

A Survey-Based Study on the Consumption Behaviour of Adolescents in Online Gaming

Sirui Wang*

Jinling High School Hexi Campus, Nanjing, 210000, China

*Corresponding author: sirui_wang2008@outlook.com

Abstract. This study investigates the influence of online gaming expenditures on adolescent consumption attitudes, integrating Theory of Planned Behaviour, Consumer Identity Theory, and The Media Effects Theory. According to questionnaires collected from 127 young online game players about their in-game purchasing habits and attitudes toward money, which can analyse their purchase behaviours and financial attitudes using descriptive statistics and multiple regression models. Findings reveal a significant correlation between game time, in-game spending as two main independent variables, and consumption attitude as a dependent variable, suggesting that excessive in-game expenditures foster incorrect and unhealthy consumption habits among youth. This research underscores the importance of fostering responsible financial habits among youth and suggests that both the gaming industry and educational institutions should collaborate to promote healthy consumer views. The study concludes with policy recommendations and educational strategies aimed at guiding adolescents towards balanced interaction with online gaming environments, thereby cultivating prudent financial behaviours and responsible consumption practices.

Keywords: Adolescent consumption behaviour; in-game spending; consumer attitudes; questionnaire; multiple linear regression.

1. Introduction

With the widespread adoption of the internet, an increasing number of adolescents are favouring online consumption as a novel method of spending. According to the "2023 China Game Industry Report on Minor Protection Progress" released by the government, as of June 2023, the scale of Chinese netizens has reached 1.079 billion, with the number of netizens aged below 18 exceeding 200 million, accounting for an increased proportion of 18.7%.

Nowadays, online gaming has become an integral part of modern society, with "spending" and "micro-transactions" being prevalent practices. Buying items like equipment and skins is now standard consumer practice. Teenagers, as a main player group, often engage in such purchases due to their affinity for novelty. Investigating their consumption behaviours and underlying motives is essential for cultivating healthy spending habits [1]. As noted by Xu et al. and the references therein, the online game industry has become an industry with inherent potential and realistic growth space, with in-game purchasing presenting unique challenges and opportunities for understanding consumer behaviour [2]. This research aims to bridge this gap, focusing on how these purchases shape adolescents' attitudes and behaviours.

Consumer behaviour theories offer a foundation, yet they must be adapted to fit the rapid, impulse-driven nature of in-game purchases. Consumer psychology provides insight into adolescent perceptions of value and risk, while media effects theory suggests that cues within gaming interfaces impact user perceptions and choices.

To investigate these effects, the study employs an approach: quantitative questionnaire surveys. A total of 127 questionnaires were collected and the data was analysed using Python to verify the research hypotheses. Regression analysis indicated that spending patterns and attitudes towards in-game purchases among adolescents influence their consumption views.

The research results show that the majority of adolescents engage in excessive spending, investing a substantial amount of money in games, leading to their incorrect and unhealthy consumption

attitudes. Policy recommendations and educational strategies may be developed from these insights, fostering responsible financial behaviours in youth.

2. Literature Review

2.1. Related Concepts

In the field of adolescent consumer behaviour, particularly within online gaming environments, multiple psychological and sociological theories provide insight into the decision-making processes and behavioural patterns of young consumers. The related concepts will discuss three core theories: the Theory of Planned Behaviour, Consumer Identity Theory, and The Media Effects Theory when considering digital media literacy. These theories contribute to deeper understanding of adolescent consumption patterns within online gaming contexts, offering a perspective on consumer behaviour.

2.1.1 Theory of planned behaviour

The Theory of Planned Behaviour, TPB, proposed by Icek Ajzen, shows that an individual's intention to perform a behaviour is the most significant predictor of the actual behaviour, influenced by attitudes towards the behaviour, subjective norms, and perceived behavioural control. In psychology, behaviour is defined as the purposeful activities that individuals engage in under the influence of external environmental stimuli, representing a specific response that emerges from the interaction between the individual and their environment. Consumer behaviour, driven by motivations to fulfil personal needs, is the process of purchasing goods and services, resulting from the interplay between consumer psychology, the purchasing environment, types of goods, supply-demand conditions, and service quality [3]. In addition, the impacts through in-game purchase system to improve the user's enjoyment and immersive, right to the use of the performance for the role of the high degree of rare access to, or use rise more convenient tool products, this paper can see as to promote the perceived ease of use of the product, in the game, you show the higher value of virtual items (arms and weapon) [4].

In the context of online gaming, adolescents' intentions to make in-game purchases can be influenced by their attitudes towards these purchases which aims to enhance game experience or social status, the opinions of others, and their perceived ability to control purchasing behaviours, like disposable income and familiarity with purchase processes.

2.1.2 Consumer identity theory

The Consumer Identity Theory illustrates how consumers use products to maintain their self-identity. Within online games, virtual items often serve as tools for adolescents to express convey messages of group identity to the external environment through customized products, in hopes of gaining group recognition and a sense of belonging [5]. For instance, acquiring rare skins, characters, or in-game achievements can help them establish or reinforce particular images within their social circles.

Consumer Psychological Theory was proposed by Leon Festinger in his 1954 paper "On Social Comparison," which posits that individuals within groups have a psychological tendency to compare themselves with others to ascertain self-worth. Influenced by social contexts, individuals sometimes compare themselves with those who are better off and at other times with those who are worse off, aiming to establish self-value. As a pervasive consumer behaviour, the mechanisms underpinning competitive consumption behaviour still require investigation [6]. In online gaming, this comparison might drive consumption to achieve parity or superiority among peers. For example, purchasing specific items to reach higher game levels or emulate popular game characters.

2.1.3 Media effects theory

In the digital age, the Media Effects Theory emphasizes the importance of digital media literacy: the ability to understand, analyse, and evaluate media messages, including recognizing sources,

purposes, and content. Understanding how adolescents interpret and process information through game interfaces, advertisements, and social media is crucial.

Applying these theories allows for a deeper comprehension of adolescent consumer behaviour within online games. Educators can leverage these theories to help adolescents critically assess in-game consumer inducements. As noticed by Zhao and Zang, media trust, as an individual behaviour, is the result of active reflection and continuous construction based on adjusting one's understanding of themselves and their environment [7]. Policymakers can use these insights to protect adolescents from adverse commercial influences while fostering healthy consumption habits.

2.2. Previous Research Process

Within the realm of online virtual spaces, the sale of virtual merchandise has emerged as a primary revenue stream for online gaming. Hee-Woong created a theoretical framework indicating that the motivation under consumers' online self-presentation is a significant force influencing their purchase of gaming products. This psychological yearning among users to express themselves in these digital environments compels them to acquire such items, and thus, the intent for online self-display also plays a vital role in the acquisition of digital goods [8]. The impact of social interaction motivations on consumer behaviour within online gaming spaces was investigated by Hamari and Wohn, concluding that players' needs for social interaction serve as a significant driving force behind the purchase of in-game features [9]. The survey found a positive correlation between social motivations and purchasing behaviour in virtual environments [10].

In conclusion, the study illustrates that the spending behaviour of young players in online games is not motivated by financial gain but rather by the desire to advance their game levels and collect in-game items, which are intrinsic goals that drive achievement. Most scholars have acknowledged the consumption behaviour of teenagers towards virtual goods in online spaces, as mentioned in current literature.

However, the consumption of virtual goods is not limited to social media, in particular, represents a virtual space where such consumption activities are prevalent among adolescents. This domain is where teenagers frequently engage in impulsive purchasing to satisfy their needs, which are often driven by the desire to advance in the game and collect items. Consequently, understanding the consumption behaviour of contemporary youth in online gaming holds significant value, as it allows us to analyse the specific motivations that drive consumption behaviours among the youth demographic and discuss the extent to which these motivations influence their purchasing activities.

3. Methodology

This segment utilizes comprehensive survey methods to understand broad trends in spending behaviours among teenage players. By analysing related literature and organizing the survey data, the study determines key factors that could influence their purchasing decisions within games. These factors are used to build a framework for the research, which includes establishing hypotheses and creating a model for the study. Drawing on the characteristics of previously researched populations, the survey is then specifically designed to gather insights from this younger gaming demographic. The questionnaires are distributed to adolescent game-players to collect their responses and analyse the collected data.

3.1. Data Collection and Preparation

A total of 127 questionnaires were collected and the data was analysed using Python to verify the research hypotheses. Data collection and preparation form the foundational steps in the analytical process.

3.1.1 Questionnaire design

The questionnaire for this research encompasses multiple areas, including gaming habits, gaming time, preferred types of games, and in-game purchasing behaviours, like frequency of purchases,

amount spent, items bought. These elements are crucial for understanding adolescent consumption behaviours and perceptions.

Gaming habits, like gaming time, which indicates the level of dependency and potential addiction risks among youth. Another factor is preferred game types. Furthermore, different genres might encourage diverse spending behaviours and perceptions.

In-Game purchasing behaviours, like purchase frequency and amount, which directly reflect the consuming power and willingness of adolescents. Also, items purchased reveals spending inclinations, with statistics showing percentages of teenagers buying skins or cosmetic items and purchasing the games themselves.

3.1.2 Sample selection

Ensuring diverse and representative samples is important for the applicability and scientific validity of the study. Distributing questionnaires through various channels is an effective strategy.

Schools need to cover students from elementary to higher education. Educational backgrounds can influence students' values and spending behaviours.

Online platforms, like social media, forums, covering a wide range of internet users. Also, Online habits potentially affect game engagement and spending patterns.

Gaming communities recruit participants directly from within the games or related communities, enhancing sample relevance. Additionally, Community interactions may amplify specific spending behaviours.

3.1.2 Questionnaire distribution

To conduct this research involving adolescents from across the country, moving beyond the limitations of local samples is important. The approach includes distributing questionnaires over the internet to ensure broader reach. Participating in online gaming WeChat groups for teens allows for precise survey distribution. Additionally, extending posting in popular gaming forums and engaging with users through comments and private messages under gaming videos on Bilibili broadens the participant base, ensuring more comprehensive and representative research findings.

3.2. Selecting Variables

3.2.1 Independent variable

The independent variables in this context are those that explain the changes in the dependent variable within the model. For this study, the independent variables are typically related to in-game purchasing behaviour in online games. These changes include amount of in-game spending, frequency of purchases, types of purchases, game playtime and game genre preference.

From the literature review, the primary factor for teenagers in online gaming are identified as in-game spending and game playtime per week. These factors are defined as independent variables in this study, with their dimensions and definitions outlined in the following table 1.

Table 1. Independent dimensions and definition

Dimensions	Definitions
In-game spending (\$)	The total amount of money spent by adolescents in online games, which could be measured as an average monthly expenditure or a cumulative amount over a certain period.
Game playtime (per week)	The amount of time adolescents spends playing online games weekly, which might influence their spending behaviour.

3.2.2 Dependent variable

In the gaming world, consumer attitude index is characterized by players purchasing game products to satisfy personal needs. The dependent variables in the model are affected by the independent variables and represent the main indicators studied. In this research, the dependent variables relate to the consumption concepts of adolescents, considering their purchase attitude as

dependent variables for investigation, with dimensions and definitions outlined in the following table 2.

Table 2. Dependent dimension and definition

Dimension	Definition
Adolescent Consumer Attitude Index	The views and attitudes of adolescents towards money, including tendencies towards saving and spending. How adolescents perceive the value of items, such as a preference for material or emotional value.

3.3. Questionnaire Collection

This study targets adolescents with purchasing histories in online games, from which 206 survey responses were gathered. After excluding invalid responses that lacked exposure to or purchases within online games, the final valid sample consisted of 127 respondents. This data set will be analysed using Python.

4. Results and Discussion

4.1. Descriptive Analysis

The demographic variables-gender, age, and educational attainment-of the valid samples were subjected to a descriptive analysis using Python. The findings are as follows: Looking at the participants, 83 are male, constituting 65.6% of the sample, while 44 are female, making up 34.4%. The ratio of males to females is nearly 2:1, reflecting a higher proportion of male consumers in online gaming, which aligns with the general gender distribution among game players.

In this study, demographic factors are set as control variables, with the expenditure amount of adolescent game players designated as the independent variable and the adolescent consumer attitude index as the dependent variable. Subsequent descriptions will analyse the control variables, independent variable, and dependent variable respectively.

Table 3. Descriptive distribution table of control variables

Variable	Mean	Standard Deviation	Variable Description
Age	13.856	4.4007	Interval variable
Gender	0.48	0.5016	Binary Variable, 1 for Male, 2 for Female
Type of Game	3.67	1.6237	Interval variable

Table 4. Descriptive distribution table of independent and dependent variables

Variable	Mean	SD	Variable Description
Game Time (per week)	3.75	3.9444	Interval variable
In-game Spending Amount (\$)	25.904	24.7850	Interval variable, weekly gaming expenditure
Consumption Attitude Index	2.8	1.4142	Interval variable, scale 1-5

In terms of average values, the data for game time is 3.75, indicating that adolescent game players play an average of 3.75 hours of games per week (Table 3 and 4). The data for in-game spending amount is approximately 25.9, suggesting that the weekly expenditure within games by adolescent game players is this value. The consumption attitude index and other similar data is about 2.8, showing that the agreement level among adolescent game players towards gaming consumption is 2.8, with differences existing across various dimensions. Additionally, in the standard deviation, the data for game time is around 4, showing that the weekly gaming hours of adolescent gamers are quite consistent. The data for the consumption attitude index is about 1, indicating a general consensus in the consumption attitudes of adolescent game players. The in-game spending amount has a relatively high standard deviation of approximately 24.8, indicating significant variability in the overall data set. This suggests a substantial divergence in the responses from the sample, reflecting diverse

opinions among adolescent game players regarding in-game spending, which aligns with the sample requirements of this study.

4.2. Correlation Analysis

In analysing the relationship between adolescent online gaming consumption and consumer attitudes, a correlation analysis is first conducted between independent and dependent variables. Correlation analysis is a statistical method commonly used to examine the relationships between variables, focusing on the magnitude and direction of these dependencies. Pearson's correlation analysis is primarily employed to investigate significant relationships between variables, determining whether these relationships are positive or negative, and using the correlation coefficient to gauge the closeness of the association between the variables. The study uses Pearson's correlation analysis to explore the relationships among game time, in-game spending amount, and consumption perception. The results are presented in Table 5.

Table 5. Pearson correlation between Variables

	Game Time (per week)	In-game Spending Amount (\$)	Consumption Attitude Index
Game Time (per week)	1		
In-game Spending Amount (\$)	0.4799	1	
Consumption Attitude Index	0.3888	0.7520	1

From Table 5, it is evident that both dimensions of players' game time (per week) and in-game spending amount have a significant correlation with the consumption attitude index at the 0.01 level. Specifically, the Pearson correlation coefficient between game time (per week) and consumption attitude index is 0.3888, which is greater than 0, indicating a positive correlation between players' weekly game time and their consumption attitude index. The Pearson correlation coefficient between in-game spending amount and consumption attitude index is 0.7520, also greater than 0, demonstrating a positive correlation between players' in-game spending and their consumption attitude index. Furthermore, the Pearson correlation coefficient between game time and in-game spending amount is 0.4799, greater than 0, suggesting a positive correlation between players' game time and their in-game spending.

However, correlation analysis only delineates the interdependency magnitude among variables. To ascertain the impact of one variable on another, regression analysis must be employed to assess the variables. Regression analysis elucidates the predictive and explanatory capacity of independent variables in relation to the dependent variable. Given the presence of two independent variables and one dependent variable in this research, multiple linear regression analysis is utilized for examining the relationship between independent and dependent variables.

To investigate the differential effects of various consumption motives and behaviours, this study extends the initial correlation analysis to further probe the causal relationships between the independent and dependent variables.

Table 6. Multiple Linear Regression between Variables

Variable	VIF
(Constant)	2.364616
Game Time (per week)	1.299330
In-game Spending Amount (\$)	1.299330
Durbin-Watson	1.8989
R ² Score	0.208
P-Value	0.000b

The model was subjected to a multicollinearity assessment using Python, which demonstrated that the Variance Inflation Factor (VIF) values for the two independent variables in this study were both below the threshold of 5 (Table 6). Such a result indicates the absence of multicollinearity among the five independent variables under investigation. Furthermore, the Durbin-Watson statistic was calculated to be 1.8989, a measure that is proximate to 2, suggesting that the sample maintains an adequate level of independence without manifestations of auto-correlation.

In terms of model fit, the linear regression model's coefficient of determination, R^2 , stands at 0.208, implying that the combination of Game time and In-game spending amount accounts for 20.8% of the variance in consumption attitude. The model's statistical significance is underscored by a P-value of less than 0.05, specifically $P=0.000$, highlighting that at least one predictor variable, whether it be Game time or in-game spending amount, wields a considerable influence on consumption attitude. Empirical findings derived from Python-based computations confirm that both game time and in-game spending amount exert a statistically significant positive influence on consumption attitude, with the magnitude of the impact being greater for in-game spending amount relative to Game time.

4.3. Results

The standardized multiple linear regression analysis results for each variable indicate that the regression equation for the consumption behaviour of college student game players is: slope 1: 0.0129, slope 2: 0.0419, intercept: 1.6654. Thus,

$$y = 0.01 * (\text{game time}) + 0.04 * (\text{in} - \text{game spending amount}) + 1.67 \quad (1)$$

5. Conclusion

This study employs the Theory of Display Needs to examine the impact of adolescent game players' "Game Time" and "In-game Spending Amount" on their "Consumption Attitude." A comprehensive review of research findings indicates that both these factors, rooted in the Theory of Display Needs, significantly influence consumption attitudes in this demographic, with "In-game Spending Amount" bearing a majority of this influence.

In response, it is vital to acknowledge and address the intrinsic needs of young game players while fostering an appropriate approach to cultivate responsible consumption behaviours. This endeavour requires a synergistic effort from individual game players, educational institutions, families, and the gaming industry, among others, to achieve a nuanced understanding and promotion of healthy consumer practices.

This study has provided valuable insights but has also uncovered several areas requiring further refinement. By employing the Theory of Display Needs, this paper examined the relationship between reasons for online gaming expenditure and changes in consumer attitudes, focusing solely on a select set of motivators behind player spending. However, modifications in game players' consumption perspectives are also influenced by additional demographic factors beyond the two factors explored, which is a limitation of the current research.

Subsequent studies could therefore enhance these findings by increasing the sample size to improve the study's comprehensiveness and rigor. Additionally, there is an opportunity to more thoroughly investigate other mediating variables that impact shifts in the consumption attitudes of online game players. Understanding the effects of these mediators on gaming consumer behaviour would be crucial in progressively refining the conceptual model within the online gaming community.

References

- [1] Wenwen Li. The Impact of Consumption Motives on Behaviour among College Student Online Gamers. Huaqiao University, 2022.
- [2] Meilun Xu, Wanting Chen, Yilan Ge. Exploring the Influencing Factors of Online Game Consumption Behavior under the "Stay-at-Home Economy" Background. China Business Review, 2021, (21): 42-44.

- [3] Xuan Fei, Lin Chen. *Consumer Psychology*. Nanjing: Nanjing University Press, 2019, 214.
- [4] Hussain A, Abid M, Shamim A, Ting D, Toha M. Videogames-as-a-service: How does in-game value co-creation enhance premium gaming co-creation experience for players. Working paper, 2024.
- [5] Bing Hu, Yuanbin Xiong, Liuyi Yu. The Impact of Identity Motivation on Consumer Participation in Product Customization: A Perspective Based on Social Identity Theory. *Economics and Management*, 2015, 29(02): 84-90.
- [6] Jingshu Yang, Gangling Chao. A Study on the Causes and Impacts of Comparative Consumption Behavior among Chinese Residents. *Consumer Economics*, 2009, 25(06): 51-54+84.
- [7] Zixin Zhao, Zhenpeng Zang. Incentives and Governance: The Media Trust Mechanism of Platform Media from the Perspective of Social Cognition-An Empirical Study of the Mediating Effect Based on Identity Recognition. *Science and Management*, 2024, 44(02): 82-91.
- [8] Hee-Woong, Kim, Hock, et al. What Motivates People to Purchase Digital Items on Virtual Community Websites? The Desire for Online Self-Presentation. *Operations Research*, 2013.
- [9] Hamari J, Alha K, Jarvela S, et al. Why do players buy in-game content? An empirical study on concrete purchase motivations. *Computers in Human Behavior*, 2017.
- [10] Wohn D Y. Spending real money: Purchasing patterns of virtual goods in an online social game. *ACM*, 2014.