Sociopsychological Determinants and Internet Gaming Disorder Among Online Gamers: The Mediating Role of In-Game Content Purchase Intention

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Abstract:

The number of internet gamers and money spent on online games is increasing dramatically under the impact of the COVID-19 pandemic. This study aimed to investigate the role of in-game content purchase intention as the mediator between sociopsychological determinants and internet gaming disorder. 410 internet gamers aged 15 to 40 who purchased in-game content were recruited. The Socio-psychological Determinants Checklist (SPCL-15), In-game Content Purchase Intention Scale (ICPIS), and Internet Gaming Disorder Scale-Short Form were used to assess sociopsychological factors, in-game content purchase intention, and gaming addiction. The bootstrap method was used for mediation analysis to test the relationship between sociopsychological determinants and internet gaming disorder through in-game content purchase intention. The findings revealed that there were significant correlations between sociopsychological determinants and internet gaming disorder, as well as in-game content purchase intention. The intermediary analysis discovered that in-game content purchase intention was a mediator between sociopsychological determinants and internet gaming disorder. Intervention and policy for internet gaming should be addressed as preventive measures on internet gaming disorder.

Keywords: Sociopsychological determinants; internet gaming disorder; in-game content purchases, Chinese internet gamers

1. Introduction

The growth of high-performance networks, high-tech mobile devices, and online payment methods can be attributed to the popularity of online games and in-game purchases. According to Newzoo, the number of online gamers reached over 3.2 billion worldwide in 2022, with 1.61 billion gamers residing in Asia-Pacific, the largest video game market (Newzoo, 2022). During the global lockdown caused by the COVID-19 pandemic, online games have emerged as one of the most popular forms of entertainment. According to specific research findings, the COVID-19 pandemic has altered people's daily lives and leisure activities (Bengtsson et al., 2021; Chung, 2021). Problematic online gaming occurs when individuals become so interested in this behavior

that they cannot perform their everyday tasks. In general, the research investigates the motivations of online gamers and their physical and mental health consequences. Internet gaming disorder is currently recognized as one of the public's key concerns due to its immediate and long-term adverse health and societal impacts (Chung, 2021).

Internet gaming disorder (IGD) as defined as "persistent and recurrent use of the internet to engage in games, often with other players, leading to clinically significant impairment or distress," was identified as a potential mental disorder warranting further investigation in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2013, p.795). Globally, the prevalence rates of internet disorder ranged from 0.21 to 57.5% in the general population (Darvesh et al., 2021). In Hong Kong, studies were predominantly conducted on children and adolescents, and the findings reported that 14.6% to 20.9% met the criteria of IGD. Chung (2021) targeted young online gamers aged 15 to 40 and found a high rate of IGD, about 74%.

Some studies (Tsui & Cheng, 2021; Zhu et al., 2021) suggested that internet gaming could be used as an avoidant coping strategy to escape stressful situations, real-life problems, and negative emotions like depression and loneliness. Taechoyotin et al. (2020) found that family dysfunction and poor school performance were associated with internet gaming disorder. While many recent studies identified that the outbreak of the COVID-19 pandemic was the main factor because a slew of preventive measures, including social distancing, school closures, and quarantine, are enforced worldwide. Consequently, people spend more time at home and on the internet (Chung, 2021; Zhu et al., 2021).

In addition to the factors leading to internet gaming, a substantial amount of research has been conducted on the motivation of game players who participate in internet games, in particular, those paid for online games. A literature review suggested that gamers intend to purchase in-game content, including for fun, to relate to friends, and show off (Chung & Lau, 2021; Hamari et al. (2017; Lehdonvirta, 2009). Researchers also discovered that gamers stressed unobstructed play and monetary and consumption value in online game purchases (Hamari et al., 2017; Wohn (2015). It is reasonable to presume that in-game content purchase intention may correlate with internet gaming disorder when gamers are eager to get what they want from online gaming. However, a literature review reveals that no research has been conducted to examine the mediating role of in-game content purchase intention. Based on the literature review, we have four research questions in this study:

Research Question 1: Is socio-psychological determinants related to internet gaming disorder?
Hypothesis 1: An association between socio-psychological determinants and internet gaming disorder.

Research Question 2: Is socio-psychological determinants related to in-game content purchase intention?
Hypothesis 2: An association between socio-psychological determinants and in-game content purchase intention.

Research Question 3: Is in-game content purchase intention related to internet gaming disorder?

Hypothesis 3: An association between in-game content purchase intention and internet gaming disorder.

Research 4: Does In-game content purchase intention mediate the impact of socio-psychological characteristics on internet gaming disorder?
Hypothesis 4: In-game content purchase intention is a mediation effect in the relationship between socio-psychological characteristics and internet gaming disorder.

2. Materials and Methods

2.1 Participants and Procedures

This study adopted a quantitative methodology with a cross-sectional research design. Purposive sampling was conducted from March to June 2020. The inclusion criteria were as follows: any Hong Kong residents aged between 15 and 40 had purchased in-game content while playing online games one month before the study and knew Chinese Characters. Subjects were recruited via online game pages and available online game chat groups. The online questionnaire includes information about participants' socio-demographics, and time spent playing online games every day, monthly spending on purchases, favorite types of online games. Each respondent took approximately 20 minutes to complete the survey. Ethical approval was obtained from the Human Research and Ethics Committee of the first author's Institute (Reference No. HRE200101). All subjects gave their written informed consent before joining the online survey. All those 410 respondents of our survey had in-game content purchase practices.

2.2 Data Analysis

We investigated the role of in-game content purchase intention in mediating the association between socio-psychological determinants and internet gaming disorder using mediation models (Models 4). The statistical analyses in this study used the SPSS 23.0 software. The results of demographic characteristics, socio-psychological determinants, in-game content purchase intention, and internet gaming disorder were reported using descriptive statistics. A Pearson correlation analysis was used to investigate the relationship between in-game content purchase intention, socio-psychological variables, and internet gaming disorder. Mediation studies were performed using the PROCESS macro for SPSS version 4.1 to assess the mediation effect of in-game content purchase intention in the relationship between socio-psychological characteristics and internet gaming disorder (Hayes, 2022). Furthermore, with 5,000 resamples, the bootstrapping method was employed to estimate the 95% confidence intervals that did not contain zero (Hayes, 2022)

2.3 Measurement Instruments

2.3.1. Social and Demographic Information

Demographic and personal information obtained included gender, age, nationality, occupation, income, education.

2.3.2. Game Playing Pattern

Respondents were asked to report their gaming patterns, including time spent on playing online games daily after the COVID-19 pandemic, the game device used for playing games, game genres, and amount of money spent in purchasing game content.

2.3.3. Internet Gaming Addiction

The Chinese 9-Item Internet Gaming Disorder Scale- Short Form (Chen et al., 2019) as a tool to measure internet gaming disorder according to DSM-5. The cut-off for internet gaming disorder is 5 out of 9 criteria. We employed it to assess the severity of IGD based on IGD questions in DSM-5. A 6-point Likert scale was used for response options (1=never, 2=rarely, 3=sometimes, 4=often, 5=very frequently, =always). In this paper, the "never" response was recoded as "0", the "rarely", "sometimes", "often", "very frequently" and "always" responses were combined to form the score "1" to mirror the dichotomous nature of DSM-5 criteria. The Chinese 9-item Internet Gaming Disorder Scale- Short Form has been validated with excellent internal consistency (Chen et al., 2019). The internal consistency of this scale is Cronbach's α=.92.

2.3.4. Socio-Psychological Determinants

Socio-psychological Determinants Checklist (SPCL-15) was used to assess the socio-psychological factors affecting gaming behavior through 15 items related to family bonding, peer influence, social strain, and psychological factors. Respondents were invited to think about the sentences that could best represent their situations and to rate the similarity on a 6-point Likert scale (1= completely different, 2= largely different, 3= somewhat different, 4= similar to my situation, 5= somewhat the same, 6= completely the same). In this paper, the "completely different" response was recoded as "0", the "largely different", "somewhat different", "similar to my situation", "somewhat the same" and "completely the same" responses were combined to form the score "1". The internal consistency of this scale is Cronbach's α=.88.

2.3.5. In-game Content Purchase Intention Scale (ICPIS)

The 10-item In-game Content Purchase Intention Scale was developed by Chung and Lau (2021). The Scale measures the purchase intention of online gamers for in-game content. Each item was rated on a 6-point Likert scale (1=strongly disagree to 6=strongly agree), with higher total scores indicating higher levels of purchase intention on in-game content. Both EFA and CFA were performed. The CFA results suggested that the chi-square statistics was significant, Chi-square (χ2) =71.445, df=34; χ2/df= 2.10; (p < .001), the value of CFI was 0.923, GFI was 0.954 the value for SRMR was 0.367, and RMSEA=0.062, which were considered a very good fit. Two factors were extracted, namely Self-liberation Subscale and Self-efficacy Subscale. The Cronbach's alpha of the 10-item ICPIS was high (α= .89), showing good internal consistency.

3. Results

3.1 Sociodemographic Characteristics

This study targeted young Hong Kong online gamers who have paid for in-game content. The age range of the respondents was 14 to 40, with a mean age of 26.8 (SD = 6.7). About 72.2% (n=296) of those polled were men, while 27.8% (n=114) were women. The majority of them (98.5%) were Chinese, with the rest being Japanese, Irish, Austrian, and Singaporeans. 64.1% of those polled were employed, 32.0% were students, 1.2% were stay-at-home moms, and 2.7% were unemployed. 27.1% had secondary education or less, while the remaining 62.9% had tertiary education or higher. About 46.8% earned less than $15,000 per month, 34.9% earned between $15,001 and $30,000 per month, and the remaining 18.3% earned more than $30,000. The sociodemographic characteristics are shown in Table 1.

Table 1.
Respondent Demographics

Characteristics		N=410	Percent (%)
Age		26.8 (SD=6.67)	
Education	Secondary or below	115	27.1
	Tertiary education or above	295	72.9
Employment	Employed	263	64.1
	Student	131	32.0
	Stay-at-home moms	5	1.2
	Unemployed	11	2.7
Salary	≤ $15,000	192	46.8
	$15,001- $30,000	143	34.9
	> $30,000	75	18.3

3.2 Online gaming patterns

Most respondents (86.3%) favored smartphones for online gaming, while 41.5% and 41.0% preferred PCs and consoles, respectively. About 31.5% of respondents spent one to three hours per day playing online games, a quarter spent 3-5 hours, 15.4% spent 5-7 hours, and 13.2% spent 7 hours or more per day. Approximately 82% of respondents spent less than HK$1,000 on online game content, while 18% spent more than HK$1,000. The majority (74.3%) paid for in-game content with a credit card, followed by a point card (21.8%), a gift card (12.2%), an online platform (10.6%), and Alipay (6.6%). Respondents supported multiplayer online battle games 29.5%, turn-based strategy games (26.4%), and role-playing games (24.4%) as the first three popular paid game genres. The online gaming patterns of respondents are shown in Table 2.

Table 2
Online Gaming Patterns

Characteristics		N	Percentage (%)
Device	Console	168	41.0
	PC	170	41.5
	Mobile phone	354	86.3

Time spent after COVID-19	≤ 3 hours/daily	191	46.6
	4-5 hours	102	24.9
	6-7	63	15.3
	>7 hours/daily	54	13.2
Money spent	≤$1,000	337	82.2
	>$1,000	73	17.8
Payment Method*	Credit card	280	59.2
	Point card	82	17.3
	Gift card	46	9.7
	Online platform	40	8.5
	Alipay	25	5.3
Top 3 paid game genres*	Multiplayer online battle arena	114	13.3
	Turn-based strategy game	102	11.9
	Role playing game	94	10.9

*Multiple response items

3.3 The Correlations between Socio-psychological Determinants, In-game Content Purchase Intention and Internet Gaming Disorder

Table 3
Descriptive statistics and Pearson correlations between all variables (N=410)

Measure		Descriptive statistics		Correlations (r)		
		Mean	SD	1	2	3
1	Socio-psychological determinants	41.17	12.85	1		
2	In-game content purchase intention	35.39	10.80	.324***	1	
3	Internet gaming disorder	27.74	8.17	.431***	.401***	1

***$p < 0.001$. All correlations are significant at the 0.001 level (two-tailed)

Descriptive analysis showed that the scores of each variable of young online gamers were as follows: socio-psychological determinants scores (41.17, SD=12.85), in-game content purchase intention scores (35.39, SD=10.80), and internet gaming disorder scores (27.74, SD=8.17). The results showed in Table 3 that socio-psychological determinants were correlated with in-game content purchase intention ($r = 0.324$, $p < .001$), and internet gaming disorder ($r = 0.431$, $p < .001$). There was a significant correlation between in-game content purchase intention and internet gaming disorder ($r = 0.401$, $p < 0.001$). Thus the findings support Hypothesis 1, Hypothesis 2, and Hypothesis 3 (Table 3).

3.4 Mediating Effect In-game Content Purchase Intention between Socio-psychological determinants and Internet Gaming Disorder

First, the effect of socio-psychological determinants on the internet gaming disorder of online gamers was analyzed. Socio-psychological determinants had a significant association with internet gaming disorder ($\beta = .41$, $p < 0.001$). Then, the intermediary role of in-game content

purchase intention in the influence of socio-psychological determinants on internet gaming disorder was analyzed. In this step, socio-psychological determinants had a significant and direct effect on internet gaming disorder (β= .32, p < 0.001), and in-game content purchase intention had a significant effect on internet gaming disorder (β= .28, p < 0.001). In addition, socio-psychological determinants had a significant effect on in-game content purchase intention (β= .32, p < 0.001). From the results above, socio-psychological determinants were directly related to internet gaming disorder, and it can also affect internet gaming disorder through the medication of in-game content purchase intention. Finally, we tested the significance of the intermediary effect by Bootstrap analysis.

Table 4
The results from mediation analysis using a bootstrapping method for Internet Gaming Disorder

Regression equation		Integral fitting index			Significance of regression coefficient	
Outcome	Predictors	R	R^2	F	β	*t*
Internet Gaming Disorder	Socio-psychological determinants	0.47	0.22	37.73	0.41	9.26***
In-game content purchase intention	Socio-psychological determinants	0.34	0.12	17.76	0.32	6.76***
Internet Gaming Disorder	Socio-psychological determinants	0.54	0.29	40.94	0.32	7.18***
	In-game content purchase intention				0.28	6.30***

N = 410 **p < .005, ***p < .001

The results showed that the direct effect of socio-psychological determinants on internet gaming disorder, the mediating effect of in-game content purchase intention were significant (the confidence interval did not include zero). The direct effect accounts for 80.77% of the total effect, while total indirect effect accounts for 23.08%. Meanwhile, the intermediary effect of in-game content purchase intention account for 34.62%. The 95% confidence interval estimation does not contain zero, thus, Hypothesis 4 was supported (Table 4, Table 5).

Table 5.
Indirect effect of socio-psychological determinants on internet gaming disorder via in-game content purchase intention

Path	Coefficient	Relative effect (%)	95% Confidence interval	
			Boot LLCI	Boot ULCI
Total effect	0.26		0.208	0.320
Direct effect	0.21	80.77	0.150	0.263
Indirect effect	0.06	23.08	0.033	0.086
Socio-psychological determinants → In-game content purchase	0.09	34.62	0.053	0.132

intention → Internet
Gaming Disorder

4. Discussion

This study examined the impact of socio-psychological determinants on the development of internet gaming disorder, and in-game content purchase intention as a mediator. In this study, we address four research issues. First, we investigated the impact of sociopsychological determinants on internet gaming disorder. Second, we investigated the association between socio-psychological determinants and in-game content purchase intention . Third, we investigated the relationship between the intent to acquire in-game content and internet gaming disorder. Finally, we examined the role of in-game content purchase intention as a mediator between socio-psychological antecedents and internet gaming disorder. While previous studies have focused on one or two areas, this study examines all these factors. This study is the first in this sector, as no previous research has studied the effect of in-game content purchase intent on internet gaming disorder in the local setting.

This study can also be considered a methodological development in the recruitment of young paid-to-play internet gamers. The majority of local studies on internet gaming were conducted on children and adolescents enrolled in elementary schools, secondary schools, and colleges and universities. The average age of gamers in 2022, according to Newzoo, was 32. In this study, we recruited young people who paid to play online games. The study enhances our knowledge of young gamers before implementing interventions or preventative strategies to help this population.

Concerning the association between socio-psychological determinants and internet gaming disorder (Research Question 1), our results indicate that socio-psychological determinants positively predicted internet gaming disorder after controlling for age and gender, supporting Hypothesis 1. The results corroborate previous research showing that adverse environmental circumstances, including stressful life events, unpleasant school or job experiences, the COVID-19 pandemic, and social learning of online gaming behaviors, are risk factors for internet gaming disorder (Choi et al., 2015; Chung, 2021; Zhu et al., 2021).

We found evidence for Hypothesis 2 that socio-psychological determinants are predictive of in-game content purchase intention in response to the second research question. The findings on social networks (i.e., family and peer involvement in online games) were consistent with Han and Windsor (2013) and Lee et al. (2018) on the intent to purchase in-game content. In addition to social networks, additional socio-psychological determinants (such as stressful life events, bad schooling or employment experiences) have been investigated in this study. Future research should investigate contextual factors that impact the intent to purchase in-game content.

Regarding the association between the intention to purchase in-game content and internet gaming disorder (Research Question 3), we discovered a strong relationship that supported Hypothesis 3. The finding is consistent with Li, Mills, and Nower's (2019) assertion that the more frequently gamers purchase in-game items the more problems there are with online games.

Given the paucity of research on in-game content purchase intent and online gaming, it is recommended that future studies investigate these topics in greater depth across age groups.

Finally, the current data indicated the partial mediation of in-game content purchase intention attributes in the interaction between socio-psychological determinants of internet gaming disorder (Hypothesis 4). The findings suggest that gamers intend to pay for in-game content to meet their requirements regarding coping with real-world experiences, resulting in internet gaming disorder or problematic gaming behavior. This observation must be replicated in future research because none has been conducted recently.

5. Conclusion

Despite the above limitations, our findings are consistent with our hypotheses, indicating the contextual factors attributed to internet gaming disorder via in-game content purchase intention. These findings provide some insight into the intervention strategies to attenuate the impact of contextual factors on internet gaming disorder, for instance, boosting commitment to family, school, and the workplace.

Authors' Contribution:

Use this section to provide a statement on the work that each of the enlisted authors has contributed to this manuscript. The author's contribution can be listed using the provided responsibilities below, through putting authors' name after each role.

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Data Availability and Release Statement:

The raw data supporting the conclusions of this article will be made available on request to the corresponding author.

Conflicts of Interest:

The authors declare no conflict of interest.

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