capital; cyberpsychology; sense of closeness; hierarchical regression

Introduction

Researchers of social network sites are concerned that Facebook addiction is emerging among Facebook users accompanying the recent increase in Internet use (Chakraborty, 2016; Kuss *et al.*, 2014), as it is related to their reoccurring motives to visit Facebook. This issue is also getting important as more and more youth educational and academic activities are facilitated through social networks sites (SNS)(Yang *et al.*, 2022; Chan *et al.*, 2020; Dong *et al.*, 2021; Fong *et al.*, 2020; Wang *et al.*, 2021), and they can now be accessed anytime, anywhere through ubiquitous mobile technologies (Yip *et al.*, 2021). Facebook-addicted users withdraw from real-life contacts because they desire the gratifications of using Facebook, such as modifying mood and eliminating boredom, by reaching out to others through such an easily accessible platform. Therefore, to some extent, these activities may result in compulsive motives for Internet use (Zalk, 2016). Such motives can be explained by the Use and Gratification (U&G) Theory as proposed by SNS researchers (Ho and See-To, 2018) in that individuals use SNS to satisfy their needs and wants.

Gratifications, which can act as a motive for using Facebook, have been preliminarily explored from the viewpoint of social capital by some previous research. Social capital refers to the resources, both actual and virtual, accumulated through recognized social relationships (Ellison *et al.*, 2007), such as feelings of belongingness, closeness, and synchrony (Putnam, 2000). Some research found that social information-seeking behaviors (e.g., checking and learning about someone they met offline) were positively related to social capital (Ellison *et al.*, 2010). Facebook users found a sense of closeness and belongingness when they maintained their close relationships on Facebook (Grieve *et al.*, 2013). For example, women had more Facebook friends, while older people were engaged in more family activities on Facebook (McAndrew and Jeong, 2012).

However, some other research discovered inconsistent findings. For example, Ellison *et*

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2
3 *al.* (2007) found that Facebook intensity, i.e., how intense a user is using Facebook, had a
4 weak association with social capital. Ellison *et al.* (2007) pointed out the lack of clarity on the
5 relationship between Facebook addiction and social capital as a key limitation of their
6 research. While SNS researchers addressed how the use of Facebook strengthened social
7 capital, they do not address excessive and uncontrollable use of Facebook, which is a key
8 sign of Facebook addiction. Therefore, our research aims at exploring the maladaptive
9 motives of Facebook addiction to deepen the knowledge of the relationships between
10 Facebook addiction and social capital.

11 12 13 14 15 16 17 18 19 20 21 22 **Literature Review and Hypotheses Development**

23 24 25 ***Maladaptive Motives of Facebook Addiction***

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28 Facebook addiction is a problematic Facebook use pattern associated with excessiveness
29 and compulsiveness reflecting salience, loss of control, and withdrawal behaviors,
30 particularly non-substance-based addictive symptomatology (Ryan *et al.*, 2016).
31 Unfortunately, Facebook addiction is not a diagnosable mental disorder thus remains unlisted
32 in any diagnostic manuals, although it shares some common mental entities with drug and
33 substance addiction, such as the loss of control, tolerance, and withdrawal behaviors
34 (Andreassen *et al.*, 2012; Chakraborty, 2016; Ryan *et al.*, 2014). Facebook-addicted users
35 were found to use Facebook as a source of distraction to escape from reality and avoid
36 real-life problems (Masur *et al.*, 2014; Kuss *et al.*, 2017), similar to general Internet addiction
37 and gaming addiction (Savci and Aysan, 2017; Yee, 2006).

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Past literature has examined the gratification of various motives serving as reinforcers of Facebook addiction, contributing to the excessive, compulsive, and uncontrollable urges. Social assurance is the need for companionship and the presence of others, and it can be found on Facebook chatrooms running under Facebook Messenger, which displays online

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3 Facebook friends (Lee-Won *et al.*, 2015). The need for companionships was gratified by
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5 visiting Facebook and thus resulted in the repeated use of Facebook to seek further
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7 gratifications, especially for those who had an insufficient offline social life (Ryan *et al.*,
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9 2016) who were seeking to compensate for social life online to feel less lonely.
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11 Consequently, they became preoccupied with Facebook to seek gratification the next time
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13 they felt lonely again. Some Facebook users desired to find Facebook updates and repeatedly
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15 checked them to alleviate the fear of missing out on new updates and irritability (Andreassen
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17 *et al.*, 2012). Repeated actions resulted in a disproportional amount of allocated attention to
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19 Facebook. Facebook addicted users show feelings of irritability when being removed from
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21 using Facebook and impairment in the offline world (Caci *et al.*, 2017). Such consequences
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23 indicate excessiveness and compulsiveness, which are key signs of Facebook addiction, as
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25 suggested in the literature above. Furthermore, dysfunctional time management, especially in
26
27 the daytime, was related to the daily over-usage of Facebook at night, which was then
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29 associated with physical problems such as sleep disorders (Caci *et al.*, 2017). Andreassen *et*
30
31 *al.* (2012) further classified the characteristics of Facebook addiction into six aspects. They
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33 developed the Bergen Facebook Addiction Scale to measure the negative consequences of
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35 Facebook addiction, further suggesting the importance of exploring the phenomenon of
36
37 Facebook addiction. The six aspects included salience, mood modification, tolerance,
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39 withdrawal, conflict, and relapses, and are detailed in the Method section below.
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41 Unfortunately, prior research did not adequately address Facebook addiction and its
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43 consequences, particularly in relationship aspects.
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51 Caci *et al.* (2017) also examined the associations of Facebook addiction with gender and
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53 personality factors and found that openness and neuroticism were highly correlated with
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55 Facebook addiction. Females in the group of higher openness and neuroticism felt more loss
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57 of control when being removed from visiting Facebook than males, because females tended
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3 to use Facebook to maintain interpersonal relationships while males used it to seek
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5 information.
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8 *Social Capital* 9

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11 Social capital is the resources, both actual and virtual, accumulated through recognized
12 social relationships among people (Ellison *et al.*, 2007). Individuals can accumulate social
13 capital when they give and take resources. For example, receiving information from others
14 and providing information back to them are ways to accumulate social capital (Leung *et al.*,
15 2022; Fong *et al.*, 2020) because this creates feelings of belongingness and synchrony. Under
16 circumstances where both genders take up a social role, such as youth using Facebook,
17 women and men may manifest different observable behaviors according to each gender's
18 characteristics (Prebor, 2021). Women were found to be more collaborative, and value
19 harmony more (Westermann *et al.*, 2005) than men, and they scored higher in agreeableness
20 than men across 55 cultures (Schmitt *et al.*, 2009). Women thus perceived more cognitive,
21 bonding, and bridging social capital than men in general. Due to the effect of gender on social
22 capital, our research controls the gender variable statistically.
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39 Putnam (2000) further classified social capital into three main types: cognitive, bonding,
40 and bridging social capital, and they are in different forms with different functions. Cognitive
41 social capital refers to shared meanings and beliefs among people in a group (St John, 2017).
42 Bonding social capital is the feeling of closeness and affiliation one finds with whom they
43 have close connections with (Putnam, 2000), while bridging social capital is a feeling of
44 closeness and affiliation one finds with loose connections and can be someone from
45 heterogeneous demographics, job nature, or even from other loosely connected groups of
46 friends—the outgroups (Putnam, 2000). Our research examines cognitive social capital and
47 bonding social capital only and leaves out bridging social capital because of its difficulty to
48 be measured. Bridging social capital gives information about outgroup communities
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(Villalonga-Olives and Kawachi, 2015), which helps broaden social experiences (Ellison *et al.*, 2007). It is related to one's willingness to interact with outgroup communities as well as one's self-esteem and satisfaction with life, which are also related to willingness (Ellison *et al.*, 2007). Therefore, such complexity of measuring bridging social capital makes it difficult to be measured.

Cognitive Social Capital

Cognitive social capital includes shared entities that individuals feel from their social networks, such as shared meanings, beliefs, and interpretations (St John, 2017). When an individual acquires such shared entities from social networks, he/she feels trust and reciprocity, which accumulate cognitive social capital (St John, 2017). Therefore, cognitive social capital is related to something individuals *think* or *feel*. Specifically, cognitive social capital is acquired when group members of the social network feel synchronized within the group (Pi *et al.*, 2013). For example, individuals favor a particular country because they find similar values in the people of that country. In this example, the individuals have accumulated cognitive social capital in that country because they find shared meanings that synchronize with others. Pi *et al.* (2013) explored the importance of shared entities in groups and found that perceptions of shared entities affected the positivity of attitudes individuals held toward the group. The same study found that members of a Facebook group had a relatively positive attitude **towards** their group when there were common norms and when they felt **they were being** treated equally as others within the group. When group members were more willing to share knowledge within the group and more open in expressing their emotions instead of hiding them, the perceptions of cognitive social capital were further enhanced.

However, the Facebook News Feed algorithm prompt Facebook users to find dissimilar meanings from other users instead of shared entities, thus affecting the positive attitudes users

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3 hold toward their social groups (Wallaroo Media, 2018), which will be discussed in the next
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5 sub-section.
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7 *Facebook News Feed algorithm and McGuire's Inoculation Theory*

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10 Facebook News Feed algorithm ("FB algorithm"), a filtering function for users' News
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12 Feed, create dissimilar meanings instead of shared meanings between users. The FB
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14 algorithm automatically filtered and sorted out 1,500 posts on average each time when users
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16 logged onto Facebook based on their level of engagement in these posts (such as likes,
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18 comments, or clicks). As Facebook believed that users would not have enough time to view
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20 them all, they were shown posts that were "popular" first (Backstrom, 2013). The more
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22 engaged they were in the posts, the more "popular" the posts became, and the more likely
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24 they would appear first on users' News Feed at the next log-on. Since users were more likely
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26 to engage in the posts that they found shared entities in, they were frequently exposed to
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28 posts of similar types and those from the same group of people.
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33 In September 2011, Facebook consolidated the FB algorithm updates and stated that
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35 they wanted users to see the things they were "most interested in, like status updates from
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37 your family and closest friends" (Wallaroo Media, 2018, para. 54). In 2013, Lars Backstrom,
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39 a Facebook engineer, blogged on Facebook that News Feed provided the "right content" to
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41 the "right people" (Backstrom, 2013, para. 2). Notably, the controls of the FB algorithm to
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43 provide the "most interested" posts and "right content" are making posts that appear to
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45 become similar to each other, meaning that the posts are one-sided with similar arguments.
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47 Further, one-sided comments will be prioritized and shown automatically according to the
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49 user's interests, and users have to manually choose "Show All Comments" to see all other
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51 comments.
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56 The McGuire's (1961) Inoculation Theory can explain the effect of the FB algorithm on
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58 cognitive social capital. The theory proposes that exposure to less refutable
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3 counter-arguments allows users to think about ways to defend themselves and use them to
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5 generate resistance to strengthen existing beliefs, serving as an analogy to “immunize” by
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7 medicines. While this happens, users resist stronger counter-arguments and are less likely to
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9 change their beliefs. Thus, users perceive higher levels of similarity and more shared
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11 meanings within the community. However, the FB algorithm’s prioritization gives a
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13 restriction to the development of resistance for its users.
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17 Since Facebook-addicted users spent excessive time and engaged in compulsive use of
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19 Facebook, the FB algorithm may have become salient among this population. The literature
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21 on the effects of the FB algorithm on Facebook-addicted users serves as the theoretical basis
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23 for our research to hypothesize that the more addicted one was to Facebook, the lower
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25 cognitive social capital one perceived.
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28 ***Bonding Social Capital***

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30 Bonding social capital refers to resources accumulated with whom one has a close
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32 relationship, such as emotional support from close friends and families (Putnam, 2000; Geys
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34 and Murdoch, 2010). Thus, it is also known as strong ties (Ellison *et al.*, 2007). Unlike
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36 cognitive social capital, where resources are related to what individuals *think or feel* (St John,
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38 2017), bonding social capital relates to individuals’ concrete actions, such as messaging their
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40 families about their days. To obtain a feeling of closeness in social relationships, Baumeister
41
42 and Leary (1995) proposed the belongingness theory stating that the perceptions of bonding
43
44 social capital stem from meaningful interpersonal connections—the person feels a sense of
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46 belongingness and feelings of affiliation. It is something that everyone needs in rapport
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48 building and social engagement. Furthermore, the need for belonging was satisfied only when
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50 the quality of contact with others was meaningful instead of merely accompanying
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52 (Baumeister and Leary, 1995). For example, Zhang *et al.* (2011) found that online
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54 self-esteem, which is how worthy a person is to another person within a group, predicted
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3 positively and significantly the gratification of emotional support and maintenance of
4 connections with others on Facebook.
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8 Social network researchers found that Facebook use was linked to the perceptions of
9 bonding social capital when users searched and connected with others on Facebook through
10 interactive functions (Quan-Haase and Wellman, 2002), thereby eliciting the sense of
11 belongingness and feelings of affiliation. Facebook, which allows functions such as
12 messaging, posting, sharing photos, and reading articles on social issues, facilitates
13 reciprocity of understanding and closeness from friends and families.
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22 It is well known that Facebook-addicted users also had conflicts in offline relationships
23 with close ones. For example, they might have “ignored your partner, family, members or
24 friends because of Facebook” (Andreassen *et al.*, 2012, p. 516), making them socially
25 isolated and alienated. Such Facebook-addicted users are doubtful to have strong bonding
26 with their close ones offline. Some research suggested that Facebook-addicted users try to
27 “compensate” for socializing online (Kraut *et al.*, 2002), while Ryan *et al.* (2016) found that
28 problematic Facebook users did not find online social interactions compelling, viewed them
29 as superficial and less intimate, browsed for things happening to eliminate boredom, and
30 engaged in Facebook games most of the time.
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43 Our research addressed the mixed findings. Since it is more likely that
44 Facebook-addicted users have a weaker social bonding, our research hypothesized that the
45 more addicted one was to Facebook, the lower the bonding social capital one perceived.
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50 ***Facebook Addiction and Extraversion-Introversion***

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53 Personality psychology informs us that personalities are influential factors of the level of
54 addiction and perceptions of social capital as well as predictive factors of different patterns of
55 Facebook usage (Merton, 1968). Personality traits, such as neuroticism, conscientiousness,
56 and extraversion/introversion, were associated with problematic Facebook use
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3 (Pornsakulvanich and Dumrongsiri, 2012). Extraversion is a personality trait highly
4 associated with talkative, assertiveness, and activeness, while introversion is highly
5 associated with quietness, reservedness, and shyness (John *et al.*, 2008). Clayton et al. (2013)
6 found that extraverts' motives to use Facebook were using direct communicative practices to
7 connect with others, while introverts' motives were to reduce the anxious feelings they
8 anticipated from face-to-face interaction because the latter group was socially incompetent
9 and shy to connect with others offline. Introverts felt more comfortable connecting with
10 others online.

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22 *Social compensation hypothesis/poor gets richer (SCH/PGR)* and *social enhancement*
23 *hypothesis/rich gets richer (SEH/RGR)* theories account for the different motives of
24 Facebook use shown in extraverts and introverts, respectively (Merton, 1968; Kraut *et al.*,
25 2002). SCH believes that introverts, or those socially incompetent in the offline world, use
26 Facebook to “compensate” for socializing online. In contrast, SEH believes that extraverts, or
27 those socially competent, continue to be active online, and thus “enhance” their activeness on
28 Facebook (Pornsakulvanich and Dumrongsiri, 2012). Yet, the situations vary. Some studies
29 found that introverts spent more time on Facebook than extroverts because they wanted to
30 keep up with their friends' updates, and they were prone to develop symptoms of Facebook
31 addiction (Moore and McElroy, 2012; Rodriguez, 2017). Hence, extraversion and
32 introversion may have different effects on Facebook addiction. To this end, our research
33 wants to include the degree of extraversion-ness as a controlled variable as it may influence
34 our research outcomes. Thus, our research made the following two hypotheses:

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52 **Hypothesis 1:** The more addicted one was to Facebook, the lower the cognitive social capital
53 one perceived when demographic variables and personality remained constant.

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Hypothesis 2: The more Facebook-addicted one was, the lower the bonding social capital
one perceived when demographic variables and personality remained constant.

Methods

This study was a non-experimental study that examined the relationship between Facebook addiction and perceptions of cognitive bonding social capital and bonding social capital in youths with demographic variables and Extraversion-Introversion (E-I) dimension personality as controlled variables. Hierarchical regression and moderation analysis were used to test our hypotheses.

We recruited local Hong Kong youths through Facebook posts and university mass email by convenient sampling. We also used a snowball sampling method and invited other participants to send the questionnaire link to their friends. A total of 122 responses were used in this research after we excluded responses from non-local youths and incomplete or contradictory responses. Youths were chosen in our research because the majority of the most active Facebook users belong to this age group, according to recent data (Statistia, 2018). Statistics showed that Facebook users between the age of 18 to 34 made up 60% of all users (Statistia, 2018), and a January 2018 Social Marketing Report Hong Kong published on SocialBakers reported that the largest age group of Facebook users is 18 to 35 years of age (SocialBakers, 2018). Also, youths within the age group were more bonded to society, as they were more likely to participate in social movements, take the initiative to speak up, and comment on social issues in general, which reflected signs of critical thinkers. Hence, it is interesting to examine the role of Facebook addiction on their perceptions of social capital to draw significant implications. Departmental Research Ethics Review for Undergraduate Research Project was approved by the Department of Psychology from the University of Hong Kong for this study.

Procedures

We invited youths to complete an online questionnaire in Hong Kong. Details of each scale are discussed below. The full questionnaire took around 10 to 15 minutes to complete.

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3 Then, the participants were debriefed and appreciated for their contributions to our research
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5 online.
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7 8 **Measures**

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10 In addition to general demographic questions, the questionnaire included five different
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12 scales: Facebook Intensity (partial) (Ellison *et al.*, 2007), Bergen Facebook Addiction Scale
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14 (Andreassen *et al.*, 2012), Big Five Inventory—Extraversion-Introversion (John *et al.*, 2008),
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16 Bonding Social Capital (Ellison *et al.*, 2007), and Social Connectedness Scale (Lee *et al.*,
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18 2001).
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21 **Demographics and Facebook use.** Our research included questions on age group,
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23 gender, and field of study. A popular and widely known scale on Facebook use, Facebook
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25 Intensity Scale (partial) by Ellison *et al.* (2007), was adapted to our research. We adopted
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27 questions on the hours spent on Facebook per day and came up with a question on hours
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29 spent on other social media except for Facebook per day (Cronbach's alpha = .62). The
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31 results were reported on a three-point Likert scale (1 = < 1-2 hours, 2 = 3-6 hours, 3 = > 6
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33 hours).
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38 **Facebook Addiction.** The Bergen Facebook Addiction Scale (BFAS) (Cronbach alpha
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40 = .92), developed by Andreassen *et al.* (2012), is a widely adopted uni-dimensional scale that
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42 aims to measure six aspects of possible addiction among Facebook users. The six aspects are:
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44 salience (e.g., Facebook dominates thinking and behavior), mood modification (e.g.,
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46 Facebook “modifies/improves” mood), tolerance (e.g., Facebook use increases to achieve the
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48 same level of gratifications), withdrawal (e.g., unpleasant feelings occur when the use of
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50 Facebook is “discontinued or suddenly reduced”), conflict (e.g., Facebook use causes
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52 “conflicts in relationships, in work/education, and other activities”), and relapse (e.g., there is
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54 a “tendency to revert to earlier patterns of the activity after abstinence or control”)
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56 (Andreassen *et al.*, 2012, p. 503). There are three items for each of the six aspects, with a
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total of 18 items. The full scale was adopted. The results are reported on a five-point Likert scale (1 = Very rarely, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Very often). A higher score indicates a higher Facebook addictive tendency.

Perceptions of Social Capital. Perceptions of social capital were measured by two scales, Social Connectedness Scale (Cognitive Social Capital) and Bonding Social Capital Scale.

Social Connectedness Scale-Revised (Cognitive Social Capital). The Social Connectedness Scale-Revised (Cronbach's alpha = .92) measures a psychological sense of belonging and interprets interpersonal closeness with people around them in a cognitive sense (Lee et al., 2001). Permission to use was granted before this research. It includes 20 items, and the full scale was adopted. The results are adopted on a six-point Likert scale (1 = Strong Disagree, 2 = Disagree, 3 = Mildly Disagree, 4 = Mildly Agree, 5 = Agree, 6 = Strongly Agree). Items scales 3,6,7,9,11,13,15,17,18,20 are negative questions and thus require reverse coding.

Bonding Social Capital Scale. The Bonding Social Capital Scale (Cronbach's alpha = .73) measures ones' emotional and supportive connections with a close relationship (Ellison et al., 2007). It is also adopted from Ellison et al. (2007) and modified to fit into the Hong Kong context. For example, the location indicated in the scale was changed from "MSU" to "HK," where MSU is Michigan State University, and HK is Hong Kong. The full scale was adopted. The results are reported on a five-point Likert scale (1 = Strong Disagree, 2 = Disagree, 3 = Neither Disagree nor Agree, 4 = Agree, 5 = Strongly Agree).

Degree of extraversion. Big Five Inventory—Extraversion-Introversion (EI-dimension) (Cronbach's alpha = .83) measures the spectrum of extraversion (John et al., 2008). Previous literature found that introverts were more sensitive to cues of exclusion, and thus perceived a lower level of social capital than extraverts did, in general (Dandeneau and Baldwin, 2004).

Therefore, Facebook users who reported high scores in this dimension were more likely to rate higher **on** later scales on their perceptions of social capital. The scale has a total of eight items, and the results were reported on a five-point Likert scale (1 = Strong Disagree, 2 = Disagree, 3 = Neither Disagree nor Agree, 4 = Agree, 5 = Strongly Agree). Item scales 2, 5, **and** 7 were negative questions and thus required reverse coding. Our research considered previous literature on the influences of extraversion and introversion, which had a positive and negative relationship with the perceptions of social capital, respectively (Ryan *et al.*, 2014; Rodriguez, 2017). The E-I dimension was statistically controlled in our later statistical analyses.

Results

In order to assess the relationships between Facebook addiction and social capital, the study conducted hierarchical linear regression. In Model 1, demographic and personality variables were entered as IVs, given their effect on Facebook addiction, and social capital was entered as DVs. In Model 2, Facebook addiction was also added as IVs with demographic and personality variables (now as controlled variables), and social capital was entered as DVs to examine the unique effect of Facebook Addiction on the perception of social capital. The results were also gendered. Table I shows the correlation matrix of the measurements used.

< Insert Table I here. >

The cross-tabulated results (Table II) showed that most participants used Facebook and other social media for less than 1-2 hours per day for both genders. While the results showed only a rareness of Facebook addictive tendency among the participants, female participants in the age group of 26-31 reported the highest score among other participants in Facebook Addiction and reported the third-lowest score on cognitive social capital and second-lowest score on bonding social capital, suggesting a possible relationship between the variables.

< Insert Table II here. >

Facebook Addiction and Perceptions of Cognitive Social Capital

Referring to Table III, Model 1 showed that the controlled variables could significantly predict around 25.1% of the variance in perceptions of cognitive social capital, $F(6, 115) = 6.41, p < .001$. Model 2, the main effect model, showed that Facebook addiction and the controlled variables together explained an additional 4% of the variance in perceptions of cognitive social capital, yielding a total of 29.0% of variances, $F(1, 114) = 6.40, p < .05$. The hierarchical regression analysis showed a significant negative relationship between Facebook addiction and perceptions of cognitive social capital, $\beta = -.21, p < .05$. The result suggested that the negative relationship between Facebook addiction and perceptions of cognitive social capital could be made when demographic variables remained constant. *The unique negative effect of Facebook Addiction on perceptions of cognitive social capital was significant.* This finding supported our Hypothesis 1, which predicted that the more addicted one was to Facebook, the lower cognitive social capital one perceived. We further examined gender differences, and found that the negative relationship was significant for female only, with $\beta = -.33, p < .01$, but not for male ($\beta = -.06, p = .64$).

< Insert Table III here. >

Facebook Addiction and Perceptions of Bonding Social Capital

Referring to Table IV, our Model 1 showed that the controlled variables could explain around 4.0% of the variance in perceptions of bonding social capital. Model 2, the main effect model, showed that Facebook addiction and the controlled variables together explained an additional 3.1% of the variance in perceptions of bonding social capital, yielding a total of 7.1% of variances, $F(1, 114) = 3.87, p = .052$. The hierarchical regression analysis showed a marginal negative relationship between Facebook addiction and perceptions of bonding social capital, $\beta = -.19, p = .052$. Hypothesis 2, which predicted that the more addicted one was to Facebook, the lower bonding social capital one perceived, was thus marginally supported

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3 (with $p = .052$). We also examined gender differences, and found that the negative
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5 relationship was marginally significant for female only, with $\beta = -.24$, $p = .068$, but not for
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7 male ($\beta = -.09$, $p = .575$).
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13 **Discussion**

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16 Our research is one of the few studies that explored the association of Facebook
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18 addiction as a maladaptive motive of using Facebook with youths' social capital, which
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20 reflects resources such as shared entities and feelings of belongingness in both actual and
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22 virtual forms, accumulated through recognized social relationships among people (Ellison *et*
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24 *al.*, 2007; Putnam, 2000). Our research examined the association of Facebook addiction with
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26 two types of social capital: cognitive social capital and bonding social capital. Specific
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28 hypotheses were that 1) the more addicted one was to Facebook, the lower cognitive social
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30 capital one perceived, and 2) the more addicted one was to Facebook, the lower the bonding
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32 social capital one perceived. The results highlighted the relationship between Facebook use
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34 and the effects of shared entities as well as the feeling of belongingness in a group of
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36 Facebook-addicted users.
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42 The most important findings in this research were a significant negative relationship
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44 between Facebook addiction and perceptions of cognitive social capital, and a marginally
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46 negative relationship between Facebook addiction and perceptions of bonding social capital,
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48 after controlling for demographic variables. This suggests that Facebook addiction
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50 contributes to a lower cognitive social capital and bonding social capital when demographic
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52 variables are kept constant.
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56 Notably, the negative relationship between Facebook addictions and perceptions of
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58 cognitive social capital is consistently explained by the inoculation theory of McGuire (1961)
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60 on how frequent exposures to one-sided arguments lead to a lower ability to resist future

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3 attacks by opposite sided arguments. This adds to the new knowledge that attitude toward
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5 others' arguments varies their feelings between being an in-group or out-group member and
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7 synchronization with others (Pi *et al.*, 2013). Also, since Facebook-addicted users were
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9 gratified by their needs/interest to visit Facebook repeatedly, our research suggests that they
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11 are more prone to McGuire's inoculation theory. Surprisingly, the negative relationship was
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13 found to be only significant for the female because previous literature showed that women
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15 perceive more connectedness with others due to their collectivistic-oriented personality trait
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17 (Caci *et al.*, 2017). The negative relationship and gender differences reinforce the effects of
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19 the FB algorithm.
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24 However, it is interesting to find a negative relationship between Facebook addiction
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26 and perceptions of social capital in Hong Kong, given that the Eastern context is a
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28 collectivistic culture (Hofstede, 2011). Hofstede proposed six dimensions of cultural units:
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30 power distance, individualism, masculinity, uncertainty avoidance, long-term orientation,
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32 indulgence, and he pointed out that different cultures express different degrees of each
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34 dimension. As shown in the Hofstede Cultural Dimensions Indexes (Hofstede, 2011), Hong
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36 Kong has a low score (25) in the "individualism" dimension, which indicates that Hong Kong
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38 is a relatively collectivistic society. The collectivistic nature of Hong Kong culture indicates
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40 that the effect of Facebook platforms on social capital is very significant, because it interferes
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42 with people ways of social interactions. More understandings of the interactions between
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52 The negative relationship between Facebook addiction and perceptions of bonding social
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54 capital was marginally supported: our results suggested that Facebook-addicted users
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56 contributed to less meaningful connections with others. In particular, the marginal negative
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58 effect came from female users, which echoed the findings in some prior literature. For
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60 example, Sheldon *et al.* (2011) found that as not all social needs were satisfied through

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3 Facebook, users felt disconnected. Sheldon *et al.* (2011) provided further support to parts of
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5 our research's result, indicating that Facebook does not satisfy its users' social needs under
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7 some circumstances, forming a negative relationship between Facebook use and bonding
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9 social capital. Some previous literature suggests a positive relationship between the number
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11 of Facebook friends and social capital accumulated through posting and liking posts on
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13 Facebook (Bohn *et al.*, 2014). Our marginally negative result is probably the outcome of the
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15 negative relationship mentioned offset by these "positive impacts." This finding would lead
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17 us to rethink the complexity of closeness, affiliations, and bonding social capital means for
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19 Facebook users. The marginally negative result of how social connections are formed on
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21 social media platforms demonstrates the need for more research to extend the knowledge, i.e.,
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23 what social needs truly mean to be different for individual users.
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29 Our research addressed Facebook addiction as one of the growing maladaptive motives
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31 of using Facebook that lacks research in social capital formation on SNS. As SNS has
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33 become a significant communication tool for people and SNS users may accumulate bonding
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35 social capital through many other ways, such as offline interactions and other popular SNS
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37 platforms (Centre for Youth Studies, 2017), this suggests a need to account for motives in
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39 future research of social capital on other social media applications. Therefore, we would
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41 suggest that future research consider different SNS platforms and measurements of social
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43 capital, given that the latter involve subjective, complex, and diverse factors.
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48 In summary, our research managed to extend existing research on social capital and the
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50 motives of using SNS through the lens of Facebook-addicted users, which previous literature
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52 of relating Facebook use to social capital has largely ignored. Our research highlighted that
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54 the motives of using Facebook, specifically upon getting addicted, could have an impact on
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56 both the users' perceptions of cognitive social capital and bonding social capital. Even though
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58 Facebook-addicted users do accumulate their social capital offline at some times, their
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3 experiences on Facebook may become their main perceptions of social capital, as suggested
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5 by our research.
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7 **Conclusion and Limitation**

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10 Our research explored Facebook addiction as the maladaptive motives of using
11 Facebook and its effect on social capital. The more addicted one was to Facebook, the lower
12 cognitive social capital one perceived, due to the FB algorithm and uncontrollable urges; and
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14 the more addicted one was to Facebook, the marginally lower bonding social capital one
15 perceived since not all the social needs were satisfied through Facebook and may result in the
16 sense of disconnectedness. Still, bonding social capital is a broad category, and there are a
17 variety of subcategories that may contribute to its perceptions in our research. Subcategories
18 of bonding social capital include community-level social capital and individual-level social
19 capital, and the subcategories act as internal validity in our research. Thus, further studies are
20 suggested to include different types/subcategories of bonding social capital for piercing into
21 the impact of these subcategories and examine how Facebook addiction affects these
22 subcategories. Furthermore, bridging social capital, which was not covered in our research,
23 can be included in future studies.
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40 Although our research found a relationship between Facebook addiction and perceptions
41 of social capital, our research did not take into account other confounding factors, such as
42 different personalities, current social issues, and political issues, which may interact with
43 Facebook addiction that varies perceptions of social capital and affect the external validity of
44 our research's results. They can be a pre-and-post study, which includes a baseline, and will
45 also be useful to measure how perceptions of social capital change over time.
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53 **Notably, as Facebook is not popular among people younger than 18 years old (Statista,**
54 **2018), studies in the future are suggested to look at how other popular social media, such as**
55 **Instagram, create shared entities, bonding, and connectedness among the younger generation**
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3 (Chan et al., 2020, Lam et al., 2022). Indeed, some recent research already shows that
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5 different social media platforms (such as Facebook, Twitter, and Instagram) will affect
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8 people's psychological situations differently (Ye *et al.*, 2021).
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10 Also, Facebook addiction often accompanies other mental illnesses, such as depression
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12 (Chakraborty, 2016). The presence of other mental problems may affect their perceptions of
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14 social capital, and our research did not include this as a factor. Future research should
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16 examine Facebook addiction and social capital from a clinical perspective. Besides, it is
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18 interesting to investigate social network users' behavior before and after the COVID-19
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21 pandemic (Ye and Ho, 2022) and emotional issues (Liu *et al.*, 2021).
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Table I. Correlation Matrix

	1	2	3	4	5	6
1						
2	.18 **					
3	.05	-.28 ***				
4	.02	.04	-.12			
5	.13	-.03	.45 ***	-.25 ***		
6	-.02	-.06	.12	-.14	.43 ***	

1= Age; 2= Gender; 3=E-I dimension; 4= Bergen Facebook Addiction Scale; 5= Social Connectedness (Cognitive Social Capital); 6= Bonding Social Capital

* $p < .10$, ** $p < .05$, *** $p < .01$

Table II. Cross-Tabulation of Socio-Demographic variables.

		Use of Facebook Per Day (Frequency)			Use of Other Social Media Per Day (Frequency)			Facebook Addiction (Mean)*	Social Capital (Mean)	
		less than 1-2 hours	3-6 hours	more than 6 hours	less than 1-2 hours	3-6 hours	more than 6 hours		Cognitive Social Capital^	Bonding Social Capital#
Male (N = 48)	Age 20-25	27	10	5	22	14	6	1.86	4.15	4.01
	26-31	3	1	1	2	1	2	1.63	3.91	4.28
	32-37	0	1	0	1	0	0	1.83	4.7	4
	Total	30	12	6	25	15	8			
Female (N = 74)	Age 20-25	37	11	7	28	20	7	1.83	4.07	4.01
	26-31	8	2	2	8	4	0	2.21	3.93	3.82
	32-37	4	0	1	4	1	0	1.81	4.48	3.56
	38-40	2	0	0	2	0	0	1.61	4.95	4.70
Total	51	13	10	42	25	7				

*1 = Very rarely, 2 = Rarely, 3 = Sometimes, 4 = Often, 5 = Very often

^1 = Strong Disagree, 2 = Disagree, 3 = Mildly Disagree, 4 = Mildly Agree, 5 = Agree, 6 = Strongly Agree

#1 = Strong Disagree, 2 = Disagree, 3 = Neither Disagree nor Agree, 4 = Agree, 5 = Strongly Agree

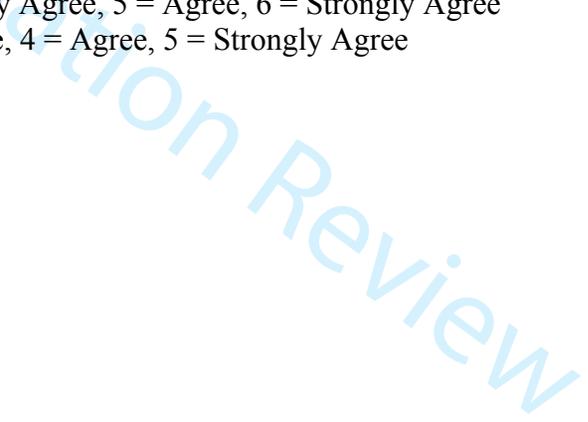


Table III. Hierarchical Regression of the Relationships between Facebook Addiction and Perceptions of Cognitive Social Capital (N = 122)

Steps		Model 1: Base Model	Model 2: Main effect		
		R^2	ΔR^2	R^2	β
Step 1	Controlled variables ^a	.25 ***			
Step 2	Facebook addiction		.04	.29 ***	-.21 ***
	Male				-.06
	Female				-.33 ***

* $p < .10$, ** $p < .05$, *** $p < .01$

^a Age, Gender, E-I dimension, Facebook Friends, Hours Spent on Facebook per Day, Hours Spent on Other Media per Day

Table IV. Hierarchical Regression of the Relationships between Facebook Addiction and Perceptions of Bonding Social Capital (N = 122)

Steps		Model 1: Base Model	Model 2: Main effect		
		R^2	ΔR^2	R^2	B
Step 1	Controlled variables ^a	.04			
Step 2	Facebook addiction		.03	.07	-.19 *
	Male				-.09
	Female				-.24 *

* $p < .10$, ** $p < .05$, *** $p < .01$

^a Age, Gender, E-I dimension, Facebook Friends, Hours Spent on Facebook per Day, Hours Spent on Other Media per Day