CORRELATES OF PURCHASE BEHAVIOUR IN YOUNG CONSUMERS OF VIDEO GAMES WITH MICROTRANSACTIONS

by

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Declaration

This project was partially assisted by the use of generative AI such as ChatGPT by OpenAI, Gemini by Google, and Grammarly by Superhuman Platform Inc. (formerly known as Grammarly Inc.) during the planning and editing phases. ChatGPT and Gemini were used to support the organisation of ideas and refinement of structure. Grammarly was used to check grammar, punctuation, and style. All content has been read, evaluated, and finalised by me, and the work reflects my own critical engagement with the literature, in full alignment with the University of Malta's academic integrity policy.

Furthermore, I wish to clarify that while this dissertation is critical of certain industry-wide practices, it is not meant to single out any specific game, developer, or publisher. Any in-game images included are for illustrative purposes only, and the specific examples used are predominantly games that I have personally engaged with and generally hold in high regard for having a lot to offer to their respective communities, independent of their microtransaction mechanics.

Dedication

To my dear mother,

Doreen Galea,

who has been an anchor of support throughout my life,

and especially during a turbulent period coinciding with the writing of this dissertation.

Words truly cannot express the sheer magnitude of my gratitude.

Anything I have ever achieved in life would not have been possible without her encouraging me to do my absolute best.

To her, I dedicate this dissertation and all my achievements.

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Abstract

Microtransactions have sparked serious concern for their potential to exploit the psychologically vulnerable. This study investigates variables hypothesised to be associated with microtransaction expenditure and extrapolates how these gamified principles can be ethically repurposed for educational contexts. This study utilises a quantitative cross-sectional design, recruiting an international sample of 1,265 participants primarily through online gaming communities. The study compared Younger Players (< 25) against Older Players (≥ 25) using psychometrics assessing Fear of Missing Out (FoMO), Susceptibility to Interpersonal Influence (SUSCEP), Buying Impulsivity (BIS), and Consumers' Need for Uniqueness (CNFU-S), alongside analysing sociodemographic variables, motivations, gaming habits and expenditure. The analysis revealed Older Players significantly outspent Younger Players, challenging the perception that such vulnerability is youth-dominated. BIS was identified as the strongest correlate of spending across the lifespan, suggesting these mechanics are effective regardless of age. Older Players exhibited an association between spending and both information-seeking behaviour (a subscale of SUSCEP) and CNFU-S. Furthermore, while competition is often assumed to be a gaming motivator, participants in both groups reported stronger motivation for cooperative and social gameplay elements, supporting a pedagogical shift towards collaborative learning. The study underscores the necessity of curriculum design that addresses digital and financial literacy as well as impulse control for students of all ages. By understanding the engaging elements of game design, educators can design learning experiences that create intrinsic motivation in learning.

Keywords: microtransactions, video games, gamification, education, gacha, motivators

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List of Abbreviations

Abbreviation	Definition
BEUC	European Consumer Organisation
BIS	Buying Impulsivity Scale
CNFU	Consumers' Need for Uniqueness
CPC	Consumer Protection Cooperation (Network)
EC	European Commission
EGDF	European Games Developer Federation
F2P	Free-to-Play
FoMO	Fear of Missing Out
GBL	Game-Based Learning
IQR	Interquartile Range
MTX	Microtransaction(s)
PSCD	Personal, Social and Career Development
SDT	Self-Determination Theory
SII	Susceptibility to Informational Influence (subscale)
SNI	Susceptibility to Normative Influence (subscale)
SUSCEP	Susceptibility to Interpersonal Influence
VGE	Video Games Europe

Glossary

Operationalisations	Definition
F2P Player (Free-to-Play Player)	A colloquial term for a player who does not spend money on microtransactions. Participants who reported spending €0 were placed in this spending category.
Older Player	A participant aged 25 or above, as defined in this study; capitalised to distinguish the study cohort from the generic term.
Spenders within the IQR	Participants who reported spending more than F2P players, and whose expenditure fell between the 25th (Q1) and 75th (Q3) percentiles of the dataset (between €0 < and ≤ €2,440).
Whale	A colloquial industry term for a high-value player. Operationally defined in this study as a participant whose spending was an outlier, calculated as being above 1.5 times the Interquartile Range (IQR) over the 75th percentile (Q3): €2,440.
Younger Player	A participant under the age of 25, as defined in this study; capitalised to distinguish the study cohort from the generic term.

Key Concepts	Definition
Gacha / Loot Boxes	Monetisation mechanics where players spend currency (in-game or real) to receive a randomised virtual item.
Gamification	The application of game-design elements and principles (e.g., points, badges, leaderboards) in non-game contexts to enhance motivation and engagement.
Game-Based Learning	The pedagogical use of digital games to supplement or achieve learning outcomes.
Material Distortion	A design practice where the true monetary cost of an item is obscured, typically by requiring players to first convert real money into a secondary in-game currency.
The First Spend	An industry term for the initial microtransaction made by a player. Its objective is to break psychological defences to spending, increasing the probability of recurring expenditure.
Serious Games	Games designed for a primary purpose other than pure entertainment, such as education, professional training, or health awareness.

Chapter 1: Introduction

Background and Context

Since the 1970s, with the introduction of arcade games, video games have become culturally and economically significant (Kline et al., 2005; LG, n.d.; Wolf, 2008). The advent of the internet in the 1990s revolutionised the gaming sector through networked online play (History.com Editors, 2024; Kline et al., 2005; Wolf, 2008). Online games offer many benefits to players, such as adding an interpersonal element to video games, making their distribution easier and simplifying the dissemination of software updates to resolve issues and add more content. Essentially, this established a paradigm where games can be considered a service rather than a finished product. However, this has also led to the rise of controversial practices in game design. Among them is the practice of microtransactions, or small purchases within games, which has become a dominant driver influencing player engagement and revenue (Ahmadu, 2023; Hanner & Zarnekow, 2015; Toyama et al., 2019). This concept is not particularly new, as players were inserting coins into arcade machines before the mainstream accessibility of gaming in households. However, the popularity of microtransactions and their constituent strategies in contemporary game design reshaped the landscape of the game industry and made scholars wonder to what extent microtransactions influence and are influenced by personal, social, and developmental stages (Kovšca et al., 2023; Raneri et al., 2022; Rita et al., 2024).

Microtransactions: The Mechanics

Examples of digital goods available through microtransactions include cosmetic items, currency, and randomised rewards (*Gacha*), among others (Ahmadu, 2023; Behuria, 2023; Gong et al., 2025; Gusmão et al., 2019; Kovšca et al., 2023; Rita et al., 2024). This is a business model that normally makes digital games available at no upfront cost, with the expectation that a portion of the player base spends real-world currency on the aforementioned digital goods. While this builds a revenue stream for the developers, concerns often arise that there is exploitation of psychological mechanisms such as impulsivity and loss aversion (Gong et al., 2025; King et al., 2019a, 2019b; Kovšca et al., 2023; Raneri et al., 2022; Rick, 2011; Rita et al., 2024). Limited-time offers and random rewards make players want to spend more by creating a feeling of missing out, known as the *Fear of Missing Out* (FoMO), a phenomenon Przybylski et al. (2013) describe as the pervasive apprehension that others are having more rewarding experiences without them.

Gamification and Engagement

Beyond microtransactions themselves, other elements of game design also play a crucial role in shaping player behaviour, engagement and as a result, potentiating spending when microtransactions are involved. Gamification is the use of game design elements, predominantly including points, badges, leaderboards, and progression systems, in contexts outside of games, to enhance motivation and engagement (Deterding et al., 2011a, 2011b). When applied to pedagogy, this is conceptually similar yet distinct from *Game-Based Learning* (GBL), which uses digital games themselves to enhance learning (Zohari et al., 2023). Gamification is

already being utilised extensively in areas such as education, health, and workplace productivity. However, the underlying principles that make gamified systems engaging have been under growing scrutiny in the context of video games for their potential to promote habitual use and their supportive role in monetisation practices like microtransactions (King et al., 2019a, 2019b).

While gamification has demonstrated utility in promoting motivation and engagement across a range of domains, pairing gamified mechanics with monetisation frameworks within digital games raises fundamental ethical issues. The same psychological mechanisms that underpin the facilitation of learning, health, and exercise habits can be exploited to drive ongoing engagement and spending, increasingly distorting boundaries between entertainment, compulsion, and commercial exploitation, with particular concern for vulnerable populations (Garea et al., 2023; King et al., 2019a, 2019b; Lee et al., 2025; Petrovskaya & Zendle, 2022; Zendle, 2020).

While these motivational frameworks help explain how game design sustains engagement, they also have deeper implications for player psychology, particularly when considered in the context of developmental stages. Understanding how these mechanisms interact with psychosocial and cognitive factors is critical when examining differences between younger and older players.

Psychological and Developmental Perspective

According to Erikson's (1968) *Theory of Psychosocial Development*, adolescents are in a critical phase of identity formation and social belonging. As there is a community aspect to video games, especially online ones, it is not unreasonable to hypothesise that young players may seek to distinguish themselves

through any form of customisation available to them in their favourite game, a feature that is often facilitated and monetised in games with microtransactions. This might involve spending money as a way of obtaining special items or cosmetic enhancements that increase social status and self-image within the context of that digital space, thus providing a very good incentive to spend money.

In my previous study focusing on a subset of microtransactions, it was found that spending was negatively correlated with the *Need for Informational Influence* (Galea, 2023). This implies that the more likely individuals are to seek information and stay informed, the more likely they are to be prudent in their spending behaviour. Hence, education and informed consumerism may be protective factors against the psychological tactics deployed in microtransaction-based game design.

Research Aim and Questions

This study seeks to extend my previous research, which focused specifically on Gacha games, a category of microtransactions involving randomised rewards (Galea, 2023). Whereas the previous study used a small adult sample and focused narrowly on Gacha, this research broadens the scope to all microtransactions and takes a more nuanced approach, focusing on a young population and comparing these with older players. It aims to revisit previously used psychometric tests, add new ones, and investigate the interpersonal, personality, and behavioural correlates of microtransaction spending across age groups. For the purposes of this dissertation, especially for the Results and Discussion chapters, *Younger Players* are operationalised as those under the age of 25, with *Older Players* being those aged 25 and over. The rationale behind this is elaborated on in the Methodology chapter. However, when reviewing the literature, a broader conceptualisation is used

as different sources have different grouping criteria. In such cases, standard lowercase terminology is employed.

The study specifically aims to tackle the following questions:

1. When discussing microtransactions, what factors (interpersonal, personality, and behavioural) are correlated with spending behaviour?
2. How do these factors differ between youth and older populations?

By exploring these questions, this research aims to contribute to consumer protection through a discussion revolving around education and policy surrounding ethical game design and regulation. More pertinent to the field of education, this research also aims to distil some of the core motivators that attract players to such games and discuss potential ways in which these motivators can be implemented into other scenarios through gamification to enhance areas such as personal development and learning.

Methodological Overview

This study employs a quantitative approach, using an anonymous online questionnaire as the primary data collection method. The questionnaire includes:

- Demographic questions (age, gender, gaming habits).
- Psychometric scales measuring FoMO, susceptibility to influence, impulsivity and need for uniqueness. While the selected tests are not limited to the context of microtransactions, this list of generalised tests has been compiled because it may help in developing an understanding of broader patterns and experiences which could be analysed in relation to and extrapolated to the context of digital games. These scales include:
    - The Fear of Missing Out Scale by Przybylski et al. (2013),

- Susceptibility to Interpersonal Influence Scale by Bearden, Netemeyer, and Teel (1989),
- The Buying Impulsiveness Scale by Rook and Fisher (1995) and
- The Consumers' Need for Uniqueness Scale; originally developed by Tian et al. (2001) and shortened by Ruvio et al. (2008).

Some of these psychometrics were used in my previous undergraduate study (Galea, 2023), but others were included with the developmental stage of younger participants in mind. This is discussed in further detail in the Methodology chapter of this dissertation.

Relevance of the Study

Report data indicates that the microtransaction model within video games is a highly profitable enterprise, accounting for 58% of all PC gaming revenue (Gallaga, 2025; Knezovic, 2025; Rosier et al., 2025), with the global market valued at over $76.3 billion in 2024 and projected to grow significantly more (The Business Research Company, 2025). With the rise of Gacha games, especially since the COVID-19 pandemic, a market which alone was valued at over $19 billion in 2023 (Patel, 2025; Research and Markets, 2020), the profitability of this industry does not seem to be waning (Allied Market Research., 2024; DeCamp & Daly, 2023; SensorTower, 2025; Nester, 2024).

The relevance of this study is crystallised by a policy debate unfolding within the European Union as of this dissertation's writing, following a 2024 complaint by the European Consumer Organisation (BEUC, 2024) targeting exploitative and manipulative practices in microtransaction-based games. Given the ongoing debates about ethical game design, consumer protection, and youth mental health, such

research becomes paramount in addressing issues that may arise (DeCamp & Daly, 2023; King et al., 2019a, 2019b; Raneri et al., 2022). By identifying risk factors, especially among (but not limited to) young players, studies of this nature may inform policy recommendations, parental guidance, and game design practices aimed at promoting healthier gaming experiences. Additionally, as a microcosm of society, the educational system must prepare young students for the evolving challenges and temptations that they may encounter beyond school.

The results of my previous research (Galea, 2023) indicated that the tendency to seek information from others before making purchase decisions correlated with decreased spending, suggesting this issue is implicated in digital and financial literacy. If being informed is a protective factor, then the educational system has a clear role in cultivating this resilience. This is especially critical for young players, who are in a key developmental stage (Erikson, 1968) and are a target of these game mechanics.

Additionally, as discussed in the Gamification and Engagement section, what research of this kind can uncover has useful implications for education. One hypothesis to be explored in the Literature Review chapter is that spending money is but one behavioural outcome of a deeper psychological investment. By reducing underlying motivational concepts that gamified systems employ to their basic constituents, these same ideas could be used as motivational catalysts, with the end goal being positive educational outcomes rather than spending. This dissertation, therefore, aims to provide data that informs protective interventions while also exploring productive applications of gamified principles.

Additionally, this is an opportunity to contribute to the limited but growing body of knowledge analysing digital spending behaviour within video games, especially

across younger age groups, which, due to rigorous ethical approval procedures amongst other sample accessibility issues, tend to be underrepresented, especially in western research (DeCamp & Daly, 2023; King et al., 2019a, 2019b; Shibuya, et al., 2019; Xi, 2024; Xiao et al., 2024; Zendle et al., 2019).

While research has explored links between microtransactions and problematic expenditure (King et al., 2019a, 2019b; Zendle & Cairns, 2018), a lot of the research has involved samples that preponderantly included adults or lacked direct comparative age-group analysis. Larcher (2017) argues that it would be a lack of due diligence to simply apply data sourced from the adult population to younger individuals, as children and adolescents are not merely small adults. This creates a demand for research to further specify how developmental factors may affect susceptibility to monetisation strategies.

Chapter 2: Literature Review

Microtransactions have become a popular monetisation model in video games, particularly within mobile games. These games are sometimes referred to as *free-to-play* (F2P) as, rather than an upfront cost, developers offer games at no initial price with the expectation that players spend money on the optional purchases embedded throughout the experience (Behuria, 2023). For this reason, Industry leader Nintendo refers to these games as *free-to-start* due to being free to download and play at the start, but may involve spending within the game to enhance the experience at later stages of the game (Nintendo, 2024; Torres, 2016).

These purchases are often marketed as small payments; however, they accumulate to represent substantial revenue streams, making the enterprise of microtransactions a very lucrative one. This profitability is well-documented in market analyses identifying patterns consistently demonstrating that a significant portion of the highest-grossing video games across different platforms (PC, console and mobile) involve microtransactions (Gallaga, 2025; Rosier et al., 2025; SensorTower, n.d.). Recent academic literature has analysed the prominence of this trend through the lens of the COVID-19 pandemic, documenting the rise of Gacha-based games over the lockdown period and consequently, a significant surge in industry growth and revenue (DeCamp & Daly, 2023; Speranza, 2021; Xi, 2024).

This paper discusses the design strategies behind microtransactions and their influence on player psychology, engagement, and spending, with particular attention given to younger players. This population is particularly important to study as there is a growing concern, both academic and journalistic, highlighting the ethical implications of these monetisation strategies, particularly when vulnerable

populations such as children and adolescents are involved (King et al., 2019a, 2019b; Davies, 2024).

Bartle's Taxonomy of Gamers

Exploring the motivations behind why individuals play video games is not a novel concept. *Bartle's* (1996) *Taxonomy of Player Types* is considered a landmark framework which explores the relationship between games and players. Bartle's Taxonomy, as the name might suggest, attempts to classify players into four categories, each characterised by their own approach to playing games as well as distinct motivations. These categories are:

- *Achievers*: who enjoy playing video games for the satisfaction of achieving measurable milestones, such as a high in-game rank.
- *Explorers:* enjoy the adventurous aspect of exploration and being immersed in what the virtual world may have to offer.
- *Socialisers*: play video games to find like-minded individuals who might share similar interests. These players treat video games as a medium for socialising and connecting with others.
- *Killers*: who find satisfaction in being superior when compared to other players. The main motivation for these players is competing with others.

Based on Bartle's Taxonomy, a psychometric test of sorts was developed, called the *Bartle Test of Gamer Psychology*, which aims to score players on these four classifications (Andreasen, n.d.; Bartle, 1996, 2003; Liu & Idris, 2019). While this test offers an interesting approach to understanding the psychology of video game players, it has been criticised for the dichotomous nature of its questions and its lack of psychometric validation (Yee, 2004). This test was more of a community-driven

project, rather than primarily a scholarly one. This, combined with the fact that such player classification does not align with this dissertation's research objectives, led to it not being utilised in the research component. Nonetheless, Bartle's work is useful to discuss, as different categories of players may engage differently with monetisation strategies. In fact, games with microtransactions tend to appeal to one or more of these motivators, with some of the most successful examples involving collectables, vast open-world exploration, multiplayer features, and competition, either through comparison or direct player-versus-player gameplay. The theories and psychological biases behind some of these motivators, their prevalence in younger populations, and how these can be commodified are explored in more detail throughout this literature review, and the Reasons for Playing sections of both the Results and Discussion chapters.

The First Spend and the Breaking of the Purchase Barrier

In mobile game development, game developers frequently bring up the concept of what is known in the industry as *The First Spend* when discussing monetisation strategies (Jernström, 2016b). Many players seem to have reservations about spending money on digital goods within a game they have recently started playing. The objective of The First Spend is to encourage a player to make the initial microtransaction as early as possible.

Research in behavioural economics suggests that once individuals make an initial purchase, they are psychologically more likely to continue spending due to *cognitive consistency* (Festinger, 1957; Babu & Edward, 2009) and the *sunk cost fallacy* (Arkes & Blumer, 1985; Gourville & Soman, 2002; Kahneman, 2011). These biases illustrate the tendency to continue investing time, effort, or money in an

activity based on past investment, independent of current utility. In gamified systems, this is exploited by mechanics such as daily login streaks or misaligned bundle pricing that results in leftover in-game currency, with both creating a sense of “wasted” investment if the player stops playing (Jernström, 2016b). The prospect of abandoning the game is perceived as a loss of investment by players, which enhances their commitment to repeat play, even when intrinsic motivation declines (King et al., 2019a, 2019b). This principle also underlies microtransaction behaviours, with players rationalising further expenditure to "justify" prior monetary investment in digital goods, cosmetic upgrades, or in-game status symbols (Jernström, 2016a, 2016b; Rick, 2011).

Through *psychological pricing* strategies (Kotler et al., 2019), initial purchases often appear to be low-cost, limited-time offers and are often exclusively offered to new players to increase their perceived value and urgency, as illustrated in *Figure 1*. This concept also leverages the *Foot-in-the-Door technique*, a persuasion tactic where convincing individuals to agree to a small initial request makes them significantly more likely to comply with a larger subsequent request (Freedman & Fraser, 1966; Yuan, 2024). This is further synergistically consolidated through the *anchoring bias*, the psychological tendency where individuals rely heavily on the first piece of information presented to them (Jernström, 2016b; Kahneman, 2011; Tversky & Kahneman, 1974). By displaying high-cost bundles or memberships first within their in-game store, developers condition players to view smaller purchases as good value for money, nudging them toward a purchase.

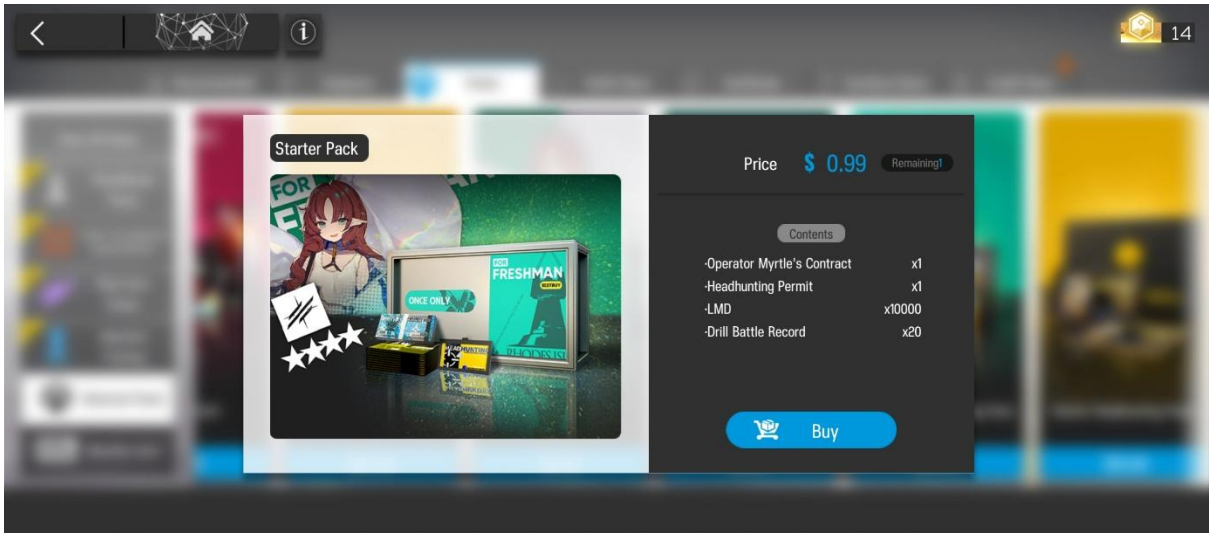

Figure 1: *Arknights Starter Pack*

Note. In-game screenshot of a one-time offering from Arknights, a Gacha game released in 2019, developed by Yostar.

Reward Conditioning and Habit Formation

Controversially, an emerging contemporary game development strategy is referred to as the *Hook-Habit-Hobby* model (Jernström, 2016a, 2016b). Within the gaming experience itself, the *Hook* in this approach involves facilitating rapid initial progression, immediate rewards, and a sense of proficiency early in gameplay. This phase is colloquially referred to as the *honeymoon phase*, underscored by novelty and a feeling of excitement (Seufert, 2017a, 2017b, 2023).

As discussed in my previous dissertation, such practices align closely with operant conditioning, wherein dopaminergic rewards through positive reinforcement (e.g. level-ups, rare items) are provided on an intermittent schedule to sustain user activity (Galea, 2023). The concept of The First Spend also tends to be utilised during this phase (Jernström, 2016b).

A strategy to nurture a sense of *habit* includes mechanisms such as battle passes, login rewards, and daily missions. These systems form a behavioural inclination, where logging in becomes necessary due to *opportunity cost*, as not only is the player awarded rewards for their logins, but they may miss out on the compounding daily login streaks/rewards that have become common across games of this genre.

Based on operant conditioning theories, the structure of habit creation in games is similar to the 'habit loop' formulation promoted by Duhigg (2012) of cue, routine, and reward. Gamified systems borrow environmental or temporal cues, such as notification reminders or daily reset timers, that initiate player routines, typically short play sessions or specific in-game behaviours. Completion of these routines rewards the player with immediate gratification, such as progress indicators, that reinforce behaviour. Iterations of this loop repeated over time consolidate habitual use, decreasing cognitive effort and increasing automaticity in player engagement (Wood & Neal, 2007). These mechanisms not only enable long-term player retention but can also normalise microtransaction spending within the habitual gameplay loop. One could argue this creates a sense of compulsion rather than enjoyment.

Over time, as players progress through the game, later progression becomes harder to achieve when compared to the honeymoon phase, similar to a logarithmic scale (Fitton et al., 2024; Lee et al., 2025; Lundy et al., 2023; Petrovskaya & Zendle, 2022; Zendle & Cairns, 2018). As progression slows down, the game offers a solution to this problem by encouraging players to pay to recapture this lost sense of advancement and excitement that used to be felt during the honeymoon phase. By getting players conditioned to seamless progression at the beginning, this gradual shift towards the game becoming a *hobby* transforms engagement from a voluntary

pastime into a conditioned behaviour, where it takes significantly more effort and resources to achieve a similar experience as the honeymoon phase.

Despite the scrutiny of this model, as parallels could be drawn to models of addiction, there is positive potential for the application of these core concepts in other settings, such as education (Drummond & Sauer, 2018). For example, the Hook aligns with the educational principle of *errorless learning*, which suggests that an early sense of success and mastery increases motivation (Woolfolk, 2020). In classroom settings, introducing material in a way that allows students to experience wins can promote confidence and intrinsic motivation to pursue more complex tasks. However, balance is important. Just like video games, educational material that is too simplistic can be unstimulating, thereby having a counterproductive effect, reducing engagement and motivation. Similar to game design, there must be a gradual increase in challenge to maintain interest while providing a sense of progress and competence (Woolfolk, 2020). This is often referred to as *Flow Theory*, which specifies an optimal psychological state where individuals are fully engaged and immersed in an activity that is suited to their skill level, avoiding boredom and frustration (Csikszentmihalyi, 1990). Flow in games is typically created through increasingly challenging tasks, levelling up, and increasingly complex objectives. Local education research supports this link as it also positions theories of motivation, such as Flow Theory, as important underlying constructs in gaming that can be leveraged in GBL (Tirazona, 2025).

Supporting intrinsic engagement through its balance of skill and challenge, *Expectancy Theory* explains how expectations of effort, performance, and reward more completely predict long-term motivation. Expectancy Theory, originally formulated by Vroom (1964), provides a theoretical model for the study of motivation.

According to the theory, individuals' motivation is influenced by three elements: expectancy, instrumentality, and valence. *Expectancy* is the belief that effort will result in successful performance. In games, players notice achievable goals, such as beating a challenging level, levelling up or gaining rewards. *Instrumentality* is about the perception that performance will be rewarded; games achieve this with explicit feedback systems such as points, badges, or rank advancement. *Valence* refers to how desirable the reward is perceived to be, something often magnified in social game settings where leaderboards or unique cosmetic items have considerable peer recognition value (Hamari & Koivisto, 2015a, 2015b). Combined, these factors create sustained player engagement and facilitate microtransaction behaviours through the alignment of effort, performance, and desired outcomes. Video games tend to be clear in their objectives and rewards, and this structured *alignment* of efforts is an important motivator in other contexts, especially education (Biggs et al., 2022; Porter, 2002; Tyler, 1949).

The process of gamification can also reduce cognitive load by simplifying complex tasks through structured progression, clear goals, and visual feedback (Deterding et al., 2011a, 2011b; Sweller, 1988; Hamari et al., 2014). This concept of *scaffolding,* which is instrumental in pedagogy, not only supports learning or skill acquisition but can also render events more streamlined in a way that nudges individuals subtly toward desired actions (Vygotsky & Cole, 1978). While in the context of microtransactions, this may be used to encourage the uptake of optional purchases, in pedagogical contexts, it could be used to encourage skill acquisition and learning. *Nudging*, a term borrowed from behavioural economics, also operates by structuring choice architecture to promote desired behaviour without overt coercion (Thaler & Sunstein, 2008). In games, nudging may come in the form of

limited-time offers, visual prompts for special items, or socially comparative features such as leaderboards, which leverage *Social Comparison Theory* (Festinger, 1954); the tendency to evaluate performance by comparing oneself in relation to others.

Another cognitive bias, the *IKEA Effect*, may also be implicated in the appeal of games with microtransactions (Jernström, 2016a, 2016b; Norton et al., 2012). The bias derives its name from the Swedish do-it-yourself furniture company IKEA, which sells economical, disassembled furniture. It is often thought that when this furniture is built by consumers, higher emotional value is placed on this piece of furniture because they have built it themselves. This idea has been extrapolated to a cognitive bias where individuals place a high value on things they have helped construct themselves. This may explain the appeal of microtransactions. When players invest time, effort, and money into creating and customising their avatars, building virtual homes, upgrading characters, completing quests, progressing through the story and strengthening their account, they often attribute greater worth to these digital assets (Norton et al., 2012). This can make purchases feel like an investment in an experience. While this effect is often exploited in gaming to encourage further purchases, it could also be constructively applied in other settings, such as educational settings (Jernström, 2016a, 2016b). Allowing students to co-create learning environments, such as decorating their own classroom and creating charts together, may create a stronger sense of ownership, empowerment and engagement with their education. This idea also aligns with a *constructivist approach* to learning, where students play an active role in constructing their own knowledge (Piaget, 1954; Vygotsky & Cole, 1978).

Having described how reward schedules and habit loops drive player engagement, it is important to discuss how game developers compound these

effects with other practices to amplify players' psychological investment and warp their perception of value, thereby reinforcing the spending habits described above.

Economic Obfuscation and Material Distortion

Another interesting strategy that has become an industry standard in relation to microtransaction game design involves the use of multiple currencies (Duverge, 2016; Petrovskaya & Zendle, 2022). This type of economic obfuscation, often referred to as *Material Distortion*, involves pricing digital goods using multiple types of fictional currencies (e.g. gems, tickets, coins, etc), requiring players to convert real money through several steps before making a purchase, rather than outright pricing packages using local real-world currency (Gordon-Petrovskaya, 2023; Petrovskaya & Zendle, 2022).

This currency conversion may serve a few purposes. One of them could be immersion into the fictional world created by the developers. The more commonly accepted and scrutinised reason is to create a gap in the mind of the consumer, sheltering them from the real-world financial cost of their actions, thereby impairing rational evaluation. Often, purchasing in-game currency requires the purchase of packages rather than a direct conversion, forcing players to buy currency in predetermined bundles that may often exceed what is necessary for most transactions. As discussed in the The First Spend and the Breaking of the Purchase Barrier section with relation to the fallacy of sunk cost, the remainder currency may encourage further purchases to avoid waste, reinforcing continued spending.

The European Games Developer Federation (EGDF) positions in-game currencies as a crucial component in the European mobile game market’s success (Kaleva, 2025). This feature of microtransactions has ushered in a regulatory

campaign by the Consumer Protection Cooperation Network (CPC) coordinated by the European Commission (EC, 2025a), with Swedish game Star Stable Online at the forefront as the alleged offender. Presumably, this is an exemplification of the EU's commitment towards consumer protection, as this was a catalyst for ongoing legislative-level discussion that is still unfolding as of writing. Details are discussed further in the Ethical Implications and Future Regulation section of this chapter.

Monetising Inconvenience: The Selling of Speed and Access

As discussed in the Reward Conditioning and Habit Formation section, beyond offering aesthetics, games increasingly monetise inconvenience, often selling the solution to intricately crafted problems (Fitton et al., 2024; Lee et al., 2025; Lundy et al., 2023; Petrovskaya & Zendle, 2022; Zendle & Cairns, 2018). Developers may opt to slow natural progression through artificial bottlenecks such as stamina systems, lengthy upgrade timers, creating limited-time levels/stages with specific limited-time characters in mind that are currently available, or restricted access to content. Players are then offered the option to bypass these delays through payment.

This method effectively sells the solution in the form of convenience that the developers themselves removed. It creates a revenue stream based not on added value but on the resolution of frustrations deliberately engineered into the system.

Pay-to-Win Mechanics and Competitive Pressure

A particular subset of microtransactions relates to gameplay advantages. While many games involving microtransactions have a main campaign that can usually be beaten without spending money, in order to accelerate progress or when it comes to elevating the gameplay to a competitive level, spending may become a

very attractive option (Duverge, 2016; Steinmetz et al., 2022). This concept is often referred to as *pay-to-win* (P2W). Certain game mechanics allow players who invest money to gain advantages over non-paying users, often in the form of stronger, exclusive equipment, faster progression, or access to superior characters. Such systems exploit social comparison and competitive drive. In other non-game-related contexts, this aspect of social comparison is often accentuated in young people (Callan et al., 2015). Therefore, it may be reasonable to hypothesise that perhaps this could be extrapolated in the digital games context as well.

Research has shown that games employing competitive monetisation systems may correlate with higher levels of problem gambling behaviour among young players (Lee et al., 2025; Li, Mills, & Nower, 2019).

People are naturally inclined to compete and succeed, and this naturally extends to cyberspace and video games, particularly in multiplayer environments. By creating observable disparities between paying and non-paying users, a sense of inadequacy can urge continued purchases as a means of not falling behind, especially when the players feel they have plateaued in terms of sheer skill alone. This dynamic contributes to what is called *power creep*, where the bar for competitiveness continuously rises, and funnelling money within the game may become the only solution to the imposed bottleneck, where skill and practice no longer provide enough gains on their own to give a competitive edge (Britt & Britt, 2021; Petrovskaya & Zendle, 2022; Wong, 2019). Young players, still forging a sense of identity and belonging, might be particularly vulnerable to these social and competitive pressures.

Developmental Vulnerabilities and Motivators

While most legislative frameworks consider individuals aged 18 and over to be legal adults, this dissertation frequently discusses age 25 as a cutoff point, especially in the Results and Discussion components. Research indicates that the human brain, particularly the prefrontal cortex in the frontal lobe that is responsible for executive functioning, risk assessment, and impulse control, fully matures by around the age of 25 (Johnson et al., 2009). This discrepancy between legal and biological maturity is significant in the context of microtransactions, as young adults may have the legal autonomy to make financial decisions, but without the full higher-order cognitive capacity to evaluate long-term consequences. The reward systems of the brain in adolescents and young adults are often more sensitive to reward stimuli, making them particularly vulnerable to persuasive in-game mechanics that exploit impulsivity and short-term gratification (Steinberg, 2010). This raises ethical questions about targeting such age groups with systems such as Gacha, loot boxes and time-limited offers, which are discussed in more detail in the following sections of this chapter.

It is also important to discuss psychological development literature, which further compounds susceptibility to persuasion, which could theoretically extend to the in-game context. Erikson's Theory of Psychosocial Development is characterised by life stages encompassing a dualistic conflict, and the way this is resolved has a bearing on one's life trajectory and the way one views and relates to the self and others. Young People find themselves navigating the developmental stages of *Industry vs Inferiority* and *Identity vs Role Confusion*, where the exploration of self-worth in the former and identity in the latter becomes increasingly tied to social comparison, competence, and recognition from others (Erikson, 1963). These drives

for accomplishment and need for uniqueness manifest themselves in many different contexts, and perhaps this also extends to digital spaces, making digital assets such as cosmetic items or exclusive avatars appealing as a form of self-expression.

A theory that is often discussed in relation to the psychological efficacy of video games and gamification is the *Self-Determination Theory* (SDT) of human motivation. It posits that motivation in humans is intrinsically driven by the need to satisfy three innate psychological needs: *autonomy* (feeling of control), *competence* (feeling of ability and progress), and *relatedness* (social connectedness) (Deci & Ryan, 2000; Moller et al., 2024; Proulx et al., 2017; Ryan et al., 2006). These needs are especially important during adolescence. Well-designed gamified systems, such as those utilised in successful microtransaction-based video games, directly appeal to these needs. For example, Pokémon Go and Duolingo utilise progress bars, levels, social sharing, and customised goals to provide users with immediate feedback, a sense of mastery, and belonging. Most digital games that include microtransactions feature the same design elements, where users pay money to accelerate progression, purchase exclusive content, or extend their social status within the game environment (Zendle & Cairns, 2018). Local education literature discusses how the mechanisms underlying SDT could be powerful learning tools, but also could, in cases of deprivation of these psychological needs, result in negative outcomes such as problematic video game use (Tirazona, 2025).

Reward Randomisation and Gambling-Like Elements

Gacha systems were the subject of my undergraduate investigation (Galea, 2023). The word Gacha is derived from the Japanese term *gachapon* (ガチャポン), a type of toy capsule machine (see *Figure 2*). True to its namesake, this game

mechanic involves a form of reward randomisation. In digital systems, this is often compared to gambling (Antepenko et al., 2022; Bobkova et al., 2024; DeCamp & Daly, 2023; Drummond & Sauer, 2018; Garea et al., 2021, 2023; Garrett et al., 2023; Gibson et al., 2023; Hing et al., 2022; King et al., 2020; Li et al., 2019; Macey et al., 2022; Raneri et al., 2022; Spicer et al., 2022; Steinmetz et al., 2022; Villalba-García et al., 2025; Xiao et al., 2024, 2025; Zendle & Cairns, 2018; Zendle, 2020). Rather than allowing players to directly purchase the virtual goods they desire, these mechanics offer players a chance at rare items or characters through randomised rewards. Some jurisdictions have begun classifying such systems as risky, and there has been progress in terms of regulation, such as requiring probabilities to be more transparent to players (1D3 Digitech, 2023; BEUC, 2024; Xiao, 2024). While nuances exist, *loot boxes* are conceptually similar to Gacha as they share the core characteristic of randomised rewards; therefore, the terms are used interchangeably within this dissertation.

Figure 2: *Toy Capsule Machine*

Note: Photo of a generic toy capsule machine taken in Mellieħa, Malta.

As discussed in my previous dissertation on the topic (Galea, 2023), such reward randomisation exploits *variable-ratio reinforcement scheduling*, which is the same psychological mechanism underlying slot machines (Brooks & Clark, 2019; Drummond & Sauer, 2018; King et al., 2019a, 2019b; Davies, 2024). The unpredictability of rewards combined with visual stimuli and intermittent wins creates powerful compulsion loops. Combined with the use of multiple currencies, this further obfuscates the perceived cost of participation.

Another psychological process implicated is the *illusion of control*, where individuals overestimate the extent to which they can influence outcomes in chance-determined situations (Langer, 1975). In video games, this has typically been operationalised through mechanisms such as randomised reward schedules or loot boxes, where players perceive that strategy influences inherently probabilistic outcomes (Zendle et al., 2019). This sense of control can sustain repeat play and consumption activity, particularly when players believe that additional attempts or financial investment will increase their odds of obtaining desirable goods, independent of actual chance. Game mechanics such as *pity systems*, where the odds of obtaining rare goods increase and/or become guaranteed after a set number of randomised attempts, can sustain this illusion of control. While these systems do offer some degree of control, they engage the aforementioned sunk cost fallacy instead, leading players to continue spending to justify prior investment and perhaps reach the pity system threshold.

Artificial Scarcity, Limited-Time Offers and Fear of Missing Out

Games with microtransactions frequently make obtaining certain digital goods limited to a specific time period (see *Figure 3*). By creating what is known as *artificial scarcity*, this often triggers *loss aversion*, a psychological tendency where the pain of losing something outweighs the pleasure of gaining it (Cialdini, 2001; Deepwater, 2025; Duverge, 2016; Lim, 2018; Rick, 2011; Tiemessen et al., 2023). Often accompanied by visible countdown timers, rotating in-game shop items, or temporary access to certain content, developers generate FoMO (Deepwater, 2025; Petrovskaya & Zendle, 2022; Rick, 2011).

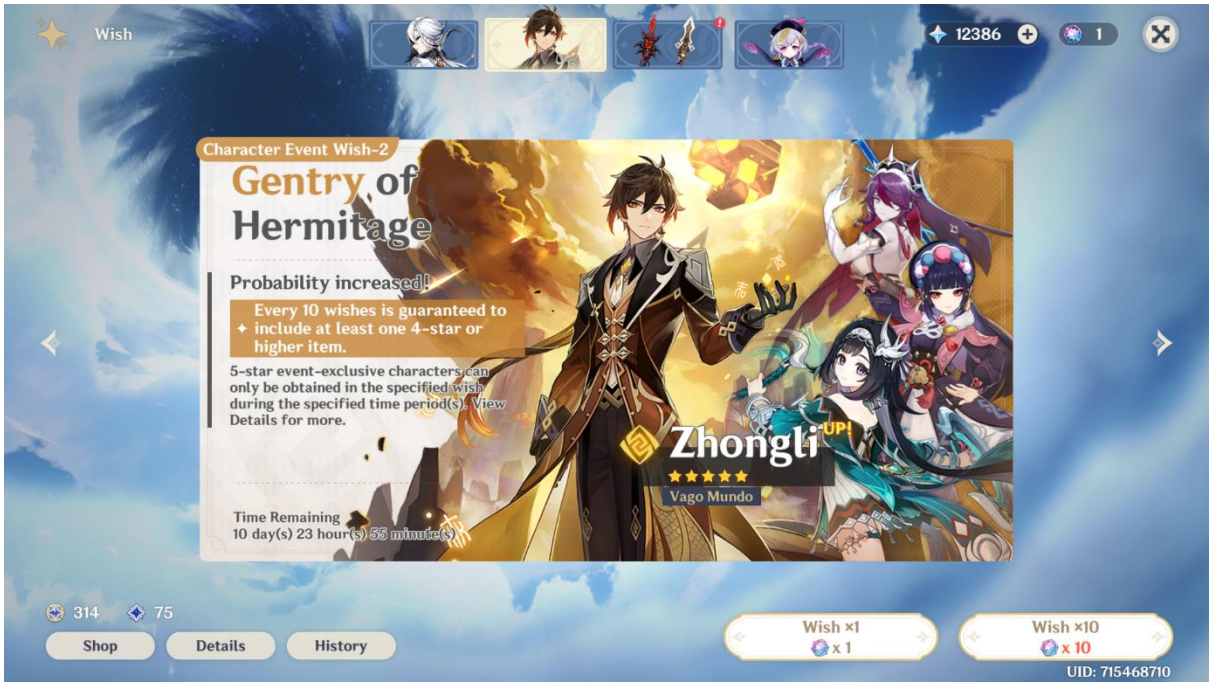

Figure 3: *Genshin Impact Character Wish Banner*

Note: In-game screenshot of a limited-time character banner from Genshin Impact, a Gacha game released in 2020, developed by Hoyoverse, formerly known as Mihoyo.

FoMO can be defined as the pervasive feeling of anxiety that others may be having experiences that one is not a part of (Przybylski et al., 2013). This trait tends to vary in intensity across individuals, with some being more susceptible to the FoMO phenomenon than others. This may also be closely linked and further exacerbated in youth, driving players, especially younger ones, to engage with time-sensitive offers or rare content not necessarily out of need, but to avoid missing out. This is supported by *Dual Processes Theory*, which posits two distinct systems for reasoning processes (Kahneman, 2003, 2011). *System 1* tends to be fast, automatic, and is often intertwined with strong emotions, as is presumably the case when FoMO is involved. This kind of reasoning is thought to be based on heuristics; habits that are difficult to change. *System 2* is considered slower as it is subject to conscious psychic effort, judgments and attitudes rather than heuristics. Emotional pressure is

hypothesised to trigger system 1 reasoning, pushing players toward spending now, because they may miss out on an experience or a collectable they may otherwise never have the chance to obtain again (Shibuya et al., 2019; Davies, 2024). Sometimes, players are allowed to temporarily use premium content via a trial or character/item demo. While this can be useful in allowing players to test digital goods before committing to obtaining them, such a practice could also create a sense of perceived ownership, resulting in attachment, which increases perceived feelings of loss if the player chooses not to purchase, nudging emotional investment into monetary action. This is referred to as the *endowment effect* and deals with the natural inclination towards loss aversion, where perceived losses are often deemed as more perilous than gains (Deepwater, 2025; Lim, 2018; Rick, 2011).

Similar to Material Distortion, such design can be considered unethical and in violation of EU consumer protection legislation as it exploits consumer vulnerabilities for profit. In fact, time-limited practices were listed as a reason for a coordinated enforcement action against Star Stable Online (EC, 2025a). Further details on this policy and enforcement are discussed in the Ethical Implications and Future Regulation section of this chapter.

Susceptibility to Interpersonal Influence

When discussing youth and adolescents, the interpersonal component is paramount. Numerous papers discuss the social element in the context of microtransactions (Bobkova et al., 2024; Gibson et al., 2023; King et al., 2020; Lee et al., 2025; Rita et al., 2024; Xi, 2024). Susceptibility to Interpersonal Influence (SUSCEP) specifically was something that was discussed in my previous study on Gacha games (Galea, 2023). According to Bearden, Netemeyer, and Teel (1989), it

is an individualistic trait characterised by the extent to which individuals conform to expectations or seek approval in their consumption behaviour. Their overall scale is made up of two indices: *normative influence*, the tendency to succumb to social pressure and *informational influence*, the drive to seek out expertise or insight from peers or experts before making a purchase decision. In multiplayer games, where players often observe and imitate high-status avatars, content creators or friends, this could potentially influence spending. The use of social features is a critical element of gamified systems. Features such as leaderboards, group goals, and unlockable achievements promote social comparison and competition, often encouraging users to invest more time or resources in order to maintain or enhance their position (Hamari & Koivisto, 2015a, 2015b). Social influence, such as peer behaviour or public acknowledgement of achievement, can further enhance engagement or spending, with some evidence suggesting that susceptibility to these influences may be particularly strong in younger users due to ongoing psychosocial development (Erikson, 1968; Foulkes et al., 2018). However, my undergraduate study (Galea, 2023) did not find any correlation between normative influence and spending in Gacha. However, an inverse correlation was observed between informational influence and spending, which could be interpreted as the more likely one tends to seek information before spending, the more prudent they would be when it comes to such transactions. While that study was limited in scope and its conclusions should not be generalised due to its size and sampling technique used, this finding still aligns with broader literature suggesting that education can have something of a protective effect against susceptibility to exploitative monetisation practices (Burke et al., 2022; Sipahutar et al., 2024).

Such a mindset of continuously seeking knowledge is heavily implicated in what education plans to achieve. Examining how and if this tendency for interpersonal influence correlates with spending in younger individuals who are developing social identity and autonomy would be interesting and could further underscore the importance of consumer education at a young age.

Buying Impulsivity

In the context of microtransactions, it is often discussed in the literature how gamified systems may induce impulsive behaviours in players (Gibson et al., 2023; King et al., 2020; Rita et al., 2024; Spicer et al., 2022; Villalba-García et al., 2025; Xiao et al., 2024). However, it could also be the case that such mechanics by themselves do not cause impulsive buying patterns, but rather precipitate and perpetuate them in predisposed individuals. In the literature, *Buying Impulsivity* is sometimes considered a generalised tendency that tends to vary from person to person. Rook and Fisher (1995), for example, define it as the tendency to make spontaneous purchases driven by immediate emotional responses rather than rational evaluation. As impulsive buyers may be more prone to experiencing a sudden urge to acquire items, this would closely align with the instant-gratification design of many microtransaction offers. It may stand to reason that, while this tendency could be present across all age groups, it may be amplified in younger demographics due to the ongoing development of the prefrontal cortex, which, as previously discussed, governs inhibitory control and long-term decision making.

Consumers' Need for Uniqueness

Another factor that may be relevant, especially considering younger consumers of games with microtransactions, is the *Consumers' Need for*

Uniqueness (CNFU). A theory of uniqueness was conceptualised by Snyder and Fromkin (2012), and it was further developed by Tian et al. (2001). CNFU is described as the need to distinguish oneself from others through the acquisition, use, and display of consumer goods. The potential application of such a theory to the context of digital games seems natural. This could theoretically manifest itself through the purchase of exclusive characters, customisation options, collectables, or other enhancements that visually differentiate a player's in-game persona. These virtual goods, while they sometimes influence the gameplay, do not necessarily have to alter gameplay mechanics; rather, the focus is on serving as status symbols within the online communities. Although the rarity and utility of certain digital assets in terms of gameplay can also result in such items becoming highly prized.

Tian et al. (2001) propose that CNFU is made up of three dimensions:

- *Creative choice counterconformity* (CCC): involves striving for originality but in a way that is socially acceptable and garners approval from others.
- *Unpopular choice counterconformity* (UCC): involves striving for individuality even if it means deviating from the norm and risking disapproval from others.
- *Avoiding similarity* (AS) involves striving for uniqueness and losing interest in something that is considered commonplace.

These dimensions could theoretically be leveraged through microtransaction design, such as limited-edition or customisable items and characters. For example, making use of unpopular/conventionally weak characters.

Such drives for uniqueness could be especially pronounced during adolescence. As previously discussed, adolescence is a period marked by identity formation and peer differentiation (Erikson, 1963). This could especially be pronounced when it comes to public visibility of in-game purchases, where players'

digital goods are constantly on display. This tendency of CNFU may also interact with FoMO and SUSCEP, creating a loop where the desire to stand out paradoxically leads to conforming to the intentions of the developers.

Younger players, who may still be negotiating their social identities, are growing up in a time when cyberspace is viewed as an extension of the real world rather than just a tool, as it was perceived by previous generations. As a result, younger players may be more inclined to see their online representations as extensions of themselves. This perception can make games that offer self-expression, such as those with microtransactions, more appealing to players who may eventually be willing to spend money to shape their identities within these digital communities.

Additionally, as a result of the underdeveloped prefrontal cortex in youth, traits such as buying impulsivity and SUSCEP can lead to spontaneous, socially-driven spending decisions which may extend to games as well (Rook & Fisher, 1995; Bearden et al., 1989).

Theories of psychology tend to explore cognitive and social domains in a multitude of contexts, and while cyberspace is abstract, it still deals with human relationships, in certain games more than others. When online ecosystems replicate or amplify peer dynamics, this may result in the pressures to conform or compete, just like any other context, making young players of games with microtransactions more vulnerable to spending beyond their means or intention (Davies, 2024).

The Ethical Implications and Future Regulation

The psychological manipulation inherent in modern microtransaction systems raises serious ethical concerns, particularly in relation to younger or vulnerable

populations (Davies, 2024). Strategies such as the Hook, Habit, Hobby model are often scrutinised as there is a striking similarity to models of addiction (King et al., 2019a, 2019b).

Due to such similarities, there is growing pressure for oversight over psychological risks of behavioural design, emphasising the need for consumer protections specifically targeting in-game purchasing mechanisms that can be considered manipulative (Shibuya et al., 2019; King et al., 2019a, 2019b). The ethical controversies of microtransactions have raised many questions about regulation. Gacha and Loot boxes, often compared to gambling, have been criticised for their ability to take advantage of players in vulnerable positions.

In fact, this discourse on the overlap between gaming and gambling has escalated into a high-stakes policy debate, particularly within the European Union. The European Parliament signalled significant concern in a 2022 report on consumer protection in online video games, calling for investigations into loot boxes, manipulative design, and the need for stronger consumer protection for all players, especially minors (European Parliament, 2022).

As briefly discussed in the Introduction chapter, 2024 may be considered a turning point; the BEUC filed a complaint with the EC, accusing the video game industry of breaching EU consumer law through manipulative practices such as the aforementioned Material Distortion and limited-time offers (BEUC, 2024).

This heralded regulatory action. In March 2025, the EU's CPC Network published a set of key principles asserting that in-game virtual currencies are subject to European consumer protection laws (CPC Network, 2025). The EC also announced the aforementioned enforcement action against Star Stable Online on the basis of making “direct appeals to children” and using “pressuring techniques” (EC,

2025a). This regulatory push is in accordance with the proposed *Digital Fairness Act,* which targets “addictive design” and digital profiling of consumer vulnerabilities for commercial exploitation purposes (Cyber Risk GmbH, 2024; EC, 2025a, 2025b). This chronicle demonstrates the present relevance of this dissertation, as the issues raised in this research’s proposal stage are now at the forefront of international consumer protection policy.

Proposed solutions in academic literature include mandatory disclosures of the probability of obtaining specific rewards, spending limits, and stricter enforcement of age restrictions (Dentons, 2023; Macey et al., 2022). The key principles for ethical microtransaction game design published by the CPC suggest similar practices involving transparency, abolishment of Material Distortion by simply using real-world currency, respecting the right to withdrawal and ensuring consumer vulnerabilities are not exploited, especially when dealing with the vulnerable cohort of children (EC, 2025a, 2025b).

The industry has framed this regulatory push as a threat (Osborn, 2025). The EGDF argued that the Commission's consumer protection plans, particularly those discussed in the Digital Fairness Act, are perilous to businesses whose games rely on the microtransaction model and “threaten the games industry” (Kaleva, 2025). The core concern is these proposed rules on in-game currencies will “seriously weaken the performance” of the F2P mobile game sector. The EGDF notes that in-game currencies are the “foundation of the success” of the European mobile games industry, and that significant changes to their logic would “jeopardise its future growth” (Kaleva, 2025). This could all be reasonably interpreted as the industry, at the very least, being aware that some of their mechanics have a psychological effect

on players that nudges them towards increased spending, even considering them the very foundation of the model's success.

The gaming industry's position on the matter seems to shift the onus towards parental responsibility, as observed from the focus of industry-funded research, such as the 2024 GameTrack survey, which tracks the use of parental control tools for in-game spending (Ipsos, 2024). This creates a conundrum: does the solution to problematic spending lie in industry regulation, as proposed by the discussed consumer protection agencies, or in user-level controls, as advocated by the industry? Often, the truth is nuanced and lies somewhere in between.

Whatever the answer, education remains a proactive and sustainable approach, empowering individuals to navigate these challenges independently, especially when legislation lags behind cutting-edge developments, underscoring the importance of school subjects such as Personal, Social and Career Development (PSCD), which primarily deals with equipping students with the competencies necessary to make informed decisions (Government of Malta, n.d.).

The Positive Potential of Video Games

While concerns about microtransactions dominate the discourse, and video games have historically had a negative connotation attached to them, only discussing this media in a negative light would be reductionist (One World Education, 2014). *Serious games* offer an alternative lens through which to view gaming's potential. Apart from video games being a relatively common pastime nowadays, and an entertaining medium like any other, serious games are designed to educate, train, or promote awareness while retaining the engaging elements of traditional games (Abt, 1987; Tirazona, 2025; Zohari et al., 2023).

Play does not necessarily mean avoiding hard work; it can also mean a pedagogy that maximises learning and long-term growth. This is why even in military training, soldiers use simulations, mock battles, and mission exercises; serious games designed to refine skills without real-world consequences.

This concept is supported by Carse (1986), who differentiates between *finite* and *infinite* games. A finite game has a clear end, with winners and losers. In contrast, an infinite game continues as long as possible, with the goal of ongoing learning and improvement. This concept of serious games has become a major component in martial arts training as well, with those who embrace an infinite mindset not being focused on winning each practice round but on evolving their skills over time. This is why some elite fighters are reducing sparring, relying on technical drills and controlled play-based training to refine skills while avoiding unnecessary damage (Blomqvist Mickelsson & Stylin, 2021; Ouergui et al., 2021).

Similarly, Huizinga (1955) argues that play is a fundamental aspect of human culture, shaping how societies develop skills and strategies. This idea extends to sports as well as education, where structured, game-like training methods allow athletes and students to experiment and grow without excessive risk. Einstein once remarked that “play is the highest form of research,” highlighting the cognitive benefits of engaging in structured but enjoyable learning experiences (as cited in Morgan, 2024). In fact, the PSCD pedagogy is based on the *Experiential Learning Model*, which as indicated in *Figure 4*, involves an engaging experience in the form of an activity followed by a period of processing via reflection upon that activity (Institute for Education; Janning et al.; Marzano, 2017; Norman & Jordan, 2006; NumberWorks’nWords, n.d.; Wisconsin, 2020; Woolfolk, 2019).

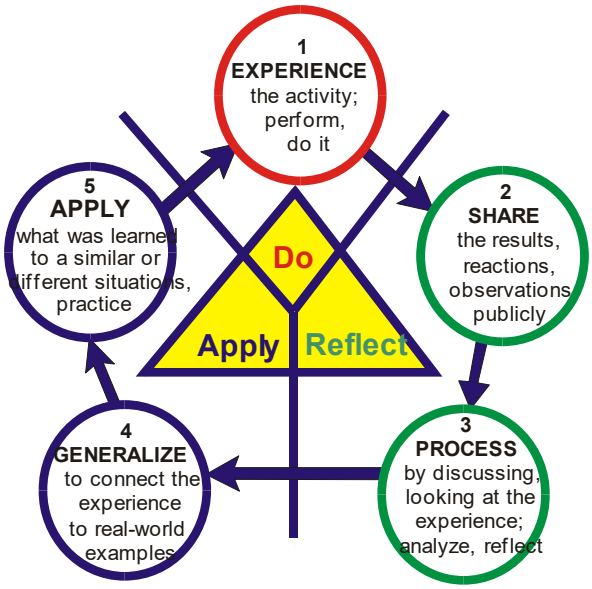

***Figure 4**: Experiential Learning Model*

Note. From "Using an Experiential Model in 4-H," M. M. Norman and J. C. Joy, 2006, *EDIS*, *2006*(9) (10.32473/edis-4h243-2006). Used with permission.

The effectiveness of this approach is further supported by research. The *Yerkes-Dodson Law* (1908), as depicted in *Figure 5*, states that stress can contribute to learning, but this is only up to a certain point until it ends up hindering it. Huberman (2021) explains that *neuroplasticity*, the brain's ability to adapt, is maximised when learning is engaging and within that optimal level of stress, making it easier to refine new skills.

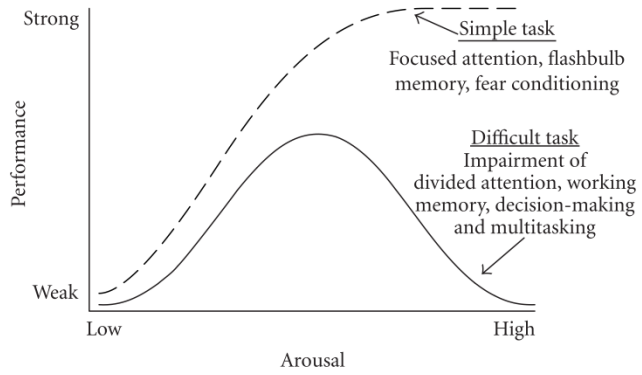

Figure 5: *Yerkes-Dodson Curve*

Note. From "The Temporal Dynamics Model of Emotional Memory Processing: A Synthesis on the Neurobiological Basis of Stress-Induced Amnesia, Flashbulb and Traumatic Memories, and the Yerkes-Dodson Law", by Diamond, D. M., Campbell, A. M., Park, C. R., Halonen, J., & Zoladz, P. R., 2007, Neural Plasticity, 2007, Article 60803 (https://doi.org/10.1155/2007/60803). This file is made available under the Creative Commons CC0 1.0 Universal Public Domain Dedication.

Play, according to Huberman (2021), decreases *cortisol*, generally referred to as the stress hormone, while increasing *dopamine*, also commonly referred to as the reward hormone. Both these neurotransmitters have a direct impact on neuroplasticity. When cortisol levels are high and dopamine is low, learning becomes impaired due to the activation of the *sympathetic nervous system* (fight-or-flight) response, which negatively impacts memory and cognitive flexibility (McEwen, 2007). Conversely, when dopamine is elevated and cortisol is controlled, the brain enters an optimal state for learning, allowing individuals to retain information more effectively and refine new skills.

This explains why structured play is such a powerful training tool. Play-based learning reduces stress while keeping engagement high, creating an environment

where skill acquisition happens naturally. This is reflected in Huberman's (2022) discussion on neuroplasticity, where he posits that enjoyable, low-stress activities enhance the brain's ability to form and strengthen neural pathways.

By shifting from a finite to an infinite mindset, athletes can extend their careers, improve learning retention, and reduce injury risk. Similarly, novel learning stimuli are able to consolidate educational gains more efficiently and effectively when compared to the traditional bank model of education (Woolfolk, 2020). Serious games provide the perfect balance: structured yet flexible, challenging yet enjoyable.

Examples of serious games include simulation games for medical training, aircraft piloting simulations and language-learning apps like Duolingo: a game that has integrated engaging gamified features such as daily practice "streaks" to encourage consistency (see *Figure 6*) (Abt, 1987; Duolingo, n.d.; Zohari et al., 2023). Minecraft, a game that has implemented microtransactions in its flagship edition of the game, has also created an educational version for classroom use to inspire and facilitate learning through GBL (Gee, 2003, 2007; Minecraft, n.d.-a, n.d.-b).

Figure 6: *Duolingo Streak*

Note: A shareable digital reward from Duolingo, a language learning app released in 2012. This game utilises a daily streak mechanic not dissimilar to those in other mobile games, but with a focus on learning. Additionally, this image is a product of one of the many social networking features that allow sharing of milestones, further exemplifying the utility of applying gamified features in pedagogy.

Gee (2003, 2007) argues that well-designed serious games leverage principles of effective learning, such as problem-solving, collaboration, and

immediate feedback. These attributes align closely with PSCD objectives, particularly in nurturing critical thinking, teamwork, and ethical decision-making (Government of Malta, n.d.).

Tirazona (2025) raises similar arguments, highlighting the potential of serious games for ethics education. This independent validation from a separate researcher strengthens the credibility of this dissertation's inferences. Based on these convergent inferences, incorporating serious games into curricula by emphasising their constructive applications can leverage some of the psychological tactics that enhance immersion and channel it into an interest in learning.

Conclusion

Microtransactions have become an influential business model in modern gaming. While they offer developers an avenue for sustained income and allow for ongoing content updates, it could be a slippery slope that oversteps certain boundaries towards outright exploitative practices. By leveraging psychological biases and obscuring financial clarity, developers maximise profitability often at the expense of the user.

Ethical discourse around game design must weigh the financial incentives of microtransactions against the moral obligation to protect players from manipulation, especially the most vulnerable in society, such as the youth. A critical reassessment of industry standards, as is being done, is necessary to ensure games remain a source of enjoyment and not exploitation.

Additionally, taking a holistic approach to video games rather than vilifying the medium would be a prudent approach. Education should equip students with the tools to navigate the digital world and to become more informed consumers rather

than dismissing the recreational, artistic and sometimes educational potential of video games (One World Education, 2014).

Overall, the literature demonstrates that microtransaction design leverages a complex interplay of psychological processes, from operant conditioning to social influence. However, existing research increasingly focuses on adults and does not go into detail on how these different facets operate across developmental stages. The relatively sparse investigation of interpersonal and personality predictors, particularly for younger players, represents a key area of research necessity. Addressing this gap lies at the heart of the present study, which seeks to inform knowledge on age-sensitive susceptibilities.

Chapter 3: Methodology

Research Design and Rationale

The study utilises a quantitative cross-sectional survey design, chosen due to its suitability in determining statistical relationships between individual difference variables and spending behaviour. When carried out prudently, the quantitative method has the potential to provide measurable, reproducible, and generalisable insights, particularly when examining trends in large and heterogeneous samples (Bryman, 2016; Creswell & Creswell, 2018; Watson, 2015). This was deemed most appropriate given this study's emphasis on correlates of spending among young consumers of microtransaction-based games, as it allows for the systematic comparison between age groups and the examination of behavioural correlates.

The research aims to address two primary research questions:

1. What are the individual personality and behavioural attributes that are associated with spending behaviour among players of video games with microtransactions?
2. How do such factors differ among *Young Players* (age < 25) and *Older Players* (age ≥ 25)?

Quantitative survey research is a prevalent approach in gaming and consumer psychology, particularly when looking at motivational or cognitive-behavioural predictors at scale (Hamari & Keronen, 2017; King et al., 2020). Similar survey-based methodologies have been widely employed in the study of gaming and consumer psychology, particularly in research exploring risk factors in microtransaction and loot box spending (Ahmadu, 2023; Behuria, 2023; Garea et al., 2023; Hamari & Koivisto, 2015a, 2015b; Hing et al., 2022; Li et al., 2019; Spicer et

al., 2022; Xiao et al., 2024; Zendle & Cairns, 2019a, 2019b; Zendle et al., 2019). Meta-analytical work on digital consumption behaviour has also demonstrated the suitability of this approach (Hamari & Keronen, 2017).

Participants and Recruitment

In total, 1,275 responses were collected through a combination of convenience and snowball sampling approaches. Given the research questions' focus on broad consumer trends and the concern that local recruitment would not yield enough participants for meaningful statistical analysis, this study was disseminated on a global scale; it was not limited to the Maltese population. Participants were primarily recruited through international, English-speaking gaming-related forums on sites such as Reddit, Discord. This strategy aligns with other large-scale survey studies of video game players that also relied on online Reddit communities for access to relevant populations (Zendle et al., 2019).

Communities on Discord and Reddit interested in games involving microtransactions were identified by using the names of popular games relevant to this study as search terms on Disboard, a Discord server listing community, and the built-in community search functionality on Reddit. Moderators/administrators were then identified, contacted, and if permission was granted, the anonymous survey was disseminated to community members. This survey was also distributed to academic institutions such as the University of Malta students through the eSIMS mailing system via the Office of the Registrar, and student union networks like the City St George's, University of London Gacha Society. Participants were also encouraged to share the survey with eligible individuals who might be interested in participating.

Inclusion Criteria

This study required participants to:

- Be at least 12 years of age.
- Play or have played video games that include microtransaction elements.

There were no other exclusion criteria. Anyone under the age of 12 was automatically ruled out by the consent form.

Ethical Considerations

The study was granted ethical approval by the University of Malta Faculty of Research Ethics Committee (FREC); Application ID: EDUC-2024-00883. No data was collected until FREC approval was received. Additionally, explicit permission was obtained from the authors of the psychometric scales used in the survey. The following considerations are also important to mention:

- *Informed Consent*: An opt-in approach was used. The information sheet on participation and survey introduction clearly stated that participation was voluntary and anonymous at the source.
- *Parental Consent*: As the Young Players group includes participants under the age of 18, the issue of parental consent was a primary ethical consideration. This presented a complex challenge of balancing the legal requirement for verifiable parental consent against the study's commitment to "anonymity at the source," which would be broken by a signed form. To resolve this conflict, guidance was sought from the University of Malta's FREC chairman at the time. Based on this correspondence, an information sheet was constructed, which clearly stated that in the case the respondent was under the age of 18, consent from the guardian and assent from the minor would be assumed

upon submission of the completed, anonymous questionnaire. This information sheet was approved by the *University Research Ethics Committee Application* (URECA) protocol. This solution upheld the principle of anonymity while following a clear and documented ethical procedure.

- *Anonymity and Data Security*: Identifying information was not gathered. Data was stored securely and was accessed only by the dissertation supervisors and me.
- *Youth Protection*: Even though a few participants were minors (12–17 years of age), the language and content of the questionnaire were deemed suitable for their age, and an effort was made to ensure that no generally sensitive, compromising or triggering content was included.
- *Relevance*: No additional data was collected other than what was necessary or relevant to the research questions.

Pilot Study

Before public dissemination of the survey, a pilot test using five participants, including those within the Younger age group, was conducted. The pilot demonstrated that:

- Certain scale items were perceived as redundant or needlessly repetitive.
- Improvement in formatting, navigation and aesthetics was required to ensure sustained interest.
- Transitions between sections had to be more distinctly marked, especially when questions shifted from those directly pertaining to microtransactions to those about broader personality/behavioural traits.

  Revisions involved:

- The use of a shortened version of the CNFU scale (Ruvio et al., 2008) instead of the full version,
- Improved layout and titles,
- Larger and more reader-friendly fonts for accessibility, and
- Visual enhancements such as a calming colour palette and implementation of thematically relevant royalty-free gaming-related and gaming-adjacent imagery (sourced from online image repository Pexels), to maintain engagement.

These tweaks, most notably, reorganising the layout for enhanced readability and clearly subdividing components, enhanced flow and strengthened the instrument's face validity (Nevo, 1985). By cutting repetitive items (e.g., replacing CNFU scale with the CNFU-S) and adding visual improvements, the shortened survey was streamlined for younger users while preserving the foundational validity of the measures.

Measures

The survey was administered through Google Forms and included:

- Demographic Questions: Age, gender, gaming behaviour, information on average playtime and money spent on microtransactions.
- Psychometric Instruments were also utilised. While these instruments were not necessarily created with the gaming context in mind, for the purposes of this study, they were analysed in relation to the gaming context. These psychometric instruments included:

Fear of Missing Out (FoMO)

Przybylski et al. (2013) constructed this ten-item, five-point Likert scale measure to scale to assess anxiety related to missing out on rewarding experiences. As discussed in the Literature Review, video games often have a social/community-based element, especially those involving microtransactions. This scale was included to discern if there is a correlation between this phenomenon and microtransaction spending and how this may differ between Younger and Older Players. Individual scores range from 10 to 50, as the score is determined by summing all 10 items of the scale.

This measure demonstrates high internal consistency (α = .87 to .90) and construct validity at all ages. The construct also has face validity, as it includes items relating to anxiety from being left out of social events, which seem to describe this construct and the FoMO phenomenon accurately. Additionally, there is a demonstration of content validity as items constituting this construct are based on relevant FoMO research and literature (Bowman & Clark-Gordon, 2019). Przybylski et al. (2013) demonstrated convergent validity through positive correlation with another one of their scales; social media 26 engagement (r = .40). Discriminant validity is highlighted by demonstrating negative correlation with a psychological need satisfaction scale (r = -.29) developed by La Guardia et al. (2000), as those who had a higher FoMO factor felt a decline in needs for autonomy, competence, and relatedness.

Susceptibility to Interpersonal Influence (SUSCEP)

This 12-item, seven-point Likert scale, by Bearden et al. (1989) scale measures the degree to which individuals are influenced by others in their

purchasing behaviour. The first eight items of this construct are a subscale of normative influence, which is the general tendency to comply with social norms (Stöckli & Hofer, 2020). The last four items make up a subscale of informational influence, the tendency to seek counsel from others for information on products, services, and/or experiences.

It is highly validated and widely applied in consumer psychology. Internal consistency for these subscales is estimated to be high (α = .88 and .82, respectively), and so is test-retest reliability (*r* = .79 and .75, respectively) (Bearden et al., 1989, 2011). Through five separate studies, the convergent and discriminant validity of these subscales was investigated. The normative dimension seemed to correlate more consistently with the measures investigated in these validity studies when compared to the informational influence dimension. However, in terms of correlation, both subscales demonstrated a pattern of significance that is comparable to other studies of scale development. An overall score of general SUSCEP, ranging from 12 to 84, can be generated by summing up responses from all 12 items of this construct.

Buying Impulsiveness Scale (BIS)

This nine-item, five-point Likert-type scale, developed by Rook and Fisher (1995), measures dispositional consumer impulsivity, capturing the tendency to make spontaneous, unplanned purchases driven by immediate desires rather than rational deliberation. In the context of this study, this measure is particularly relevant as microtransaction systems often leverage time-limited offers, emotional appeals, and ease-of-purchase mechanisms that are known to trigger impulsive buying behaviours. An overall index score ranging from 9 to 45 is produced by summing the item scores, with higher scores indicating greater impulsivity.

Internal consistency was shown to be high (α = .88) in one undergraduate sample (*n* = 212) (Bearden et al., 2011). In a second validation using a mall record store sample, the scale again demonstrated unidimensionality and adequate internal consistency (α = .82). Validity evidence is robust with significant positive correlations found between BIS and actual impulse-related buying behaviour ($r = .53$, $p < .05$). Additional correlations with measures of normative evaluation ($r = .21$) and other spending-related behaviours ($r = .21$) further support convergent validity, while the low correlation ($r = .10$) with an unrelated construct demonstrate discriminant validity. Multiple mean-level difference tests have also reinforced the validity of the scale across contexts.

Consumers' Need for Uniqueness – Short Form (CNFU-S)

This is a shortened 12-item, 5-point Likert-type version of Tian et al.'s (2001) 31-item CNFU scale, developed by Ruvio et al. (2008). The CNFU-S assesses the individual's need to establish their identity through consumption choices that differentiate them from others. This abridged form was selected for its reduced participant burden, which is particularly important given its inclusion alongside multiple other measures in the present study. Items are designed to tap into three underlying dimensions of uniqueness-seeking: creative choice (e.g., selecting products to express individuality), unpopular choice (e.g., preferring items that differ from mainstream preferences), and avoidance of similarity (e.g., discarding items that have become too common or popular). Ruvio et al. (2008) reported that the shortened scale maintained strong psychometric properties when compared to the full CNFU. The CNFU-S score can be calculated by averaging the item responses, yielding a final score ranging from 1 to 5.

Internal consistency was acceptable across samples (α = .77 to .85 for the subscales and α = .84 for the total score). Convergent validity was evidenced through positive correlations with measures of innovative behaviour and status consumption, while discriminant validity was demonstrated through low correlations with unrelated constructs, such as conformity. Factor analysis confirmed the three-factor structure of the CNFU-S, explaining a substantial proportion of variance and supporting its construct validity. An overall CNFU-S score can be computed by summing responses, with higher scores indicating a stronger consumer need for uniqueness.

Analysis of Measures

All scales were scored with Likert-type responses and computed into composite scores per the original authors' directions. The use of psychometric instruments to assess individual differences in susceptibility to game monetisation has been similarly applied in prior research, reinforcing the validity of this approach (Brooks & Clark, 2019; Etchells et al., 2022; Garea et al., 2023; Zendle et al., 2019; Zendle, 2020).

Data Collection Procedure

The survey was distributed with an opt-in participation model. No direct incentives were provided, and no identifying information (e.g., names, email addresses) was collected.

While participants were given the option to skip questions, low-quality and overly blank responses were excluded from the analysis phase. Data was collected over a period of approximately 9 months.

Data Cleaning

Data was cleaned using a combination of IBM SPSS (Version 29) and OpenRefine (Version 3.9). Before formal analysis, data cleaning involved:

- Removing answer sets with nonsensical contradictions (e.g., inconsistent or illogical responses such as first transaction amount exceeding total lifetime expenditure, age when first exposed to microtransactions exceeding current age, and ages that far exceed the recorded maximum human lifespan).
- Finding and, where appropriate, standardising entries (e.g., converting birth year to age in years, standardising various references to countries).
- Using discretion to fix certain typographical errors (e.g., country names).
- Some underrepresented data were grouped to increase statistical power and enhance generalisability (e.g., grouping countries into culturally or geographically related regions to reduce data fragmentation and reveal broader regional trends).

Out of the 1,275 respondents, 10 participants were omitted due to a high volume of missing data and nonsensical entries, or not specifying age, which is considered a key variable in this research. While there were outliers, these were deemed to be well within the realm of possibility. Therefore, the final clean effective sample size was 1,265 participants. To tackle the research question investigating difference between younger and older players, the sample was divided into two groups: Younger group: n = 728, Older group: n = 537 (see Younger vs Older Players subsection for more details).

To handle missing data, *pairwise deletion* was applied so that each participant's valid responses could be analysed with minimal loss, regardless of blanks in other variables. This technique aims to preserve the largest possible valid

dataset for each measure, helping to minimise the inflation of standard errors that often accompanies smaller sample sizes (Allison, 2009). For instance, any participant lacking a few answers on the FoMO scale could still contribute to the analysis of scores on the SUSCEP scale, provided that the remaining data met the analysis requirements. This approach retains more usable observations than listwise exclusion but may yield distinct sample sizes for different analyses. (Enders, 2022). Apart from avoiding needless omission of perfectly serviceable data, this was done out of respect for the participants' time and contribution to this study.

Younger vs Older Players

Although the original plan was to contrast participants under the age of 18 with those 18 and over, the insufficient numbers of under-18 respondents compelled adjustment. The cut-off age was raised to 25 years, a change that is supported by developmental neuroscience literature, which posits the prefrontal cortex continues to fine-tune inhibitory control and executive heuristics until the mid-twenties (Casey et al., 2008; Steinberg, 2013). An analysis thus contrasted participants under the age of 25 with participants aged 25 and above.

Recent data from Video Games Europe (VGE) and EGDF (2023) found that the average player age in Europe is 31.4, and 75% of all video game players are 18 or older. This data refutes assumptions that microtransaction spending is a phenomenon exclusive to youth. Therefore, this study's examination of the Older Players cohort is not only useful as a baseline for comparative analysis but informative in its own right, as this demographic represents a significant segment of the player base. It remains within the scope of a pedagogical thesis, as the ultimate aspiration of education, and especially PSCD, is imparting competencies useful well into adulthood, as demonstrated by the curriculum's learning outcomes (Government

of Malta, n.d.). Additionally, tertiary and adult education are primarily comprised of adults, potentially benefiting from the educational/pedagogical inferences of this study.

Regional Groupings

Participants' country entries were grouped into regions based on the UNSD (2024) regional geoscheme, driven by both geographical and socio-economic factors, ensuring logical and meaningful analysis despite varying sample sizes across regions. In certain cases, regions were further combined where there was insufficient representation, maintaining coherence based on shared characteristics. Regions were grouped based on a combination of geographical proximity, similar economic conditions, and cultural factors. This approach ensures that the analysis captures regional nuances while maintaining statistical power across varying sample sizes, balancing between maintaining regional distinctions and maximising the dataset's statistical power. Each combined region preserves important cultural, political, and economic similarities in the pursuit of a deeper understanding of the global patterns in microtransaction spending.

Outliers and Spending Categories

Regarding outliers, these were only removed when dealing with nonsensical extremes. When discussing microtransactions, it is thought that the largest revenue stream for the developers of these games comes from an estimated 2% of the player base (Britt & Britt, 2021; Grguric, 2024; Unity, n.d.). These spending outliers are often referred to as *Whales*, and their contributions to this study are worth exploring, as they represent a real-world phenomenon. It would be a disservice to dismiss this small but significant population.

The literature is not consistent on the cutoff point separating Whales from regular spenders. Therefore, Whales, for the purposes of this study, are operationalised as spenders above 1.5 times the Interquartile Range (IQR) over the 75th percentile (Q3). Therefore, those who spent above €2,440 fell into this category (overall *N* spending: *Mdn* = €200.00, IQR = €40.00–€1000.00).

On the opposite end of the spectrum, there is a category of players who choose not to spend money on these games. These are often referred to as *Free-to-play players* (F2P) (Britt & Britt, 2021). These are operationalised as players who reported spending €0.

Data Analysis

Data was analysed using IBM SPSS (Version 29). As the data collected violates assumptions of normality, as determined by Shapiro-Wilk test (< .001 significance across all continuous variables tested), nonparametric tests were used (Sainani, 2012). Frequency distribution was used to summarise categorical data. Continuous data were summarised using the median and IQR, with Tukey's hinges employed for these calculations, as these measures are standard for reporting central tendency and dispersion due to their robustness to extreme values and non-normal distributions.

Given a large enough sample size, most phenomena in the real world tend to be distributed on a relatively normal bell curve (Curran-Everett, 2017). However, non-normality in this study is to be expected given the sampling techniques used. While nonparametrics have an elevated risk of *Type II* error (false negatives), the alternative of using parametric tests despite violated assumptions increases the risk of *Type I* error (false positives) (Field, 2024). According to the statisticians who

developed the theory of hypothesis testing, it is more dangerous to conclude there is an effect that does not exist than to overlook an effect that does exist (Neyman & Pearson, 1967). Although this probably depends on the context. Nonparametric tests also have the advantage of being robust to outliers, which is useful considering these were not excluded from this study.

A range of statistical procedures was conducted. The threshold for statistical significance for this study is a probability (*p*) value of less than 0.05, indicating that there is only a 5% chance outcomes are actually not significant or only significant due to chance. This is the standard for the social sciences.

Mann-Whitney U tests were used to assess dichotomous categorical group and subgroup differences in spending between the two age groups (Younger vs Older). When subgroups included more than two categories, *Kruskal-Wallis* tests were used. If statistical significance was determined, this was followed by a pairwise post hoc test, with *p*-values adjusted as per the *Bonferroni method*. Bonferroni correction helps limit the risk of Type I error. Pairwise comparison was carried out, as Kruskal-Wallis only indicates overall significant difference, but not which specific groups differ from each other. Visual inspection of histograms exhibited similar distributional shapes and spreads among sub-groups, suggesting that any statistically significant group differences were likely drawn from comparable populations with different median total spending.

Spearman's Rank Order Correlation was utilised to ascertain correlations between spending and other continuous variables, such as the psychometrics.

Similar statistical approaches have been widely used in survey research on digital consumption and gaming behaviour, utilising correlational techniques to observe trends (Hamari & Keronen, 2017).

Reflexivity

Having an undergraduate psychology background, the dissertation submitted in partial fulfilment of the requirements for that course involved Gacha games and similarly focused on spending motivation. In that research, educated consumerism was demonstrated to be a potential buffer against excessive microtransaction expenditure. It was this finding suggesting a protective effect of knowledge/education that prompted the present study. While bias is perhaps unavoidable and personal interest may shape interpretation, an effort to maintain objectivity was exercised through the use of standardised instruments, ethical safeguards, and transparent analytical procedures.

Validity and Reliability

This study aimed to ensure measurement validity and reliability through several strategies:

- The use of already validated psychometric instruments.
- Pilot study to refine participation experience and question comprehension.
- Analytical emphasis on internal consistency, data cleansing, and outlier management.

Conclusion

This chapter has detailed the quantitative, cross-sectional methodology employed to investigate the correlates of microtransaction spending. A large-scale online survey (N = 1,265) was conducted, leveraging validated psychometric scales to gather data on personality and behavioural traits.

While it is important to proactively acknowledge how convenience sampling and online recruitment limit this study's generalisability, the size of the sample and diversity of the respondents contribute to enhancing credibility of this research. As for the non-normal distribution of the data, this was managed through deliberate selection of robust nonparametric statistical tests.

This detailed Methodology chapter aspires to provide a rigorous and ethically sound framework for the subsequent analysis, facilitating the replicability of study components. The results derived from this process are presented in the following chapter.

Chapter 4: Results

This chapter presents the statistical analysis of the data collected from the 1,265 participants. The analysis begins by detailing the sociodemographic characteristics of the sample, including the composition of the Younger Player and Older Player groups. These characteristics are analysed through a variety of nonparametric tests against spending in games involving microtransactions (referred to as MTX in this chapter) for any possible association. This is followed by a section presenting descriptive statistics on participants' primary reasons for playing MTX games. The subsequent section comprehensively examines the gaming habits of participants through a variety of nonparametric tests, investigating how these might be associated with MTX spending. The last section before this chapter's conclusion then investigates the psychometric correlates of spending, examining the relationship between MTX expenditure and the four key psychological scales: FoMO, SUSCEP, BIS, and CNFU.

Throughout the chapter, the analysis extends beyond a simple comparison between the two age groups. It also contrasts the data from key spending categories within each age group: F2P players, Spenders within the IQR, and Whales, to identify how these distinct spending archetypes differ from one another.

Sociodemographic Profile of Participants

The sociodemographic sample characteristics have been tabulated across this chapter. Nonetheless, *Table 1* has been compiled for the reader's convenience.

Baseline characteristic	Younger Players		Older Players		Full sample	
	N	%	*N*	%	*N*	%
Gender						
Female	117	16.1	112	20.9	230	18.1
Male	579	79.6	401	75.0	983	77.5
Other	31	4.3	22	4.1	55	4.3
Geoscheme [a]						
Africa & Middle East	22	3.0	6	1.1	28	2.2
Latin America & the Caribbean	58	8.0	43	8.1	101	8.0
Northern America	276	38.2	255	47.9	533	42.4
Eastern Asia	28	3.9	12	2.3	40	3.2
Southern & South-eastern Asia	86	11.9	37	7.0	123	9.8
Eastern Europe & Central Asia	47	6.5	26	4.9	73	5.8
Northern Europe	84	11.6	45	8.5	129	10.3
Southern Europe	58	8.0	39	7.3	97	7.7
Western Europe	44	6.1	51	9.6	95	7.6
Oceania	20	2.8	18	3.4	38	3.0

Table 1: *Sociodemographic Characteristics of Participants*

Note. N = 1,265 (728 Younger Players and 537 Older Players). The median age of the Younger Players group was 20 years old (IQR = 18.0–22.0), while for the Older Players group it was 30 (IQR = 27.0–34.0). On a 10-point Likert scale, Household Financial Satisfaction was reported at a median of 7.0 (IQR = 6.0–8.0) by the Younger Players group as well as the Older Players group (*Mdn* = 7.0, IQR = 6.0–8.0).

[a] Country entries were grouped into regions based on the United Nations Statistics Division (UNSD, 2024) regional *geoscheme* and regions were further grouped based on factors discussed in the Geoscheme subsection of this chapter.

Correlations of Sample Characteristics

As demonstrated in *Tables 2* and *3*, Spearman's Rank Correlation was used for both Younger and Older Players to explore potential relationships across various continuous sample characteristics with total money spent on MTX games. Descriptive statistics, including the median and IQR for each variable, are also presented in *Tables 2* and *3*.

Variable	*N*	*Mdn*	IQR	*n*	r_s
Age	728	20.0	18.0–22.0	717	.23**
Household Financial Satisfaction Score	725	7.0	6.0–8.0	714	-.02

Table 2*: *Sample Characteristics vs MTX Expenditure (Young Players)

N = total number of non-missing cases. The median and IQR were calculated based on this.

n = viable sample size used in Spearman's r_s after pairwise deletion.

*$p < .05$. **$p < .01$.

Variable	*N*	*Mdn*	IQR	*n*	r_s
Age	537	30.0	27.0–34.0	525	-.03
Household Financial Satisfaction Score	537	7.0	6.0–8.0	525	-.03

Table 3*: *Sample Characteristics vs MTX Expenditure (Older Players)

N = total number of non-missing cases. The median and IQR were calculated based on this.

n = viable sample size used in Spearman's r_s after pairwise deletion.

*$p < .05$. **$p < .01$.

Age

A Mann-Whitney U test, as depicted in *Table 4*, indicated a statistically significant difference in MTX-related spending between Younger and Older Players (U = 248,311.00, p < .001). Mean ranks indicate that Older Players spend more and have a broader IQR (mean rank: 735.97, IQR = €97.00–€2000.00) than Younger Players (mean rank: 537.68, IQR = €20.00–€500.00).

	n	Mean Rank	*Mdn*	IQR	*U*	*p*
Younger Players	717	537.68	100.00	20.00–500.00	248311.00	<.001
Older Players	525	735.97	400.00	97.00–2000.00		

Table 4: *Total Money Spent on MTX Across Age Groups*

When exploring subgroup participant age as a scale quantity in relation to total money spent on MTX, a weak yet statistically significant positive correlation was observed in Younger Players, as shown in *Table 2* (r_s = .23, p < .001). However, as observed in *Table 3*, no such correlation was found among the Older Players (r_s = −.03, p = .514). This suggests that, for Younger Players, spending on MTX games tends to somewhat increase with age, though this relationship may plateau as they get older.

As compiled in *Table 5*, a chi-square test was also carried out to explore intergroup spending category distributions between age groups. It revealed a significant relationship between age group and spending category, $\chi^2(2) = 65.51$, p < .001. Cramér's V (.230) suggests a moderate association. These results indicate Younger Players were more likely to be F2P (14.2%) when compared to Older Players (6.1%). In contrast, proportionally, Older Players were more likely to be in the Whale category (20.2%) relative to Younger Players (6.6%).

	F2P		Spenders within IQR		Whales		Total				
	n	%	*n*	%	*n*	%	*n*	%	$\chi 2(2)$	*p*	φ_c
Younger Players	102	14.2	568	79.2	47	6.6	717	100	65.51	<.001	.230
Older Players	32	6.1	387	73.7	106	20.2	525	100			
Total	134	10.8	955	76.9	153	12.3	1242	100			

Table 5**:** *Spending Category Across Age Groups*

Gender

As outlined in *Table 6*, a Kruskal-Wallis test was conducted to examine whether there were significant differences in the total amount spent on MTX based on gender for both Younger and Older Players. In both age groups, males had a higher mean rank (Younger: 367.36, Older: 267.97), compared to females (317.17, 249.99) and others (348.89, 214.27). However, the Kruskal-Wallis tests did not yield significant results, indicating that gender does not appear to play a major role in the total amount spent on MTX (Younger Players: $H(2) = 5.725$, $p = .057$, Older Players: $H(2) = 3.497$, $p = .174$). This suggests that this variation is likely due to chance rather than a robust gender-based effect.

		n	Mean Rank	*Mdn*	IQR	*H*(2)	*p*
Younger Players	Female	115	317.17	61.00	13.50–332.50	5.725	.057
	Male	570	367.36	130.00	24.00–500.00		
	Other	31	348.89	100.00	44.00–400.00		
Older Players	Female	108	249.99	400.00	70.90–1400.00	3.497	.174
	Male	393	267.97	500.00	100.00–2000.00		
	Other	22	214.27	340.00	50.00–700.00		

Table 6**:** *Total Money Spent on MTX Across Gender*

Note. As the Kruskal-Wallis test was not significant, pairwise comparisons were not conducted.

A chi-square test, as reflected in *Table 7*, was used to assess whether there were significant differences in the distribution of spending patterns across gender for both Younger and Older Players. For both age groups, males had the highest proportion of players in the Whale category (Younger Players: 7.0%, Older Players: 22.1%) compared to females (5.2%, 16.7%) and others (3.2%, 4.5%). However, once again, the chi-square test revealed no statistically significant differences in spending patterns across gender for both Younger Players ($\chi^2(4) = 2.302$, $p = .680$) and Older Players ($\chi^2(4) = 7.277$, $p = .122$).

		F2P		Spenders within IQR		Whales		Total				
		n	%	*n*	%	*n*	%	*n*	%	$\chi2(4)$	*p*	φ_c
Younger Players	Female	20	17.4	89	77.4	6	5.2	115	100	2.302	.680	.040
	Male	76	13.3	454	79.6	40	7.0	570	100			
	Other	5	16.1	25	80.6	1	3.2	31	100			
	Total	101	14.1	568	79.3	47	6.6	716	100			
Older Players	Female	7	6.5	83	76.9	18	16.7	108	100	7.277	.122	.083
	Male	25	6.4	281	71.5	87	22.1	393	100			
	Other	0	0.0	21	95.5	1	4.5	22	100			
	Total	32	6.1	385	73.6	106	20.3	523	100			

Table 7*: *Spending Pattern Across Gender

Geoscheme

For analysis purposes, participants were aggregated into regional groups based on the UNSD (2024) geoscheme, as detailed in the Methodology chapter.

As compared in *Table 8*, a Kruskal-Wallis test was conducted to examine whether there were significant differences in the total amount spent on MTX across regional groupings for both Younger and Older Players. This test assumes that the

groups are independent and that distributions are similar across groups. The distributions appeared similar across all regions, as determined by visual inspection of histograms. The results revealed statistically significant differences for both Younger Players ($H(9) = 36.702$, $p < .001$) and Older Players ($H(9) = 20.036$, $p = .018$), suggesting that regional factors play a role in spending behaviour.

		n	Mean Rank	*Mdn*	IQR	*H*(9)	*p*
Younger Players	Africa & Middle East	22	362.77	162.50	10.00–1000.00	36.702	<.001
	Latin America & the Caribbean	58	309.97	52.64	15.00–250.00		
	North America	268	384.71	144.63	40.00–700.00		
	East Asia	28	380.30	125.00	38.98–481.50		
	South & South-east Asia	85	281.68	50.00	3.36–214.67		
	East Europe & Central Asia	46	318.50	75.00	15.00–300.00		
	North Europe	83	341.80	100.00	20.00–380.00		
	South Europe	58	325.28	100.00	20.00–300.00		
	West Europe	44	469.61	400.00	125.00–1500.00		
	Oceania	20	381.30	150.00	27.00–601.50		
Older Players	Africa & Middle East	6	199.25	225.00	30.00–479.00	20.036	.018
	Latin America & the Caribbean	42	218.90	250.00	97.00–700.00		
	North America	250	282.62	500.00	100.00–3000.00		
	East Asia	12	224.67	160.50	39.23–2000.00		
	South & South-eastern Asia	34	229.04	250.00	60.00–1000.00		
	East Europe & Central Asia	26	222.87	300.00	35.00–1000.00		
	North Europe	45	259.61	500.00	50.00–1500.00		
	South Europe	38	204.67	125.00	50.00–1000.00		
	West Europe	51	284.64	700.00	135.00–2000.00		
	Oceania	16	260.00	420.00	72.50–3500.00		

Table 8**:** *Total Money Spent on MTX Across Geoscheme*

Note. This Kruskal-Wallis test for both age groups yielded statistically significant differences in spending across regional groupings. To further investigate where these differences lie, pairwise comparisons were performed. Kindly refer to *Table 9*.

For Younger Players, Western Europe showed the highest mean rank (469.61), with a median of €400.00 and a relatively wide IQR (€125.00–€1500.00),

indicating a wider distribution of spending within this region. In contrast, Southern & South-eastern Asia had the lowest mean rank (281.68), with a median of €50.00, and the narrowest IQR (€3.36–€214.67), suggesting a lower and more concentrated spending pattern.

For Older Players, Western Europe (284.64) also had the highest mean rank, followed by North America (282.62), whereas regions like Southern Europe (204.67) and Latin America & the Caribbean (218.90) showed lower mean ranks, indicating a similar regional trend in spending. However, after adjusting the probability values using the Bonferroni Method, pairwise comparisons for Older Players revealed no significant differences among regions.

In contrast, as summarised in *Table 9*, pairwise comparisons for Younger Players further highlighted several significant differences in spending patterns. When viewed concurrently with *Table 8*, it can be inferred that Southern & South-eastern Asia had significantly lower spending compared to Northern America ($p = .003$) and Western Europe ($p < .001$). Similarly, Latin America & the Caribbean spent significantly less than Western Europe ($p = .005$), and Eastern Europe & Central Asia spent less than Western Europe ($p = .022$). These comparisons reveal that players from regions such as Western Europe and North America tend to spend more on MTX compared to regions like Southern & Southeastern Asia and Latin America & the Caribbean.

	Sample 1	Sample 2	Test Statistic	Std. Error	Sig.	Adj. Sig.
Younger Players	South & South-east Asia	North America	103.034	25.562	<.001	.003
	South & South-east Asia	West Europe	-187.937	38.137	<.001	<.001
	Latin America & the Caribbean	West Europe	-159.648	41.054	<.001	.005
	East Europe & Central Asia	West Europe	-151.114	43.302	<.001	.022
	South Europe	West Europe	-144.329	41.054	<.001	.020
	North Europe	West Europe	-127.818	38.294	<.001	.038

Table 9*: *Pairwise Comparison of Geoscheme

Note. For the sake of brevity, only the statistically significant results, as determined by the adjusted Bonferroni value, have been included in this table. Non-significant results at the 0.05 level have been omitted.

A chi-square test, as catalogued in *Table 10*, was also conducted to assess whether there were significant differences in the distribution of spending categories across different regions for both Younger and Older Players. Among Younger Players, the test revealed no statistically significant relationship between spending category and region, $\chi^2(18) = 25.556$, $p = .110$. For Older Players, the chi-square test yielded a statistically significant result, $\chi^2(18) = 36.634$, $p = .006$, indicating that regional differences in spending behaviour were meaningful. Cramér's V (.188) suggests a weak association between region and spending category, with some differences across regions.

A large proportion of Older Players in North America are Whales (26.0%). This suggests that Older Players in North America are more likely to be high spenders. The majority of Older Players in Latin America & the Caribbean fall within the IQR category of spenders (92.9%), with only a small portion in the Whales category (4.8%). This is a stark contrast to regions like North America, where a

larger portion falls into the Whale category. Older Players in Western Europe also show a significant proportion in the Whales category (21.6%), although this is still lower than in North America. This suggests that, like North America, Western Europe may have a higher concentration of high-spending players.

		F2P		Spenders within IQR		Whales		Total				
		n	%	*n*	%	*n*	%	*n*	%	$\chi 2(18)$	*p*	φ_c
Younger Players	Africa & Middle East.	5	22.7	15	68.2	2	9.1	22	100	25.556	.110	.134
	Latin America & the Caribbean.	9	15.5	44	75.9	5	8.6	58	100			
	North America.	31	11.6	216	80.6	21	7.8	268	100			
	East Asia	3	10.7	23	82.1	2	7.1	28	100			
	South & South-east Asia.	19	22.4	64	75.3	2	2.4	85	100			
	East Europe & Central Asia.	4	8.7	40	87.0	2	4.3	46	100			
	North Europe.	16	19.3	62	74.7	5	6.0	83	100			
	South Europe.	9	15.5	49	84.5	0	0.0	58	100			
	West Europe.	2	4.5	37	84.1	5	11.4	44	100			
	Oceania.	2	10.0	15	75.0	3	15.0	20	100			
	Total	100	14.0	565	79.4	47	6.6	712	100			
Older Players	Africa & Middle East	0	0.0	6	100	0	0.0	6	100	36.634	.006	.188
	Latin America & the Caribbean	1	2.4	39	92.9	2	4.8	42	100			
	North America	13	5.2	172	68.8	65	26.0	250	100			
	East Asia	2	16.7	8	66.7	2	16.7	12	100			
	South & South-east Asia	4	11.8	25	73.5	5	14.7	34	100			
	East Europe & Central Asia	2	7.7	21	80.8	3	11.5	26	100			
	North Europe	1	2.2	37	82.2	7	15.6	45	100			
	South Europe	7	18.4	25	65.8	6	15.8	38	100			
	West Europe	1	2.0	39	76.5	11	21.6	51	100			
	Oceania	0	0.0	12	75.0	4	25.0	16	100			
	Total	31	6.0	384	73.8	105	20.2	520	100			

Table 10**:** *Spending Category Across Geoscheme*

Household Satisfaction Score

As made evident by Spearman's Correlation *Tables 2* and *3*, for both age groups, financial household satisfaction did not show a statistically significant

relationship with total MTX spending (Younger Players: r_s = −.02, p = .547; Older Players: r_s = −.03, p = .541).

A Kruskal-Wallis test was also conducted to examine differences in the Household Satisfaction Score across spending categories for both Younger and Older Players. As noted in *Table 11*, the test revealed no significant differences across categories for Younger Players (H(2) = 0.014, p = .993). Similarly, for Older Players, no significant differences were observed (H(2) = 0.266, p = .876). Since the Kruskal-Wallis tests were not statistically significant, pairwise comparisons were not performed.

		n	Mean Rank	*Mdn*	IQR	*H*(2)	*p*
Younger Players	F2P	101	356.21	7.00	6.00–9.00	0.014	.993
	Spenders within IQR	566	357.48	7.00	6.00–8.00		
	Whales	47	360.49	8.00	6.00–8.00		
Older Players	F2P	32	272.80	7.00	7.00–8.00	0.266	.876
	Spenders within IQR	387	261.15	7.00	6.00–8.00		
	Whales	106	266.80	7.00	6.00–8.00		

Table 11**:** *Household Satisfaction Score Across Spending Category*

Note. As the Kruskal-Wallis test was not significant, pairwise comparisons were not conducted.

Reasons for Playing

As illustrated in *Figure 7*, this part of the analysis explores reasons why players engage with MTX games across Younger Players and Older Players. The data was collected from players who reported reasons for playing MTX games based

on a predefined list. They were also allowed to add their own entries. Players could check as many responses as they deemed appropriate.

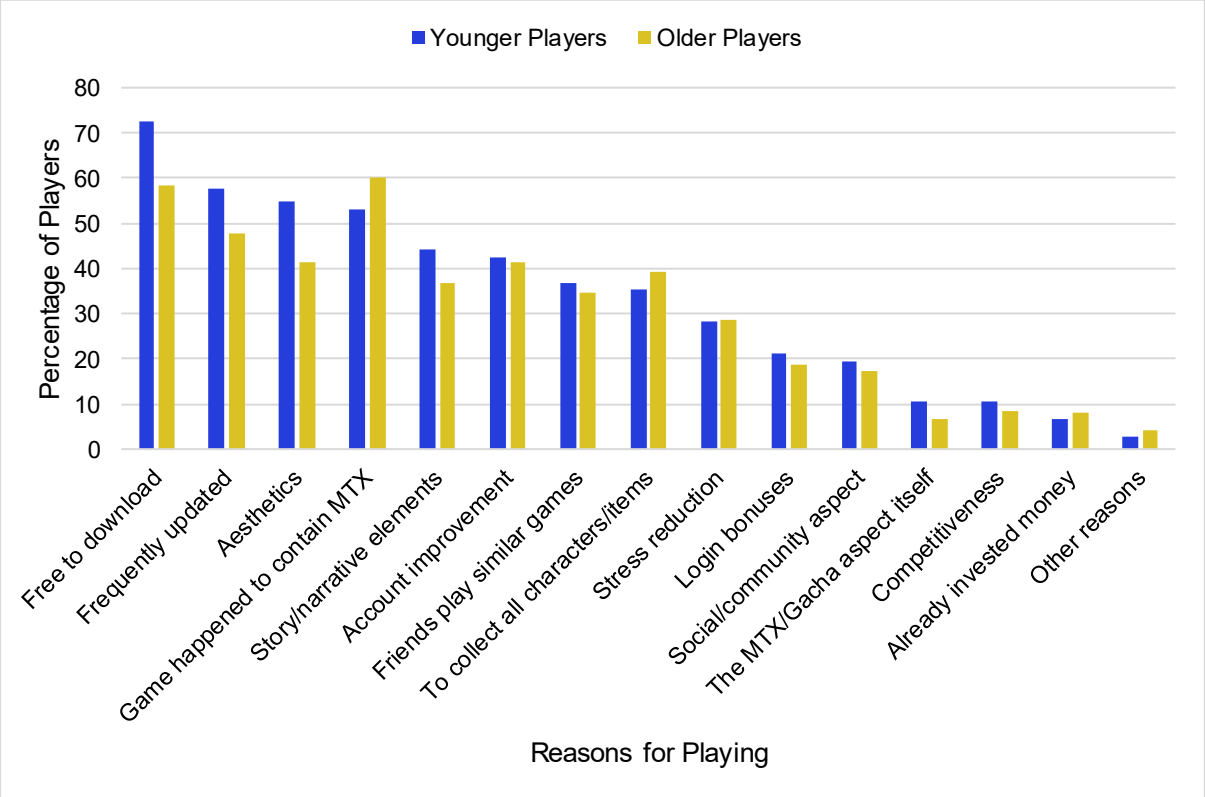

Figure 7: *Clustered Bar Count of Reasons Given for Playing MTX Games*

Younger (72.5%) and Older Players (58.3%) both valued the game being free to download, but Younger Players were more likely to report this as a reason. Both groups frequently reported that the game just happened to have microtransactions, with Younger Players (53.2%) slightly less likely to cite this reason compared to Older Players (60.0%).

Both groups valued the continuous support MTX games receive through updates to provide more content, Younger Players (57.7%) more so than Older Players (47.7%). Story/narrative elements (Younger: 44.2%, Older: 36.7%) and the desire to collect all the characters and/or items (Younger: 35.4%, Older: 39.3%) were also frequently reported by both groups.

Both Younger and Older Players reported lower percentage engagement driven by competitiveness relative to other factors (10.6%, 8.6%). Cooperative elements seemed to be a more popular reason for playing among both age groups; participants cited friends who play similar games (Younger: 36.7%, Older: 34.5%) and community engagement (Younger: 19.4%, Older: 17.3%) more frequently relative to competition. A notable portion of both Younger (28.2%) and Older Players (28.5%) also reported playing for stress reduction.

Both groups, but especially Younger Players, reported sensory elements such as art, graphics, character aesthetics, and music as motivators (Younger: 54.8%, Older: 41.3%). Additionally, both groups reported similar percentages for account improvement satisfaction (Younger: 42.6%, Older: 41.3%).

A relatively smaller but not insignificant percentage of participants reported login bonuses as a motivator (Younger: 21.2%, Older: 18.8%). An even smaller percentage of participants reported the MTX/Gacha aspect itself as a reason for playing (Younger: 10.6%, Older Players: 6.7%). Finally, regarding sunk costs, Younger Players (6.5%) were less likely to report playing because they had already spent money, whereas Older Players (8.2%) were slightly more likely to report this reason.

A very small percentage of players in both groups cited reasons that were not listed (Younger: 2.6%, Older: 4.1%). These included:

- Brand loyalty (Younger: n = 8, Older: n = 5), either towards a game developer or franchise,
- Convenience (Younger: n = 3, Older: n = 6), in terms of these games being easy to play in short bursts and in different locations, and
- Exercise (Younger: n = 1, Older: n = 5).

Gaming Habits of Participants

The sample's gaming habits have been tabulated across this chapter. *Table 12* has been compiled for the reader's convenience.

Baseline characteristic	Younger Players		Older Players		Full sample	
	N	%	*N*	%	*N*	%
Spending Category						
F2P	102	14.2	32	6.1	134	10.8
Spenders within IQR	568	79.2	387	73.7	958	76.9
Whales	47	6.6	106	20.2	153	12.3
Engagement with MTX Games						
No longer plays MTX games	2	.3	5	.9	7	.6
Actively plays only one MTX game	154	21.2	170	31.7	326	25.6
Actively plays multiple MTX games	572	78.6	362	67.4	939	73.8
Daily Time Spent Playing MTX Games						
Less than 1 hour	78	10.7	73	13.6	153	12.0
1–2 hours	255	35.1	213	39.7	471	37.1
2–4 hours	271	37.3	183	34.1	455	35.8
4–6 hours	89	12.2	41	7.6	131	10.3
6+ hours	34	4.7	27	5.0	61	4.8
Platform Used to Play MTX Games						
PC	286	39.4	148	27.6	436	34.4
Mobile	405	55.8	364	67.9	773	61.0
Gaming Console	24	3.3	15	2.8	39	3.1
Other	11	1.5	9	1.7	20	1.6
Plays Other Video Games (not including MTX) [a]	715	98.2	506	94.2	1228	96.5

Table 12*: *Gaming Habits of Participants

Note. The Younger Players group had a median of 8 years (IQR = 6.0–10.0) of experience with MTX games and spent an estimated total median of €100 (IQR = €20.0–€500.0), while the Older Players group had a median of 11 years (IQR = 8.0–15.0) of experience and spent an estimated total median of €400 (IQR = €97.0–€2000.0).

[a] Reflects the number and percentage of participants answering “yes” to this question.

Correlations of Gaming Behavioural Patterns

As can be seen in *Tables 13* and *14*, Spearman's Rank Correlation was carried out between various study variables to explore potential relationships with spending in Younger Players and Older Players. Descriptive statistics, including the median and IQR for each variable, are presented in these tables.

Variable	*N*	*Mdn*	IQR	*n*	r_s
Engagement with MTX Games [a]	728	3.0	3.0–3.0	717	.04
Daily Time Spent Playing MTX Games [b]	727	3.0	2.0–3.0	717	.15**
Age when first started playing MTX Games	720	12.0	10.0–14.0	710	.00
Years spent playing MTX games	720	8.0	6.0–10.0	710	.20**
First Spend Amount	550	8.0	5.0–15.0	544	.14**

Table 13**:** *Gaming Behavioural Patterns vs MTX Expenditure (Younger Players)*

[a] 0 = Has never played MTX games, 1 = No longer plays MTX games, 2 = Actively plays/played only one MTX game, and 3 = Actively plays multiple MTX games.

[b] 1 = Less than 1 hour, 2 = 1–2 hours, 3 = 2–4 hours, 4 = 4–6 hours, and 5 = 6+ hours.

N = total number of non-missing cases. The median and IQR were calculated based on this.

n = viable sample size used in Spearman's r_s after pairwise deletion.

*$p < .05$. **$p < .01$.

Variable	*N*	*Mdn*	IQR	*n*	r_s
Engagement with MTX Games [a]	537	3.0	2.0–3.0	525	.24**
Daily Time Spent Playing MTX Games [b]	537	2.0	2.0–3.0	525	.23**
Age when first started playing MTX Games	533	18.0	14.0–25.0	521	-.17**
Years spent playing MTX games	533	11.0	8.0–15.0	521	.20**
First Spend Amount	430	7.0	4.0–20.0	422	.12*

Table 14**:** *Gaming Behavioural Patterns vs MTX Expenditure (Older Players)*

[a] 0 = Has never played MTX games, 1 = No longer plays MTX games, 2 = Actively plays/played only one MTX game, and 3 = Actively plays multiple MTX games.

[b] 1 = Less than 1 hour, 2 = 1–2 hours, 3 = 2–4 hours, 4 = 4–6 hours, and 5 = 6+ hours.

N = total number of non-missing cases. The median and IQR were calculated based on this.

n = viable sample size used in Spearman's r_s after pairwise deletion.

*$p < .05$. **$p < .01$.

Number of Active MTX Games

As recorded in *Table 13*, Spearman's Rank Correlation indicated no statistically significant relationship between the engagement level of MTX games played and total spending among Younger Players ($r_s = .04$, $p = .284$). However, as indicated in *Table 14*, a weak yet statistically significant positive correlation was observed among Older Players ($r_s = .24$, $p < .001$). This suggests that among Older Players, spending tends to increase more with the extent of engagement.

As displayed in *Table 15*, a Mann-Whitney U test was also conducted to examine differences in spending between the number of active MTX games. As

indicated in *Table 12*, the sizes of the groups that do not play and those that stopped playing MTX games are too small for meaningful comparison. Therefore, they were omitted from this test. The results did not show statistically significant differences in spending for Younger Players (U = 45,443.00, p = .239). For Older Players, however, this test yielded statistically significant differences (U = 38,771.00, p < .001), indicating that players active in multiple MTX games spent more on average compared to those who are active in only one game.

		n	Mean Rank	*Mdn*	IQR	*U*	*p*
Younger Players	Active in one	152	340.53	89.00	15.00–482.85	45443.00	.239
	Active in multiple	563	362.72	120.00	24.50–500.00		
Older Players	Active in one	170	207.44	175.00	49.00–952.00	38771.00	<.001
	Active in multiple	350	286.27	600.00	150.00–2500.00		

Table 15: *Total Money Spent on MTX Across Number of Active MTX Games*

As detailed in *Table 16*, a chi-square test was conducted to investigate whether spending categories differed based on the number of MTX games played. For Younger Players, the results showed no significant differences in the distribution of spending categories across the engagement levels ($\chi^2(4) = 0.761$, p = .684). However, for Older Players, the chi-square test yielded significant results ($\chi^2(4) = 19.718$, p < .001), suggesting an association between the active number of MTX games and spending behaviour. Cramér's V (.195) indicates a moderate association.

Out of the Older Players engaged with only one MTX game, 9.4% fell into the Whales category. A larger proportion of Older Players who play multiple MTX games

were categorised as Whales (25.4%). This suggests higher spending is associated with active engagement with multiple MTX games.

		F2P		Spenders within IQR		Whales		Total				
		n	%	*n*	%	*n*	%	*n*	%	$\chi 2(2)$	*p*	φ_c
Younger Players	Active in one	25	16.4	117	77.0	10	6.6	152	100.0	0.761	.684	.033
	Active in multiple	77	13.7	449	79.8	37	6.6	563	100.0			
	Total	102	14.3	566	79.2	47	6.6	715	100.0			
Older Players	Active in one	15	8.8	139	81.8	16	9.4	170	100.0	19.718	<.001	.195
	Active in multiple	17	4.9	244	69.7	89	25.4	350	100.0			
	Total	32	6.2	383	73.7	105	20.2	520	100.0			

Table 16**:** *Spending Category Across Number of Active MTX Games*

Daily Playtime

As reflected in *Table 13*, daily time spent playing MTX games was statistically significantly correlated with total money spent for both age groups. Younger Players exhibited a weak positive correlation (r_s = .15, p < .001), while Older Players showed a slightly stronger weak positive correlation (r_s = .23, p < .001). This indicates that, although both groups spend more as they play longer, the relationship was still weak in both cases.

Additionally, a Kruskal-Wallis test was conducted, as represented in *Table 17*, to examine whether there were significant differences in total money spent on MTX based on the amount of time spent playing MTX games daily. The results revealed statistically significant differences for both Younger Players (p = .003) and Older Players (p < .001), suggesting that daily time spent on MTX games influences spending behaviour in both age groups.

		n	Mean Rank	*Mdn*	IQR	*H*(4)	*p*
Younger Players	Less than 1 hour	77	297.64	63.00	20.00–200.00	15.965	.003
	1–2 hours	251	340.36	100.00	18.27–390.00		
	2–4 hours	268	375.39	150.00	20.00–600.00		
	4–6 hours	88	391.47	143.50	31.50–814.00		
	6+ hours	33	424.29	250.00	56.50–1500.00		
Older Players	Less than 1 hour	73	196.57	145.00	30.00–500.00	29.175	<.001
	1–2 hours	208	246.35	300.00	100.00–1000.00		
	2–4 hours	179	293.91	750.00	115.00–3000.00		
	4–6 hours	39	308.12	713.00	225.00–4181.01		
	6+ hours	26	302.23	650.00	80.00–4000.00		

Table 17**:** *Total Money Spent on MTX Across Daily Time Spent on MTX Games*

Note. This Kruskal-Wallis test yielded statistically significant differences for both age groups. To further investigate where these differences lie, pairwise comparisons were performed. Kindly refer to *Table 18*.

For Younger Players, the mean rank of total money spent on MTX increased as daily playtime increased. Players who reported playing for more than 6 hours spent the most (mean rank = 424.29) while those who played less than 1 hour spent the least (mean rank = 297.64). For Older Players, a similar pattern emerged, with players who spent 4–6 hours (mean rank = 308.12), 6+ hours (302.23), 2–4 hours per day (mean rank = 293.91) spending more than those in the 1–2 hours (mean rank = 246.35) and less than 1 hour (mean rank = 196.57) categories. This trend suggests players who invest more time in MTX games tend to spend more on average.

Pairwise comparisons were carried out to investigate where the differences lie and if they are statistically significant or likely due to chance. In Younger Players, this analysis further confirms the less than 1 hour group spends significantly less when

compared to the 2–4 hours (p = .036), 4–6 hours (p = .036), and 6+ hours (p = .032) groups. Similarly, among the Older Players, pairwise comparisons showed significant differences in spending between the less than 1 hour category and those in the 2–4 hours, 4–6 hours, and 6+ hours categories. Players in the less than 1 hour group spent significantly less than those in the 2–4 hours (p < .001), 4–6 hours (p = .002), and 6+ hours (p = .023) categories. Additionally, the 1–2 hours group spent statistically significantly less than the 2–4 hours category (p = .021).

	Sample 1	Sample 2	Test Statistic	Std. Error	Sig.	Adj. Sig.
Younger Players	Less than 1 hour	2–4 hours	-77.755	26.736	.004	.036
	Less than 1 hour	4–6 hours	-93.830	32.267	.004	.036
	Less than 1 hour	6+ hours	-126.652	43.023	.003	.032
Older Players	Less than 1 hour	2–4 hours	-97.345	21.049	<.001	<.001
	Less than 1 hour	6+ hours	-105.662	34.618	.002	.023
	Less than 1 hour	4–6 hours	-111.547	30.064	<.001	.002
	1–2 hours	2–4 hours	-47.565	15.453	.002	.021

Table 18**:** *Pairwise Comparison of Daily Time Spent on MTX Games*

Note. For the sake of brevity, only the statistically significant results, as determined by the adjusted Bonferroni value, have been included in this table. Non-significant results at the 0.05 level have been omitted.

As conveyed in *Table 19*, a chi-square test was conducted to investigate whether the distribution of spending categories differed across levels of daily time spent playing MTX games. The results showed statistically significant differences for Older Players ($\chi^2(8) = 30.346$, p < .001). Cramér's V (.170) suggests a weak association, still supporting the previous findings that the amount of time spent on MTX games is associated with the distribution of spending. However, unlike previous analysis of this time variable, for Younger Players, no significant differences were found ($\chi^2(8) = 14.046$, p = .081). Conversely, Older Players exhibit a clear pattern

where increased time spent on MTX games is associated with higher spending, with the percentage of Whales peaking between the 4–6 hours category (33.3%) and decreasing slightly in the 6+ hours bracket (30.8%).

		F2P		Spenders within IQR		Whales		Total				
		n	%	*n*	%	*n*	%	*n*	%	$\chi 2(8)$	*p*	φ_c
Younger Players	Less than 1 hour	10	13.0	67	87.0	0	0.0	77	100.0	14.046	.081	.099
	1–2 hours	37	14.7	202	80.5	12	4.8	251	100.0			
	2–4 hours	41	15.3	205	76.5	22	8.2	268	100.0			
	4–6 hours	11	12.5	69	78.4	8	9.1	88	100.0			
	6+ hours	3	9.1	25	75.8	5	15.2	33	100.0			
	Total	102	14.2	568	79.2	47	6.6	717	100.0			
Older Players	Less than 1 hour	5	6.8	63	86.3	5	6.8	73	100.0	30.346	<.001	.170
	1–2 hours	17	8.2	163	78.4	28	13.5	208	100.0			
	2–4 hours	7	3.9	120	67.0	52	29.1	179	100.0			
	4–6 hours	2	5.1	24	61.5	13	33.3	39	100.0			
	6+ hours	1	3.8	17	65.4	8	30.8	26	100.0			
	Total	32	6.1	387	73.7	106	20.2	525	100.0			

Table 19: *Spending Category Across Daily Time Spent on MTX Games*

Years Dedicated

The number of years spent playing MTX games was computed by subtracting the age at which participants reported starting to play MTX games from their present age. As indicated in *Tables 13* and *14*, the number of years spent playing MTX games showed a statistically significant positive correlation with the total money spent for both age groups (Younger Players: $r_s = .20$, $p < .001$; Older Players: $r_s = .20$, $p < .001$). This suggests that greater experience with MTX games is associated with higher spending in both Younger and Older Players, with a similar weak correlation.

As compared in *Table 20*, Kruskal-Wallis tests revealed significant differences in the number of years spent playing MTX games across spending categories for

both age groups. Among Younger Players, the results indicated significant differences ($H(2) = 17.893$, $p < .001$). Similarly, significant differences were found among Older Players ($H(2) = 16.813$, $p < .001$). Mean ranks for both age groups indicate that Whales have dedicated more years to MTX games (Younger: 420.65, Older: 311.15), while F2P dedicated the least (283.28, 212.45).

		n	Mean Rank	*Mdn*	IQR	*H*(2)	*p*
Younger Players	F2P	99	283.28	7.00	5.50–9.00	17.893	<.001
	Spenders within IQR	564	362.75	8.00	6.00–11.00		
	Whales	47	420.65	9.00	7.50–12.00		
Older Players	F2P	32	212.45	10.00	8.00–12.00	16.813	<.001
	Spenders within IQR	383	251.18	11.00	8.00–14.00		
	Whales	106	311.15	13.00	10.00–16.00		

Table 20**:** *Years Spent Playing MTX Games Across Spending Category*

Note. This Kruskal-Wallis test yielded statistically significant differences for both age groups. To further investigate where these differences lie, pairwise comparisons were performed. Kindly refer to *Table 21*.

As indicated by *Table 21*, further post hoc pairwise comparisons were conducted. For Younger Players, this indicated that F2P players spent significantly fewer years playing MTX games compared to both Spenders within IQR ($p = .001$) and Whales ($p < .001$). However, there was no significant difference between Spenders within IQR and Whales ($p = .185$). For Older Players, pairwise comparisons revealed that Whales spent significantly more years playing MTX games than F2P players ($p = .003$) and Spenders within IQR ($p = .001$). However, no significant difference was found between F2P players and Spenders within IQR ($p = .483$).

	Sample 1	Sample 2	Test Statistic	Std. Error	Sig.	Adj. Sig.
Younger Players	F2P	Spenders within IQR	-79.465	22.241	<.001	.001
	F2P	Whales	-137.366	36.155	<.001	<.001
	Spenders within IQR	Whales	-57.902	30.988	.062	.185
Older Players	F2P	Spenders within IQR	-38.724	27.625	.161	.483
	F2P	Whales	-98.693	30.281	.001	.003
	Spenders within IQR	Whales	-59.969	16.476	<.001	.001

Table 21**:** *Pairwise Comparison of Years Spent Playing MTX Games*

Tables 13 and *14* also indicate that the raw value representing the specific age when players first started playing MTX games was statistically significantly related to total money spent among Older Players (r_s = -.17, p < .001); however, this correlation was a negative one, albeit weak. This indicates that players who started playing at a later age tended to spend less overall. No such significant correlation was found among Younger Players (r_s = .00, p = .950). This suggests that among Older Players, an earlier onset of play is associated with higher spending, whereas the age at which Younger Players began playing showed no significant association with spending.

The specific age of MTX gaming onset in relation to the spending category was also explored. As tabulated in *Table 22*, a Kruskal-Wallis test revealed significant differences among Older Players (H(2) = 13.317, p = .001). However, significant differences were not found among Younger Players (H(2) = 5.258, p = .072). Mean ranks for Older Players indicate that this sample's F2P group started playing at an older age (317.13), whereas Whales were exposed to them earlier (219.51).

		n	Mean Rank	*Mdn*	IQR	*H*(2)	*p*
Younger Players	F2P	99	385.81	12.00	10.00–14.00	5.258	.072
	Spenders within IQR	564	346.66	12.00	10.00–14.00		
	Whales	47	397.74	13.00	10.00–15.00		
Older Players	F2P	32	317.13	21.00	16.50–30.00	13.317	.001
	Spenders within IQR	383	267.79	19.00	14.50–25.00		
	Whales	106	219.51	17.00	13.00–23.00		

Table 22**:** *Age When First Started Playing MTX Games Across Spending Category*

Note. For the Older Players group, this Kruskal-Wallis test yielded statistically significant differences. To further investigate where the differences among the Older Players group lie, a pairwise comparison was performed. Kindly refer to *Table 23*.

When viewed in conjunction with the correlation in *Table 14* and mean ranks and median in *Table 22*, the pairwise comparisons, as presented in *Table 23*, further supported these findings. Among Older Players, a statistically significant difference was found between Whales and both Spenders within the IQR (p = .010) and F2P players (p = .004). There was no significant difference between Spenders within the IQR and F2P players in terms of the age at which they started playing MTX games (p = .224). These findings suggest that Whales in the Older Players group have been playing MTX games for a longer period.

	Sample 1	Sample 2	Test Statistic	Std. Error	Sig.	Adj. Sig.
Older Players	Whales	Spenders within IQR	48.284	16.498	.003	.010
	Whales	F2P	97.616	30.322	.001	.004
	Spenders within IQR	F2P	49.331	27.662	.075	.224

Table 23**:** *Pairwise Comparison of Age When First Started Playing MTX Games*

The First Spend

The phenomenon of The First Spend, as discussed in the Literature Review chapter, was investigated through various types of analysis. As catalogued in *Tables 13* and *14*, Spearman's Correlation test indicated a very weak but significant positive correlation across both age groups (Young Players: $r_s = .14$, $p = .002$, Older Players: $r_s = .12$, $p = .012$) between the amount spent in the first transaction and total spending. Despite the weak correlation, this supports the notion that The First Spend is associated with future spending behaviour.

Complementing the analysis of quantitative spending data, participants' perceptions were also investigated. The survey asked whether participants believed this initial transaction influenced subsequent spending behaviour. A Kruskal-Wallis test, as indicated in *Table 24*, was conducted to see if there were differences in total money spent on MTX based on this self-reported valuation of The First Spend's influence on subsequent spending. In both age groups, the test found statistically significant differences (both: $p < .001$).

		n	Mean Rank	*Mdn*	IQR	*H*(2)	*p*
Younger Players	Unlikely to spend more money	288	235.42	50.00	10.50–191.00	139.445	<.001
	Likely to spend more within a game	230	369.90	200.00	80.00–600.00		
	Likely to spend more on all games	137	452.29	510.00	175.86–1383.79		
Older Players	Unlikely to spend more money	225	187.00	150.00	30.00–800.00	104.289	<.001
	Likely to spend more within a game	164	273.55	500.00	200.00–2000.00		
	Likely to spend more on all games	117	353.28	2000.00	527.00–5000.00		

Table 24**:** *Total Money Spent on MTX Across Self-Report Effectiveness of The First Spend*

Note. This Kruskal-Wallis test yielded statistically significant differences for both age groups. To further investigate where these differences lie, pairwise comparisons were performed. Kindly refer to *Table 25*.

From both groups, those who believed their First Spend did not lead to further purchases had the lowest mean rank (Younger: 235.42, Older: 187.00), indicating they spent less money on MTX. Players who believed their first purchase encouraged more spending within that same game had a higher mean rank (369.90, 273.55), indicating a higher total spend than the first group. The group that believed their First Spend encouraged spending across all MTX games had the highest mean rank (452.29, 353.28), suggesting they spent the most on MTX.

Pairwise comparisons, as shown in *Table 25*, further support these findings for both age groups, with statistical significance across all comparisons ($p < .001$). This alignment between participants' retrospective perception of the impact of their

first in-game transaction on future spending and their actual spending behaviour suggests strong congruence in their responses.

	Sample 1	Sample 2	Test Statistic	Std. Error	Sig.	Adj. Sig.
Younger Players	Unlikely to spend more money	Likely to spend more within a game	-134.481	16.726	<.001	<.001
	Unlikely to spend more money	Likely to spend more on all games	-216.872	19.630	<.001	<.001
	Likely to spend more within a game	Likely to spend more on all games	-82.390	20.413	<.001	<.001
Older Players	Unlikely to spend more money	Likely to spend more within a game	-86.559	15.000	<.001	<.001
	Unlikely to spend more money	Likely to spend more on all games	-166.286	16.652	<.001	<.001
	Likely to spend more within a game	Likely to spend more on all games	-79.727	17.680	<.001	<.001

Table 25**:** *Pairwise Comparison of the Effectiveness of The First Spend*

A chi-square test, as portrayed in *Table 26*, was also conducted to examine whether players' perception of the effectiveness of The First Spend was associated with any particular spending categories. Results for both Younger and Older Players revealed statistically significant moderate associations between these two variables ($\chi^2(4) = 62.054$, $p < .001$, Cramér's $V = 0.218$, $\chi^2(4) = 56.685$, $p < .001$, Cramér's $V = 0.237$, respectively).

Younger Players who reported that they were more likely to spend money on all MTX games after their first transaction were more likely to be categorised as Whales (13.9%). Similarly, a significant portion of Older Players who reported being more likely to spend on all MTX games after their initial purchase belonged to the Whales category (40%), suggesting a greater financial commitment to gaming. As expected, the majority of F2P in this analysis indicate they are not likely to spend

more (Younger Players: n = 42, Older Players: n = 16), as they reported never spending at all.

		F2P		Spenders within IQR		Whales		Total				
		n	%	*n*	%	*n*	%	*n*	%	$\chi 2(4)$	*p*	φ_c
Younger Players	Unlikely to spend more	42	14.6	235	81.6	11	3.8	288	100	62.054	<.001	.218
	Likely to spend more within a game	2	0.9	211	91.7	17	7.4	230	100			
	Likely to spend more on all games	0	0.0	118	86.1	19	13.9	137	100			
	Total	44	6.7	564	86.1	47	7.2	655	100			
Older Players	Unlikely to spend more	16	7.1	184	81.8	25	11.1	225	100	56.685	<.001	.237
	Likely to spend more within a game	0	0.0	131	79.9	33	20.1	164	100			
	Likely to spend more on all games	0	0.0	70	59.8	47	40.2	117	100			
	Total	16	3.2	385	76.1	105	20.8	506	100			

Table 26: *Spending Category Across Self-Report Effectiveness of The First Spend*

However, as outlined in *Table 27*, when exploring the raw spending data and comparing the Whales category to the other spenders, the Mann-Whitney U test for The First Spend amount did not yield significant differences for either Younger Players (U = 11,989.50, p = .159) or Older Players (U = 14,396.50, p = .316).

		n	Mean Rank	*Mdn*	IQR	*U*	*p*
Younger Players	Spenders within IQR	494	266.23	8.00	5.00–13.99	11989.50	.159
	Whales	43	300.83	10.00	5.00–26.00		
Older Players	Spenders within IQR	340	207.16	6.00	4.00–18.73	14396.50	.316
	Whales	79	222.23	10.00	4.38–21.50		

Table 27**:** *First Spend Amount Across Spending Category*

Note. The F2P category was omitted from this test due to the logical assumption that F2P players, as operationalised in this study, would only fit the criteria if they did not spend any money on MTX games. Therefore, there would be no First Spend, and as pairwise analysis confirmed, F2P would naturally statistically significantly differ from the other groups due to this study design.

Gaming Platform

The main platform utilised for MTX games was also investigated. An “Other” category was also added in case there were some obscure platforms that were popular among MTX players; however, participants mainly used this to indicate they used a combination of pre-listed platforms.

As indicated in *Table 28*, a Kruskal-Wallis test was conducted to explore differences in total money spent on MTX based on the platform used to play MTX games. A statistically significant difference was observed in both age groups (Younger Players: $H(3) = 18.708$, $p < .001$, Older Players: $H(3) = 8.505$, $p = .037$).

When it came to Younger Players, Gaming Console players had the highest mean rank of total money spent on MTX (414.83), although this category has a

relatively small portion of players (*n* = 23). PC players had a mean rank of 394.66, and Mobile players spent the least on average, with a mean rank of 328.74, while "Other" platform users had a mean rank of 354.91, which is still higher than Mobile players but lower than the other two platforms. This suggests that Younger Players using PC or Gaming Console platforms tend to spend more on MTX compared to those playing on Mobile devices. As for the Older Players group, PC players had the highest mean rank (293.77), with Mobile and Gaming Console players spending comparably less (250.86 and 245.37, respectively). "Other" platform users had the lowest mean rank (251.11), suggesting they spent the least across the different platforms.

		n	Mean Rank	*Mdn*	IQR	*H*(3)	*p*
Younger Players	PC	283	394.66	190.00	47.50–578.82	18.708	<.001
	Mobile	398	328.74	86.00	10.00–400.00		
	Gaming Console	23	414.83	200.00	50.00–800.00		
	Other	11	354.91	100.00	30.00–816.50		
Older Players	PC	144	293.77	737.00	150.00–2500.00	8.505	.037
	Mobile	356	250.86	300.00	62.50–1550.00		
	Gaming Console	15	245.37	500.00	100.00–1000.00		
	Other	9	251.11	330.00	100.00–2380.00		

Table 28**:** *Total Money Spent on MTX Across Platform*

Note. This Kruskal-Wallis test yielded statistically significant differences for both age groups . To further investigate where these differences lie, pairwise comparisons were performed. Kindly refer to *Table 29*.

As highlighted in *Table 29*, further pairwise comparisons confirmed statistically significant differences among Younger Players who played on Mobile

compared to those on PC (p < .001). This difference was also observed among Older Players, with statistically significant differences between Mobile and PC players (p = .024). This implies that platform choice, especially between Mobile and PC, is a strong factor influencing the spending behaviour of both groups, with *Table 28* indicating PC users spend significantly more than Mobile users.

	Sample 1	Sample 2	Test Statistic	Std. Error	Sig.	Adj. Sig.
Younger Players	Mobile	PC	65.921	16.034	<.001	<.001
Older Players	Mobile	PC	42.915	14.941	.004	.024

Table 29**:** *Pairwise Comparison of Platform*

Note. For the sake of brevity, only the statistically significant results, as determined by the adjusted Bonferroni value, have been included in this table. Non-significant results at the 0.05 level have been omitted.

A chi-square test was conducted to examine whether the gaming platform is associated with spending categories. As reflected in *Table 30,* the test revealed a statistically significant association between platform choice and spending category for Younger Players ($\chi^2(6) = 18.885$, p = .004). However, Cramér's V (0.115) indicates platform choice is only weakly associated with spending behaviour. For Older Players, however, the chi-square test yielded a non-significant result, $\chi^2(6) = 5.850$, p = .440, suggesting no meaningful relationship between platform and spending category. Young Mobile players, in particular, have the highest proportion of F2P players (18.6%) compared to PC users (8.1%). Younger Gaming Console players are predominantly Spenders within the IQR (91.3%). However, the volume of Whale players is relatively low across all platforms (< 10%).

		F2P		Spenders within IQR		Whales		Total				
		n	%	*n*	%	*n*	%	*n*	%	$\chi 2(6)$	*p*	φ_c
Younger Players	PC	23	8.1	240	84.8	20	7.1	283	100.0	18.885	.004	.115
	Mobile	74	18.6	299	75.1	25	6.3	398	100.0			
	Gaming Console	1	4.3	21	91.3	1	4.3	23	100.0			
	Other	3	27.3	7	63.6	1	9.1	11	100.0			
	Total	101	14.1	567	79.3	47	6.6	715	100.0			
Older Players	PC	5	3.5	102	70.8	37	25.7	144	100.0	5.850	.440	.075
	Mobile	24	6.7	267	75.0	65	18.3	356	100.0			
	Gaming Console	1	6.7	12	80.0	2	13.3	15	100.0			
	Other	1	11.1	6	66.7	2	22.2	9	100.0			
	Total	31	5.9	387	73.9	106	20.2	524	100.0			

Table 30: *Spending Category Across Platform*

Opinions on MTX

The participant's overall opinion on MTX as a mechanic was also investigated. A Kruskal-Wallis test was conducted to explore whether this influenced the amount of money spent on MTX games. As presented in *Table 31*, statistically significant differences in spending across opinion groups were observed for both Younger and Older Players, suggesting that a player's attitude toward MTX influences their spending behaviour ($H(2) = 9.758$, $p = .008$, $H(2) = 7.476$, $p = .024$).

From both age groups, those who like the MTX element had the highest mean rank (Younger: 470.24, Older: 336.88), indicating they spent more on MTX compared to those who don't care about MTX (353.82, 267.48) or those who dislike the mechanic (350.50, 251.91).

		n	Mean Rank	*Mdn*	IQR	*H*(2)	*p*
Younger Players	Likes	31	470.24	500.00	110.00–1100.00	9.758	.008
	Does not care	387	353.82	100.00	20.00–476.50		
	Dislikes	296	350.50	100.00	20.00–500.00		
Older Players	Likes	24	336.88	1000.00	422.50–4000.00	7.476	.024
	Does not care	208	267.48	439.50	100.00–2000.00		
	Dislikes	291	251.91	400.00	50.00–1952.39		

Table 31**:** *Total Money Spent on MTX Across Opinion on MTX Mechanic*

Note. This Kruskal-Wallis test yielded statistically significant differences for both age groups. To further investigate where these differences lie, pairwise comparisons were performed. Kindly refer to *Table 32*.

Pairwise comparisons presented in *Table 32* confirmed that Younger players who like MTX spent significantly more than both those who do not care about MTX (p = .007) and those who dislike MTX (p = .006). Similarly, Older Players who like MTX spent significantly more than those who do not (p = .024), but no significant difference was found between those who do not care about MTX and both those who dislike MTX (p = .768), and those who do (p = .099).

	Sample 1	Sample 2	Test Statistic	Std. Error	Sig.	Adj. Sig.
Younger Players	Dislikes	Does not care	3.323	15.900	.834	1.000
	Dislikes	Likes	119.742	38.873	.002	.006
	Does not care	Likes	116.419	38.437	.002	.007
Older Players	Dislikes	Does not care	15.578	13.710	.256	.768
	Dislikes	Likes	84.970	32.068	.008	.024
	Does not care	Likes	69.392	32.552	.033	.099

Table 32**:** *Pairwise Comparison of Opinion on MTX Mechanic*

A chi-square test was also conducted to examine whether there is an association between one's opinion on MTX as a mechanic and spending categories. As detailed in *Table 33*, the chi-square test revealed no statistically significant relationship between opinion on MTX and spending category for either group ($\chi^2(4) = 6.818$, $p = .146$, $\chi^2(4) = 6.594$, $p = .159$).

		Spenders within										
		F2P		IQR		Whales		Total				
		n	%	*n*	%	*n*	%	*n*	%	$\chi2(4)$	*p*	φ^c
Younger Players	Likes	1	3.2	26	83.9	4	12.9	31	100.0	6.818	.146	.069
	Does not care	60	15.5	299	77.3	28	7.2	387	100.0			
	Dislikes	40	13.5	241	81.4	15	5.1	296	100.0			
	Total	101	14.1	566	79.3	47	6.6	714	100.0			
Older Players	Likes	0	0.0	15	62.5	9	37.5	24	100.0	6.594	.159	.079
	Does not care	13	6.3	151	72.6	44	21.2	208	100.0			
	Dislikes	19	6.5	220	75.6	52	17.9	291	100.0			
	Total	32	6.1	386	73.8	105	20.1	523	100.0			

Table 33: *Spending Category Across Opinion on MTX Mechanic*

Material Distortion

The concept of multiple currencies discussed in the Literature Review chapter was also explored in this research. The most straightforward way to tackle this was to ask participants whether different in-game currencies cause them to spend more than planned. A Kruskal-Wallis test was conducted to assess whether the perceived complexity of multiple in-game currencies (Material Distortion) influenced the amount of money spent on MTX. The results tabulated in *Table 34* indicate significant differences in spending behaviour for both Younger and Older Players, suggesting that Material Distortion affects overall spending (Younger Players: $H(2) = 12.500$, $p = .002$; Older Players: $H(2) = 10.991$, $p = .004$).

For Younger Players, those who reported that the currencies frequently cause them to spend more had the highest mean rank (368.58), indicating they spent more on MTX games compared to players who did not spend more than planned (mean rank = 309.15) or those who only occasionally spent more (mean rank = 366.28). Among Older Players, those who reported being only occasionally influenced to spend more had the highest mean rank (283.39). This was followed by those who frequently spent more than planned (mean rank = 274.20), with the lowest spending group being those who did not find Material Distortion influential in their spending decisions (mean rank = 232.55).

		n	Mean Rank	*Mdn*	IQR	*H*(2)	*p*
Younger Players	Confusing [a]	318	368.58	150.00	30.00–700.00	12.500	.002
	Not confusing [b]	212	309.15	76.50	20.00–300.00		
	Sometimes confusing [c]	169	366.28	130.00	34.00–500.00		
Older Players	Confusing [a]	222	274.20	500.00	100.00–2000.00	10.991	.004
	Not confusing [b]	194	232.55	292.50	50.00–1500.00		
	Sometimes confusing [c]	104	283.39	500.00	200.00–2000.00		

Table 34**:** *Total Money Spent on MTX Across Perceived Material Distortion*

Note. This Kruskal-Wallis test yielded statistically significant differences for both age groups. To further investigate where these differences lie, pairwise comparisons were performed. Kindly refer to *Table 35*.

[a] Finds that multiple currencies cause them to spend more than intended.

[b] Does not find that multiple currencies cause them to spend more than intended.

[c] Sometimes finds that multiple currencies cause them to spend more than intended.

As demonstrated in *Table 35*, pairwise comparisons in Younger Players confirmed that players who claimed they were not affected by Material Distortion spent significantly less than both those who were frequently affected (p = .003) and those who only occasionally spent more than planned (p = .018).

Pairwise comparisons also showed that Older Players who reported not finding Material Distortion confusing spent significantly less than both those who did (p = .014) and those who occasionally did (p = .016). Among both age groups, there was no statistically significant difference in spending between those who reported frequently versus only sometimes spending more than planned (Younger: 1.00, Older: 1.00).

	Sample 1	Sample 2	Test Statistic	Std. Error	Sig.	Adj. Sig.
Younger Players	Not confusing	Sometimes confusing	-57.132	20.798	.006	.018
	Not confusing	Confusing	59.439	17.882	<.001	.003
	Sometimes confusing	Confusing	2.307	19.199	.904	1.000
Older Players	Not confusing	Confusing	41.651	14.755	.005	.014
	Not confusing	Sometimes confusing	-50.845	18.246	.005	.016
	Confusing	Sometimes confusing	-9.194	17.840	.606	1.000

Table 35*: *Pairwise Comparison of Perceived Material Distortion

As displayed in *Table 36*, a chi-square test was carried out to explore potential associations between this self-report measure and the different spending categories. For Younger Players, the chi-square test showed no significant relationship between the perceived effectiveness of Material Distortion and spending category ($\chi^2(4) = 3.058$, p = .548). However, for Older Players, the test revealed a significant relationship ($\chi^2(4) = 10.390$, p = .034), although Cramér's V (0.100) suggests a weak association.

Older Players who reported spending more than originally planned due to Material Distortion had a relatively high likelihood to be in the Whales category (24.3%), followed by the group who reported sometimes spending more than planned (20.2%). Older Players who do not spend more than planned also have a significant portion in the Whales category (15.5%).

		F2P		Spenders within IQR		Whales		Total				
		n	%	*n*	%	*n*	%	*n*	%	$\chi 2(4)$	*p*	φ_c
Younger Players	Confusing	35	11.0	260	81.8	23	7.2	318	100.0	3.058	.548	.047
	Not confusing	33	15.6	167	78.8	12	5.7	212	100.0			
	Sometimes confusing	19	11.2	138	81.7	12	7.1	169	100.0			
	Total	87	12.4	565	80.8	47	6.7	699	100.0			
Older Players	Confusing	15	6.8	153	68.9	54	24.3	222	100.0	10.390	.034	.100
	Not confusing	12	6.2	152	78.4	30	15.5	194	100.0			
	Sometimes confusing	1	1.0	82	78.8	21	20.2	104	100.0			
	Total	28	5.4	387	74.4	105	20.2	520	100.0			

Table 36**:** *Spending Category Across Perceived Material Distortion*

Engagement with Non-MTX Games

Whether players engaged with a variety of video games or were dedicated solely to MTX-based games was also explored. However, it should be noted that the validity of this test is the weakest of all these comparative analyses due to only a minority making up the MTX exclusive group. But perhaps the frequencies are of interest.

As shown in *Table 37* via Mann-Whitney U test, a statistically significant difference is indicated for Older Players, with those who also play non-MTX games having a higher mean rank (267.92), suggesting they are more likely to spend more on MTX games compared to MTX-only players (mean rank = 184.60, U = 5,226.50, p = .003). However, there was no such statistically significant difference among

Younger Players, but this could be due to the small size of the MTX exclusive group (n = 12, U = 3,412.00, p = .249).

		n	Mean Rank	*Mdn*	IQR	*U*	*p*
Younger Players	Play other games	705	360.16	100.00	20.00–500.00	3412.00	.249
	MTX-only	12	290.83	55.08	1.50–425.00		
Older Players	Plays other games	494	267.92	500.00	100.00–2000.00	5226.50	.003
	MTX-only	31	184.60	80.00	20.00–500.00		

Table 37**:** *Total Money Spent on MTX Across General Engagement with Video Games*

A chi-square test, as compiled in *Table 38*, was also carried out to analyse this variable's distribution across spending categories. For Younger Players, the chi-square test revealed no significant relationship between general engagement with video games and spending category ($\chi^2(2) = 1.823$, $p = .402$). However, for Older Players, a significant relationship was identified ($\chi^2(2) = 7.246$, $p = .027$). Cramér's V (0.117) suggests a weak association. Older Players who engage with a wider variety of video games are more likely to be Whales (20.9%) compared to those who only play MTX games, who are more likely to be Spenders within IQR (74.2%).

		F2P		Spenders within IQR		Whales		Total				
		n	%	*n*	%	*n*	%	*n*	%	$\chi 2(2)$	*p*	φ_c
Younger Players	Plays other games	99	14.0	559	79.3	47	6.7	705	100.0	1.823	.402	.050
	MTX-only	3	25.0	9	75.0	0	0.0	12	100.0			
	Total	102	14.2	568	79.2	47	6.6	717	100.0			
Older Players	Plays other games	27	5.5	364	73.7	103	20.9	494	100.0	7.246	.027	.117
	MTX-only	5	16.1	23	74.2	3	9.7	31	100.0			
	Total	32	6.1	387	73.7	106	20.2	525	100.0			

***Table 38*:** *Spending Category Across General Engagement with Video Games*

Psychological Traits of Participants

Correlations of Psychometric Instrument Scores

As depicted in *Tables 39* and *40*, Spearman's Rank Correlation was carried out across various psychometric variables to explore potential relationships with spending in Younger and Older Players. Descriptive statistics, including the median and IQR for each variable, are presented in these tables. For more details about the psychometric instrument scores, their relevance to this study and their sources, please refer to the Literature Review and Methodology chapters.

Variable	*N*	*Mdn*	IQR	*n*	r_s
FoMO	717	25.00	20.00–30.00	706	.04
SNI	716	14.00	10.00–22.00	705	.04
SII	724	19.00	15.00–23.00	713	.00
SUSCEP	712	34.00	26.50–42.00	701	.04
BIS	722	21.00	17.00–26.00	711	.36**
CNFU-S	679	2.17	1.58–2.71	669	.02

Table 39**:** *Psychometric Instrument Scores vs MTX Expenditure (Younger Players)*

Note. N = total number of non-missing cases. The median and IQR were calculated based on this.

n = viable sample size used in Spearman's r_s after pairwise deletion.

*$p < .05$. **$p < .01$.

Variable	*N*	*Mdn*	IQR	*n*	r_s
FoMO	526	22.00	17.00–27.00	514	.05
SNI	529	12.00	8.00–19.00	517	-.03
SII	529	18.00	13.00–22.00	517	.10*
SUSCEP	524	31.00	24.00–39.00	512	.05
BIS	532	20.00	16.00–25.00	520	.40**
CNFU-S	508	2.00	1.50–2.67	498	.10*

Table 40**:** *Psychometric Instrument Scores vs MTX Expenditure (Older Players)*

Note. N = total number of non-missing cases. The median and IQR were calculated based on this.

n = viable sample size used in Spearman's r_s after pairwise deletion.

*$p < .05$. **$p < .01$.

FoMO

Spearman's rank correlation coefficient was calculated to examine the relationships between the FoMO score and the total money spent on MTX. However, as represented in *Tables 39* and *40*, no statistically significant correlations were observed for either Younger or Older Players (r_s = .04, p = .341, r_s = .05, p = .228, respectively).

A Kruskal-Wallis test was also performed to examine if an association could be observed between FoMO and any particular spending category. As recorded in *Table 41*, this test revealed no significant differences for Younger Players ($H(2)$ = 1.319, p = .517) nor Older Players ($H(2)$ = 2.545, p = .280). As these tests were not significant, pairwise comparisons were not performed.

		n	Mean Rank	*Mdn*	IQR	*H*(2)	*p*
Younger Players	F2P	100	331.94	23.00	20.00–29.50	1.319	.517
	Spenders within IQR	561	356.78	25.00	20.00–30.00		
	Whales	45	360.57	25.00	20.00–32.00		
Older Players	F2P	32	231.20	20.00	1.65–2.50	2.545	.280
	Spenders within IQR	377	254.92	22.00	1.70–2.70		
	Whales	105	274.79	22.00	1.90–2.90		

Table 41**:** *FoMO Score Across Spending Category*

Note. This Kruskal-Wallis test did not yield statistically significant differences for neither age group. Since the Kruskal-Wallis test was not significant, pairwise comparisons were not conducted.

SUSCEP

As listed in *Tables 39* and *40*, SUSCEP correlations with spending on MTX games were statistically insignificant for both Younger and Older Players (r_s = .04, p = 292, r_s = .05, p = .244, respectively).

As recorded in *Table 42*, further exploration of SUSCEP and any potential association with intergroup spending categories through a Kruskal-Wallis test indicated that neither Younger (H(2) = 3.100, p = .212) nor Older Players (H(2) = 2.187, p = .335) exhibited statistically significant differences. Therefore, pairwise comparisons were not conducted.

		n	Mean Rank	*Mdn*	IQR	*H*(2)	*p*
Younger Players	F2P	99	317.91	34.00	23.50–41.50	3.100	.212
	Spenders within IQR	558	356.77	34.00	28.00–41.00		
	Whales	44	352.31	36.00	25.00–46.50		
Older Players	F2P	31	225.53	28.00	22.50–39.00	2.187	.335
	Spenders within IQR	377	255.45	31.00	24.00–38.00		
	Whales	104	269.54	31.00	24.50–40.00		

Table 42**:** *SUSCEP Score Across Spending Category*

Note. This Kruskal-Wallis test did not yield statistically significant differences for neither age group. Since the Kruskal-Wallis test was not significant, pairwise comparisons were not conducted.

Susceptibility to Informational Influence (SII)

However, as outlined by *Table 43*, when examining the subscales that make up SUSCEP, Spearman's Correlation indicated a weak but statistically significant

relationship between SII and spending among Older Players (r_s = .10, p = .030). This was not observed among Younger Players (r_s = .00, p = .973).

This was followed by another Kruskal-Wallis test to examine whether this subscale was associated with any particular spending category. As reflected in *Table 43*, a significant difference was observed in SII scores across spending categories in the Older Players group (H(2) = 6.400, p = .041). Based on mean rank, the Whale category is positioned as having the highest SII scores (286.51), with F2P players having the lowest (216.27). Similar to Spearman's Correlation, this test indicated no statistically significant difference among the Younger Players (H(2) = 1.970, p = .373).

		n	Mean Rank	*Mdn*	IQR	*H*(2)	*p*
Younger Players	F2P	102	339.25	19.00	13.00–23.00	1.970	.373
	Spenders within IQR	565	362.43	19.00	15.00–23.00		
	Whales	46	329.61	18.00	14.00–22.00		
Older Players	F2P	31	216.27	15.00	12.50–19.50	6.400	.041
	Spenders within IQR	381	254.90	18.00	12.00–22.00		
	Whales	105	286.51	20.00	14.00–23.00		

Table 43**:** *SII Score Across Spending Category*

Note. For the Older Players group, this Kruskal-Wallis test yielded statistically significant differences. To further investigate where the differences among the Older Players group lie, a pairwise comparison was performed. Kindly refer to *Table 44*.

To further explore the significance of these differences, a pairwise comparison was conducted; however, as presented in *Table 44*, no statistically significant relationships SII scores among Older Player spending categories (p > .05).

	Sample 1	Sample 2	Test Statistic	Std. Error	Sig.	Adj. Sig.
Older Players	F2P	Spenders within IQR	-38.621	27.867	.166	.497
	F2P	Whales	-70.235	30.499	.021	.064
	Spenders within IQR	Whales	-31.615	16.446	.055	.164

***Table 44*:** *Pairwise Comparison of SII Score*

Susceptibility to Normative Influence (SNI)

When analysing the statistical outputs of the SNI subscale, as tabulated in the correlations of *Tables 39* and *40*, there was also no statistically significant relationship observed between the SNI subscale and spending in either group (Younger group: r_s = .04, p = .255, Older group: r_s = −.03, p = .559).

Similarly, as outlined in *Table 45*, a Kruskal-Wallis test indicated no significant differences in SNI scores across spending categories (Younger Players: $H(2)$ = 4.137, p = .126, Older Players: $H(2)$ = 0.057, p = .972).

		n	Mean Rank	*Mdn*	IQR	*H*(2)	*p*
Younger Players	F2P	99	314.55	12.00	8.50–19.00	4.137	.126
	Spenders within IQR	561	359.29	15.00	10.00–21.00		
	Whales	45	359.14	17.00	8.00–24.00		
Older Players	F2P	31	253.35	11.00	8.50–17.50	0.057	.972
	Spenders within IQR	381	259.70	12.00	8.00–19.00		
	Whales	105	258.12	12.00	8.00–18.00		

***Table 45*:** *SNI Score Across Spending Category*

Note. This Kruskal-Wallis test did not yield statistically significant differences for neither age group. As the Kruskal-Wallis test was not significant, pairwise comparisons were not conducted.

BIS

As indicated in *Tables 39* and *40*, BIS demonstrated a moderate correlation with total money spent on MTX games in both groups, and these correlations were statistically significant for both Younger (r_s = .36, p < .001) and Older Players (r_s = .40, p < .001). This suggests that individuals who are more impulsive in their purchasing behaviour tend to spend more on MTX games, regardless of age.

As detailed in *Table 46*, a Kruskal-Wallis test was also conducted to examine intergroup spending categories. Among both age groups, a Kruskal-Wallis test revealed significant differences in BIS scores across spending categories (Younger: $H(2) = 59.749$, p < .001, Older: $H(2) = 41.944$, p < .001). Mean ranks indicate a consistent pattern of F2P players scoring the lowest on BIS (Younger: 236.30, Older: 165.66) and Whales scoring the highest (503.49, 336.17).

		n	Mean Rank	*Mdn*	IQR	*H*(2)	*p*
Younger Players	F2P	102	236.30	17.00	14.00–21.00	59.749	<.001
	Spenders within IQR	563	365.63	22.00	17.00–26.00		
	Whales	46	503.49	27.50	22.00–35.00		
Older Players	F2P	32	165.66	16.00	14.00–20.00	41.944	<.001
	Spenders within IQR	384	247.91	20.00	16.00–24.00		
	Whales	104	336.17	23.50	19.00–30.00		

Table 46**:** *BIS Score Across Spending Category*

Note. This Kruskal-Wallis test yielded statistically significant differences for both age groups. To further investigate where these differences lie, pairwise comparisons were performed. Kindly refer to *Table 47*.

Pairwise comparisons, as represented in *Table 47*, were carried out to investigate whether these group differences are statistically significant or likely due

to chance. Pairwise significance was achieved in both age groups across all intergroup spending categories, further supporting the interpretations. Whales had significantly higher BIS scores than both F2P players (both: $p < .001$) and Spenders within IQR (both: $p < .001$) among both age groups. Additionally, Spenders within IQR had higher BIS scores than F2P players in both groups (Younger: $p < .001$, Older: $p = .009$).

	Sample 1	Sample 2	Test Statistic	Std. Error	Sig.	Adj. Sig.
Younger Players	F2P	Spenders within IQR	-129.331	22.075	<.001	<.001
	F2P	Whales	-267.185	36.433	<.001	<.001
	Spenders within IQR	Whales	-137.854	31.457	<.001	<.001
Older Players	F2P	Spenders within IQR	-82.254	27.606	.003	.009
	F2P	Whales	-170.512	30.330	<.001	<.001
	Spenders within IQR	Whales	-88.258	16.585	<.001	<.001

***Table 47*:** *Pairwise Comparison of BIS Score*

CNFU

As extrapolated from *Table 39*, when exploring CNFU, Spearman's Correlation indicated no significant correlation among Younger Players ($r_s = .02$, $p = .705$). However, among Older Players, a weak yet statistically significant positive correlation was observed, as conveyed in *Table 40* ($r_s = .10$, $p = .033$). This suggests that Older Players with a higher CNFU were more likely to make purchases within MTX games.

A Kruskal-Wallis test was also carried out to explore intergroup differences in score distribution. However, as enumerated in *Table 48*, no significant differences were found in CNFU-S scores across spending categories in either group (Younger:

H(2) = 0.081, *p* = .960, Older: *H*(2) = 4.102, *p* = .129). Therefore, pairwise comparisons were not conducted due to the lack of statistical significance. While it would be interesting to discuss the subscales that make up the CNFU separately, as was done with SUSCEP, the textbook these scales were sourced from recommends working with the total composite index (Bearden et al., 1989).

		n	Mean Rank	*Mdn*	IQR	*H*(2)	*p*
Younger Players	F2P	93	331.63	2.25	1.33–2.67	0.081	.960
	Spenders within IQR	535	336.03	2.17	1.58–2.71		
	Whales	41	329.18	2.08	1.50–2.92		
Older Players	F2P	31	215.55	1.83	1.29–2.29	4.102	.129
	Spenders within IQR	366	246.50	2.00	1.50–2.58		
	Whales	101	270.79	2.25	1.50–2.83		

***Table 48*:** *CNFU-S Score Across Spending Category*

Note. This Kruskal-Wallis test did not yield statistically significant differences for neither age group. As the Kruskal-Wallis test was not significant, pairwise comparisons were not conducted.

Conclusion

This study aimed to identify interpersonal, personality, and behavioural correlates of MTX spending in Younger and Older Players, expanding upon previous research by focusing on a younger population while comparing them with older age groups. These findings seem to indicate some difference in spending between Younger and Older Players of MTX games.

Overall, the results indicated that Older Players spent more on average. Additionally, Younger Players were more likely to be F2P players, and Older Players

had more outliers indicative of a Whale spending pattern. Another interesting finding is the tendency Older Players have to seek information from others, as well as the inclination to distinguish oneself from others through one's purchases, which both correlated with MTX spending. The number of games played was also relevant, as results indicate those who played multiple MTX games spent more than those who only played one. This was an interesting difference, as this was not observed among the Younger Players. Another difference in Younger Players is that age was found to be positively correlated with spending within their group. This pattern was not observed in Older Players, suggesting a cut-off point.

One psychometric variable stood out across both groups as observed through tests of correlation and group difference. BIS consistently and significantly emerged as moderately associated with spending across these analyses. In other words, higher levels of buying impulsivity were associated with greater spending, indicating that players with more impulsive tendencies are more likely to engage in higher levels of MTX spending regardless of age group, which is not unexpected. Other interesting results were the tendency Older Players have to seek information from others (SII), as well as the inclination to distinguish themselves from others through their purchases (CNFU-S), which both correlated with MTX spending; however, these correlations were not observed among Younger Players.

There were other notable observations in this study, some of which supported and/or questioned established notions that are lacking in rigorous exploration and testing within the gaming context. Some of these include the effectiveness of The First Spend, Material Distortion, the lack of influence from generalised FoMO and influenceability on MTX-related spending, and the characteristics that set F2P and Whale spenders apart from other players. However, a significant portion of this study

involved retaining the null hypotheses regarding correlates of and differences in spending behaviour. Although disproving hypotheses might not be as compelling as proving them true, operating under the *falsification principle* of disproving testable hypotheses is considered a cornerstone of the scientific method, allowing theorists to develop and continuously hone more meticulous and precise models of the natural world (Wilkinson, 2013).

Chapter 5: Discussion

This chapter interprets the results of the previous chapter. Through the lens of existing pedagogical literature, it examines the utility and implications of the findings for educational practice. To facilitate cross-referencing, the structure of this chapter mirrors that of the Results chapter. For more detailed statistical information on the tests referenced in this chapter, please refer to the corresponding section and subsection with the same heading name in the Results chapter.

Sociodemographic Profile of Participants

This section discusses the results of the tests involving spending across sociodemographic variables. Significant associations were found regarding age and geographical location.

Age

The results of this study indicate that Older Players seem to spend more compared to their Younger counterparts. Although spending large amounts in itself is not necessarily a problem unless it is beyond the player's means or control, this outcome could be considered as a positive one in the sense that extreme spending outliers are relatively fewer among the Younger Players analysed. This makes sense as Older Players tend to have more disposable income than their Younger counterparts, whose financial decisions may also be restricted by third parties such as parents/legal guardians.

This result also suggests that Older Players should not grow complacent and assume overspending in microtransactions is a condition that predominantly affects Younger Players. Spending patterns examined in the study could be interpreted as Older Players being a higher-risk demographic. Therefore, financial literacy and

vigilance are important for all groups, but perhaps even more so for players responsible for their own finances, as is presumably the case with most Older Players.

Gender

Consumer behaviour literature focusing on gender-based differences tends to be varied. Some discuss statistically significant differences in terms of priorities, with males tending to make riskier financial decisions and spend more on recreational goods and technology and females tending to be more price-sensitive, focusing their expenditure on personal care, clothing and social activities (Damong & Candido Perez, 2024; Grable & Joo, 2004; Lusardi & Mitchelli, 2007). When looking at literature on microtransactions, it seems that males tend to have higher loot box engagement and a higher risk of being diagnosed with Internet Gaming Disorder, while for females, attachment to particular characters may play a more pivotal role in willingness to spend (Evren et al., 2021; Raneri et al., 2022; Teng et al., 2024). In a way, this could be seen as mirroring general spending proclivities, with males leaning more into financial risk, and female expenditure having an emotional bond quality. This might explain the results of this study, as while purchases may be different across genders, perhaps they amount to a statistically insignificant difference in overall spending.

The implication of such findings would be to go beyond simply gendering traits, hobbies and issues, a tendency that is quite common when discussing prevalence in gaming and psychology literature, as well as general educational practice. Educators might be more in tune with signs of problematic gaming in male students, but perhaps less so with female students, based on a combination of mental heuristics and literature on prevalence. However, as society changes, there

might also be a shift in the prevalence metrics. For example, Body Dysmorphia used to be considered a female-dominated condition. However, literature suggests that the gap between males and females might be narrower than previously thought (Buhlmann et al., 2015; Phillips & Diaz, 1997). There has been an increasing awareness of male-dominated presentations that involve preoccupation with musculature and body composition (Devrim-Lanpir et al., 2023; Pope et al., 2000).

Rather than attributing phenomena to specific populations, it might be useful to explore their nuanced differences in motivation and manifestation across different populations. After all, prevalence can change based on environmental factors. For example, studying women's relationship to video games is not only intellectually interesting, but it would be useful for educators to garner a deeper understanding to design lessons and strategies for students to prevent such a hobby from becoming problematic should the prevalence of problematic gaming shift. It is also useful for psychology practitioners to inform therapeutic interventions.

Geoscheme

Western Europe and North America stand out as the regions with the highest distribution of total expenditure, as well as the greatest concentration of players categorised as Whales, which may be linked to higher disposable incomes and more extensive marketing by game developers targeting affluent players. These findings suggest that while global trends in gaming can be observed, spending behaviour is strongly influenced by regional and demographic factors, with Older Players showing a more pronounced regional variation than Younger Players. The significant regional differences in spending behaviour among Older Players can be attributed to several factors, including economic conditions, regional pricing, and cultural attitudes toward game-related expenditure.

Africa & the Middle East were underrepresented in this sample. Perhaps this can be attributed to price increases in regions where pricing used to be adjusted to be affordable for local players (Bentley, 2024). After instances of players from more developed countries falsifying their location, measures such as price increases across economically weaker nations may have rendered expenditure difficult for the locals. Nonetheless, this hinders this study's generalisability, and future research exploring nuances in these regions may be warranted.

Household Satisfaction Score

Factors such as socioeconomic status tend to play a pivotal role in many facets of life, especially when it comes to expenditure. Therefore, it is logical to hypothesise that it might play a role in game-related spending. However, ethical considerations are crucial when dealing with sensitive topics, such as finances. This is especially true when a portion of the target sample comprises children. Hence, a 10-point Likert scale item inquiring about the subjective household financial satisfaction was used. This was taken from the German Socio-Economic Panel by Wagner et al. (1993), as cited in Ferrer-i-Carbonell (2002), the use of which is permitted for scholarly purposes.

While it might not accurately reflect socioeconomic status, it was deemed more ethical than the alternatives of inquiring about household incomes. As this measure is based on subjective satisfaction with financial situation, considering the international nature of this study, it could perhaps be more informative, as salaries and the cost of living may vary from one location to another.

However, as observed from the results of this study, this metric was not found to be associated with microtransaction expenditure. This lack of association between Household Satisfaction score and microtransaction spending is an interesting result,

as it diverges from expectations one might derive from literature associating income with satisfaction (Conger et al., 2010; Diener & Oishi, 2000). Perhaps this simply does not extend to the microtransaction context. However, the subjective nature of this measure is important to consider. While the literature discusses factors such as education and social comparison in the lower class as potential reasons for increased financial dissatisfaction (Hsieh, 2002), the literature also discusses a tendency among higher social classes to desire more wealth and status (Wang et al., 2020). This would imply that those who are objectively of higher socioeconomic status would also not be satisfied with their current financial situation. Perhaps those players who spend comparatively more would like to spend even more if their circumstances permitted it.

Reasons for Playing

This section discusses the primary reasons underlying player engagement with microtransaction-based games. While the data is descriptive in nature, this analysis offers significant value as it intersects with the study of motivation, a prominent area in both the fields of psychology and pedagogy, as evidenced by the quantity of theories discussed in this section. These theoretical frameworks were integrated to extrapolate these motivating gamification principles to pedagogical contexts.

Perceived Value

One of the most reported reasons for playing microtransaction-based games was that they were free to download, with Younger Players more likely to cite this reason. This aligns with the notion that Younger Players tend to face greater financial limitations. Furthermore, both groups frequently reported that the game

happened to have microtransactions. This indicates other aspects that attract players rather than spending mechanics themselves; a perceived value that justifies continued investment (Kotler et al., 2019). Extrapolating this to broader scenarios, this could be interpreted as the necessity of appealing to individuals' subjective priorities as a prerequisite to motivation. This is supported by pedagogical literature that positions relevance of learning material as a critical factor in sustaining motivation (Woolfolk, 2020)

Novelty

Continuous support through updates that provide new content was also one of the most cited motivators for playing microtransaction-based games. This supports literature that regards novel experiences as intrinsic motivators (Ryan & Deci, 2000). Educational psychology and cognitive neuroscience literature often discuss novelty as a tool that facilitates consolidation of knowledge (Ballarini et al., 2013; Fenker et al., 2008; Schomaker & Meeter, 2015; Schomaker et al., 2014; Woolfolk, 2020). Strong emotional experiences tend to facilitate retention into long-term memory (Jimenez et al., 2020). This can occur in unfortunate circumstances of trauma, but extends to strong positive experiences. Consequently, more efficient and effective knowledge acquisition can be achieved through fewer, well-thought-out novel lessons rather than high-volume, repetitive *rote learning* (Woolfolk, 2020).

Competition and Cooperation

Interestingly, competitiveness was one of the least reported reasons for playing. The increasing popularity of Multiplayer Online Battle Arena games, which are highly competitive, often including optional microtransactions, makes this finding unexpected. However, this discrepancy could be an issue of sampling bias, as

gatekeeper approval for this study was predominantly granted by communities focused on single-player campaigns, with Player versus Player elements not being central.

In fact, many microtransaction-based games often include cooperative elements. These appear to be a more significant driver of engagement among both age groups relative to competition, with participants citing friends playing similar games and community engagement more frequently. The shift from competition to cooperation has been advocated in both pedagogy and psychology literature (De Francesco et al., 2024; Woolfolk, 2020). While competition sometimes enhances performance, it has also been found to increase levels of stress, which, as discussed in the Literature Review chapter, can have counterproductive outcomes in excess (De Francesco et al., 2024; Diamond et al., 2007). In fact, a good portion of participants from both groups reported playing for stress reduction.

Supporting this study's results, cooperation is often positioned as a viable, if not more effective, approach for achieving positive educational and occupational outcomes relative to competition (De Francesco et al., 2024; Woolfolk, 2020). As discussed in SDT, the relatedness component is intertwined with intrinsic motivation (Ryan & Deci, 2000). Therefore, it is worthwhile to continue the sustained pedagogical effort of nurturing a collaborative classroom environment.

Aesthetic Value

Sensory elements such as art, graphics, character aesthetics, and music were found to be a relatively substantial motivator for playing. This appealing aspect of gamified systems can be applied in the context of education through educators' efforts to ensure learning spaces and classroom material are appealing to the senses. This could extend to the aesthetic representation of information in a way that

facilitates learning through structured and intuitive formats. This may include strategies such as organising and *chunking* complex information to make it more intuitive and appealing, mind maps to create order from chaotic streams of information, and even infographics, a powerful educational tool that presents information meaningfully in a way people of different ages could intellectually benefit from (Barnes et al., 2024; Buzan, 2013; Hernández-Fernández & Morera-Vidal, 2022; Marzano, 2007).

This result aligns with the concept of *multimodal learning*: learning through appealing to different senses (Woolfolk, 2020). For example, multidisciplinary, cross-curricular approaches that integrate arts into various subjects have indicated positive outcomes such as deeper comprehension of material (Akhundova, 2024).

Direct Involvement and Support Structure

Both groups reported satisfaction from account improvement as a key motivator, suggesting the process of creating and advancing is important for engagement. This supports the hypothesis posited in the Literature Review regarding the IKEA Effect. Being invested in something one was heavily involved in is also thought to be intrinsically linked with the need to belong, as posited by *Social Identity Theory*, further reinforcing cooperation efforts (Ryan & Deci, 2000; Tajfel et al., 2001).

These statistics concerning account improvement satisfaction can indicate partiality towards the idea of playing a central, self-paced role in progression. This is supported by video game motivation research (Ryan et al., 2006). In a learning context, this implies allowing students to be active agents in their own learning, thus supporting their self-perception of competency. This can be achieved via scaffolding*:*

appropriate levels of support from *more knowledgeable others* (Vygotsky & Cole, 1978).

Furthermore, intriguing story/narrative elements and the desire to collect all the characters and/or items were also often reported as motivators. This suggests that many players appreciate the structure the game provides, alongside having specific goals. Part of the satisfaction in video game progression is thought to stem from challenging yet achievable obstacles (Ryan et al., 2006). In education, this can be achieved through the application of theories such as the *Zone of Proximal Development* and *S.M.A.R.T.* goals, establishing a framework for learning that supports the innate affinity for autonomy and competence. This approach to learning, where students are given the autonomy of intellectual exploration with support when necessary, is referred to as *Guided Discovery Learning* (Doran, 1981; Woolfolk, 2020).

As discussed in the Literature Review chapter, gestures such as allowing students to be involved in their classroom's decoration using materials they created, appeal to the innate motivational components of competency, autonomy and relatedness, as discussed in SDT and supported by these findings. Such activities also appeal to affinities towards aesthetics and involvement. Such practices are conducive to the paradigm shift towards *student-centred learning*, where students are the focus of the classroom, as opposed to the instructor in traditional classroom models (Woolfolk, 2020).

Game Design Motivators

Login bonuses were not as frequently reported as a reason for playing as other reasons. Perhaps this is considered a bonus by players and does not, by itself,

constitute a core reason to play games; however, considering the sample sizes, it is not an insignificant portion, lending credibility to the Hook, Habit, Hobby model discussed in the Literature Review.

Furthermore, Younger Players reported being less likely to engage with microtransaction-based games because they had already invested money, when compared to Older Players. Although the percentages seem small, considering the sample sizes of this study, these are not insignificant percentages, which suggests that some players are susceptible to the sunk-cost fallacy discussed in the Literature Review.

A small percentage of Younger Players and an even smaller portion of the Older Players cited the microtransactions or Gacha aspect itself as a reason for playing. The indifference or even negative feelings towards microtransactions is a common pattern among both age groups, as is explored in the Opinions on MTX subsection of this chapter.

Other Reasons

As briefly noted in the Results chapter, a small subset of the participants submitted their own motivations for playing. One of them was convenience. This is logical when considering the portability of mobile phones and certain consoles, which facilitate playing in short bursts and in different locations. Notably, some participants reported exercise as a reason for playing, presumably those from the Pokémon GO community. This finding is interesting as it goes beyond extrapolating motivating gamified features to real-world contexts, demonstrating actual lifestyle improvement benefits that transcend the confines of the game itself. Perhaps some of these reasons would have been more popular had they been included in the curated list.

Gaming Habits of Participants

This section discusses the results of tests involving spending across behaviour-related variables. Interestingly, nearly all the variables in this section were found to be statistically significant in at least one of the tests.

Number of Active Microtransaction Games

After exploring whether playing more than one microtransaction-based game has any bearing on in-game expenditure, the outcomes of tests carried out in this study suggest that Younger Players are not influenced by the number of games they play. In contrast, Older Players show an association between their microtransaction-based game engagement and spending behaviour, with Older Whales more likely to engage with multiple games with microtransactions. A potential explanation for this is that Younger Players often have limited financial resources, which could necessitate spreading resources thinly across multiple games, whereas Older Players, with higher disposable incomes, may allocate a larger budget to individual games. It could reflect deeper financial commitment patterns among Older Players.

Daily Playtime

As the results of this study suggest, time investment seems to at least play a partial role in spending. This is more strongly suggested among the Older Players, where those who are more deeply engaged with microtransaction-based games are more likely to fall into the Whale spending category. Alternatively, Whales might spend more time on these games to get the most out of their purchases. Both these possibilities could support the sunk-cost fallacy in relation to video games, where further time and/or money is spent on these games because of feelings of apprehension in rendering previous investments meaningless. Despite most

participants not reporting this as a reason for playing, as indicated in *Figure 7*, perhaps there could be unconscious motivators at play. However, it is important to consider enjoyment as a confounding variable, which was not given due attention in this study. It could simply be a matter of players dedicating more time and money to games they truly enjoy.

Years Dedicated

The results indicate that increased experience with these games is associated with higher spending, regardless of age group, although the strength of this relationship remains weak. However, the age at which players started engaging with microtransaction-based games only showed a significant correlation among the Older Players group.

To reconcile these findings, it can be argued that while duration of gameplay is a stronger correlate of spending, age of onset might have a nuanced effect on Older Players. Perhaps marketing efforts become more deeply ingrained in consumers' minds as a result of earlier exposure to microtransactions. Developmental cognitive neuroscience literature could also support this finding. The *Dual Systems Model* / *Maturational Imbalance Theory* discuss heightened brain sensitivity to dopaminergic stimuli in adolescence (Galván et al., 2006; Steinberg, 2010; Casey et al., 2011). Earlier onset increases vulnerability to more enduring addictions, as the highs experienced during adolescence tend to be higher than later points in the developmental lifespan, potentiating similar behaviour past adolescence in an effort to recapture this experience (Casey & Jones, 2010). Players exposed to microtransactions later in life might have built cognitive resilience towards overspending in video games.

One explanation for the statistical insignificance in relation to Younger Players across tests involving initial age of microtransaction-based game exposure could be that such spending tendencies are gradually embedded but manifest themselves later in life when conditions such as increased disposable income are met. But it could also be simply due to players who started earlier accumulating a larger spending aggregate, situating them in higher spending categories.

The First Spend

As noted in the Results chapter, Younger Players are somewhat reluctant to spend beyond their first purchase, with the majority remaining moderate spenders (Spenders within IQR). The results also indicate that for Older Players, the perceived effectiveness of the first purchase is associated with actual spending behaviour, with those attributing an increased likelihood of spending more across multiple microtransaction-based games clustering in the Whales category. These findings underscore the importance of understanding how players perceive the value of The First Spend and how this shapes their future financial investment in microtransaction-based games, especially among Older Players who exhibit more significant engagement after their first purchase. However, it is also possible that Whales attribute more importance to their first purchase retrospectively, rather than the first purchase being the catalyst for increased spending.

The analyses on The First Spend suggest that overall, this phenomenon plays at least a small role in further expenditure. This has been observed in the participants' actual spending behaviour. The participants themselves seem to be cognizant of this, as indicated by the self-report item. However, a test between the self-report measures and actual spending patterns showed a discrepancy, suggesting that Whales seem to attribute a lot of power to The First Spend as a

catalyst for their subsequent patronage (see *Table 26*). When examining the Whales' raw amount spent on their initial transaction in proportion to regular spenders, there was no statistically significant difference (*see Table 27*). This could be due to cognitive bias, such as the *placebo effect*, where participants attribute more influence to something than it actually has (Scribbr, n.d.). Or perhaps the amount spent on this initial transaction is not necessarily important, but rather that it occurs in the first place. This could explain why many microtransaction-based games offer low-cost starter bundles for new players, as illustrated in *Figure 1*. By lowering the initial psychological barrier to spending, The First Spend might serve as a gateway, creating psychological investment without requiring substantial initial financial investment, subtly nudging players towards more future purchases.

However, what can be inferred from these analyses is that The First Spend does seem to be associated with future spending, although this relationship is weak, explaining little about overall spending behaviour on its own, the rest being due to variance.

Gaming Platform

The results on gaming platforms are interesting, as one might expect Mobile players to make up the primary revenue source of the microtransaction market. After all, these games are often referred to as “Mobile games”. Despite this, results seem to position PC players as making up the biggest portion of spenders. This finding is similar to that in my undergraduate dissertation (Galea, 2023). However, now it is being supported by a much larger sample, and it seems consistent for both Younger and Older Players.

One hypothesis for this outcome is that microtransaction-based games, such as Gacha games, are often available on Mobile as well as PC. These versions would

be similar, but the technical specifications of the devices they run on tend to change the gaming experience, with the Mobile versions often having graphical trade-off optimisations to improve stability and smoothness despite the limitations of the device. In comparison, PCs usually allow for an enhanced experience with a combination of better graphics, which a large portion of the participants consider to be a major reason for playing, as indicated in *Figure 7*, and also better performance overall. Perhaps this leads to a more immersive, monetised gaming experience, resulting in the most dedicated players gravitating towards the PC version. Overall, these findings seem to be supported by the pre-existing literature and projections that have been documenting the slow and steady expansion of the PC gaming market (Rosier et al., 2025).

However, these analyses do not indicate a platform that is statistically significantly more popular among Whales. But it does indicate Younger F2P players prefer Mobile. This is supported by the Reasons for Playing section in the Results chapter, where some players included portability convenience as a reason for playing microtransaction-based games.

These findings contradict assumptions that mobile ecosystems have streamlined the spending experience involving in-app purchases. However, what seems to have been expedited by Mobile services such as the Google Play Store and Apple App Store is the procurement of free applications, allowing users to conveniently try different games on a pocketable device. While PC players seem to spend more as individuals, perhaps a significant portion of mobile players can be considered *butterflies*, small, infrequent spenders that make up a significant portion in total sales volume (Kotler et al., 2019).

Opinions on Microtransactions

As interpreted from *Tables 31* and *32* of the Results chapter, opinions on microtransaction mechanics appear to be associated with overall spending among Younger and Older Players. However, what is interesting is that, as can be interpreted from *Table 33*, these views do not seem to be significantly associated with the spending category participants are part of; being F2P does not necessarily imply players dislike microtransactions as a mechanic, and being a Whale does not necessarily imply that they like the mechanic. This supports the Reasons for Playing discussion in this chapter, which, based on the results, posits that other factors draw in and sustain players' attention. Based on this, the intuitive assumption to increase the likelihood of achieving success in endeavours requiring sustained attention, whether it be financial success in video games or achieving learning outcomes, is to appeal to such intrinsic motivations.

Material Distortion

This study's results highlight what seems to be a concerning trend. Players who think they only "sometimes" spend more than planned seem to spend similar amounts to those who do acknowledge frequent confusion. Perhaps this is logical, as when players underestimate purchases due to Material Distortion, this accumulates to a substantial sum over time. However, this could also be attributed to *central tendency bias*, where respondents are hesitant to provide extreme answers (Akbari et al., 2024).

As previously discussed in the Age subsection of this chapter, one possible hypothesis as to why Younger Players are less likely to become outliers (Whales) is that their financial activity is monitored by third-party gatekeepers. While spending on

microtransactions is not necessarily problematic, the results on Material Distortion are worrying as they indicate that a significant portion of Whales may not necessarily be outliers by choice.

These findings, combined with those inferred from *Table 4*, can be reasonably interpreted as one component of Older Players spending more stemming from a lack of external inhibition systems that warn them when they have spent more than planned.

Bronfenbrenner's (1994) *Ecological Systems Theory* situates individual development in a context of interconnected environmental systems. Using this theory as a framework for discussion, Young Players tend to have a strong *microsystem* in their caretakers. Perhaps for Older Players, who may lack this immediate oversight, individual-level solutions that limit spending to a user-defined budget may be useful. This could either be an in-game warning or something arranged via banking features. Crucially, these findings provide an empirical basis for *macrosystem*-level interventions such as the policies suggested by the BEUC (2024) and CPC against practices that confuse, mislead or exploit players in their expenditure; both citations explicitly targeting obfuscated pricing as an exploitative practice (EC, 2025a). These analyses also serve to highlight the importance of financial literacy education, both for the gaming context and beyond.

Another hypothesis is that players who only sometimes spend more than planned have a tendency to generally spend more overall, with currency obfuscation accounting for a small amount of the variance in spending.

Engagement with Non-Microtransaction Games

This component of the questionnaire was meant to examine whether there are any significant spending differences among those who exclusively play

microtransaction-based games and those who also play games that do not have this mechanic. However, the group distribution was too one-sided for meaningful comparative analysis. What is interesting about this component is that within this sample, the majority of microtransaction video game players also play other games. This suggests that for most participants, microtransaction-based games are not consumed exclusively, but rather form part of a broader gaming hobby.

Psychological Traits of Participants

This section discusses the results of tests involving spending across psychometric variables. In some tests, the results from this section subverted expectations, such as FoMO not being statistically significant, while others supported existing notions, as discussed in the BIS subsection of this chapter.

FoMO

The results of this study argue that, despite what seems to be the consensus, one's generalised susceptibility to the FoMO phenomenon does not seem to strongly influence spending behaviour in either age group or even in intergroup spender categories. There could be many reasons behind this outcome. Perhaps FoMO, as an individual personality trait, does not necessarily influence spending in microtransaction-based games as is commonly believed. Alternatively, microtransaction-based games might stimulate a related, yet more specialised phenomenon among players who are not necessarily predisposed to FoMO, and therefore, it is not captured by this generalised tool. This is supported by Shibuya et al. (2019), which posits that increased microtransaction expenditure is a byproduct of long-term play, slowly changing players' relationship with the game over time. It could also be a case of sampling bias. Participants were committed enough to join

the dedicated communities from which they were recruited. Therefore, it is not unreasonable to assume that they have heard of FoMO and have developed alternative coping strategies to rectify the effects of this phenomenon.

SUSCEP

This study's findings suggest that generalised influenceability does not significantly drive spending behaviour in either age group or intergroup spending category. Neither does the pressure to conform to behaviours or expectations as indicated by the SNI score. However, the results do indicate that Older Players may be more likely to make spending decisions based on the information or advice they receive from others, as indicated by the SII score.

These results are similar to those of my undergraduate dissertation, as neither the subscale of normative influence nor the total composite SUSCEP score correlated with spending (Galea, 2023). Additionally, the SII correlated weakly in both. In fact, the statistical significance of seeking knowledge in relation to spending is one of the reasons behind this follow-up study. The concept is education-adjacent and has interesting implications.

However, the findings of that study indicated an inverse relationship; this study observed a positive one. This could be explained by the smaller sample size of the undergraduate study, limiting the generalisability of those findings. Overall, the undergraduate study was not rigorous in exploring intergroup differences among different age groups and spending categories, which makes for a more nuanced discussion in this study.

While this relationship was not observed with Younger Players, Older Players seem to have an increased willingness to seek information from others before spending. This could be considered a positive, as it denotes informed consumerism

among Older Players. A systematic literature review discusses the willingness to learn as an important predictor of success. It discusses how such attitudes may permeate every aspect of life. While education is thought to benefit from such attitudes, perhaps this could be a case of education itself instilling such attitudes. This could explain this study's SII findings, as the difference in results across age groups could simply be attributed to a confounding variable of educational attainment. Based on conjecture, Older Players are more likely to have higher levels of educational attainment, as a good portion of the Young Players in this sample were secondary school age, which presents a bottleneck for that age group. However, it would have been interesting to directly investigate whether the level of education might be correlated with this tendency to seek out information.

BIS

BIS has demonstrated the strongest associations with microtransaction expenditure across all the variables investigated in this study. These findings are not unexpected. Microtransactions have been scrutinised for exploitative practices that prey on weak inhibitions. While the overall findings of this study have indicated that individuals are complex and their actions are not strongly dictated by singular factors such as FoMO, it seems that buying impulsivity plays a significant role in purchase decisions, or lack thereof.

These analyses also illuminate the issue by indicating a lack of correlational difference between the age groups. As far as BIS is concerned, it appears as the score increases, so does the likelihood of spending more in microtransaction-based games. Even the correlation coefficient is similar, indicating a similar strength in the relationship. These findings are supported by both the literature and intuition. As discussed earlier in this dissertation, the brain seems to fully develop by age 25, with

the prefrontal cortex responsible for higher-order executive functioning tending to be the last of the brain structures to develop (Johnson et al., 2009; Ward, 2025). Inhibition is one such executive function which could explain statistical significance among Younger Players. Although the findings suggest a similar correlation among the Older Players as well. If buying impulsiveness is to be considered an innate trait unbound by age, this is to be expected considering that, by definition, those with higher BIS are more likely to spend in general, regardless of whether they are Younger or Older (Bearden et al., 1989).

CNFU

The outcomes of the analyses of this variable were interesting. Foundational theories in the field of psychology, such as Erikson's (1950) Theory of Psychosocial Development, posit that, in general, it is the earlier stages of life that grapple most significantly with conflicts of Identity vs Role Confusion, with the general notion being that as individuals grow, they develop a stronger sense of self. This appears to contrast with these findings, as one would expect that in the process of identity formation, adolescents would want to distinguish themselves. However, these results can be interpreted through literature that discusses how adolescents want to fit in, which could also imply being averse to standing out (McElhaney et al., 2008). This would be congruent with social and evolutionary psychology theories that discuss how, in general, people have an ingroup tendency and rejection triggers negative emotions as an evolutionary vestige of ostracisation being tantamount to death in early human history (Hampton, 2010; Workman & Reader, 2008). While these theories do not fully explain the results of these analyses, as there was no inverse relationship, at the very least, this could explain why Younger Players might not go out of their way to spend more to stand out.

Regarding the Older Players group, these results indicate that, unlike their Younger counterparts, they do not seem to be averse to standing out but rather welcome it. Perhaps their environment rewards innovation and uniqueness, sometimes even offering a competitive edge in the labour market, whereas adolescent environments may tacitly discourage such expression. While efforts are being made in the education system through national strategies (Vella & Borg Saliba, 2023) to move away from the traditional *banking model* of education and to encourage expression of uniqueness, it is difficult to deny the persistence of the industrial roots of schooling (Freire, 1970).

Conclusion

This study's findings provide a comprehensive and nuanced picture. Exploring participants' motivations, these findings support the idea of gamification in education across age groups. While the end goals of video game developers and educators differ, both gamified systems and recent developments in pedagogy seem to tap into similar underlying psychological constructs of motivation to evoke interest and ultimately achieve goals. An overlap is observed between video game and education literature, including concepts of autonomy, competence and relatedness, which are considered innate psychological needs in SDT.

The findings also support the notion that microtransaction-based games are systemically designed to nudge players towards spending through various psychological and marketing strategies. Industry-standard game design implementations, such as The First Spend and Material Distortion, seem to be effective. Additionally, buying impulsiveness seems to extend to the digital gaming context as well.

However, these findings also elucidate these games are a source of entertainment, a medium for community engagement and socialisation between friends and family, and a catalyst for learning and even exercising. They allow those unwilling or unable to spend money on traditional video games to have access to the pastime. Therefore, it would be reductionist to simply label such games as entirely problematic. Denouncing them and suggesting a call to ban is likely not the solution, as not all microtransaction-based games share the same ethos. As discussed in my undergraduate dissertation, it would be analogous to outlawing alcohol because of its potential to cause harm.

At the same time, the vulnerable, such as young people and those with a predisposition for spending beyond their means, should be protected. Regulations that the entire industry must abide by to protect consumers, such as those suggested by the CPC (EC, 2025a), could be effective. But education plays a crucial role. Financial literacy is a protective factor useful not only in video games but in life in general. Additionally, teaching healthy coping strategies could impart competencies that keep individuals away from impulsive buying or other addictions to deal with stress in non-destructive ways.

Chapter 6: Conclusion

This study investigated psychological and behavioural correlates of microtransaction spending, comparing and contrasting Younger (< 25) and Older (≥ 25) players. This quantitative analysis yielded several interesting findings. Firstly, Older Players were found to spend significantly more on average than their Younger counterparts, disputing the notion that financial vulnerability to microtransaction mechanics is a phenomenon dominated by youth. Another notable finding is that BIS was strongly associated with increased expenditure across both groups, suggesting that microtransaction mechanics effectively exploit deficits in impulse control. Social factors also seem to play a role with Older Players exhibiting a distinct pattern, where microtransaction spending was associated with consumer information-seeking behaviours (SII) and a drive for social differentiation through purchases (CNFU). Crucially, this data indicates that susceptibility to such financial risks is a lifelong challenge rather than merely a developmental phase that is outgrown.

Implications of Findings

The findings of this study underscore the importance of understanding the psychological and behavioural predictors of microtransaction spending, particularly among Younger Players. By identifying buying impulsivity as a significant factor, this research not only highlights the potential vulnerability of Younger consumers to monetisation strategies that exploit impulsive tendencies, but also Older Players' susceptibility. Whether impulsivity is a stable trait or one cultivated by persuasive game design, these findings reinforce the principle that education systems and policymakers have a responsibility to protect the most vulnerable populations.

From an educational standpoint, such insights could inform curriculum development. This topic is particularly relevant to PSCD and similar subjects with a digital and financial literacy and safety orientation. The psychometric constructs explored (FoMO, SUSCEP, BIS and CNFU) are inextricably linked to the personal and social competencies taught in PSCD. Educators may already be aware of such susceptibilities, but designing lessons that promote critical consumption and self-regulation when engaging with online media and games meets young people in the context where they spend a good portion of their time. Awareness of tactics such as Material Distortion, where in-game conversion obscures real-world currency, can empower students to recognise manipulative marketing techniques and make informed decisions.

Additionally, this study supports the idea of gamification, as the principles that drive engagement and spending in digital games can be ethically repurposed in educational settings to elicit intrinsic motivation and resilience. Gamification promotes learning by facilitating learners' shift from a self-limiting *fixed mindset*, where mistakes and shortcomings are perceived as the insurmountable limitation of ability, towards *growth mindset,* whereby mistakes are perceived as a constructive springboard for further learning and success (Woolfolk, 2020). This optimal level of stress creates ideal conditions for learning.

As this dissertation suggests, very similar mechanisms that stimulate monetary investment could, when applied prudently, encourage alternative expressions of motivation; psychological investment in learning, manifested as sustained attention and academic achievement instead of financial expenditure. Moreover, the study's insights extend to adult education and lifelong learning, as Older Players demonstrated very similar inclinations towards gamified systems.

Finally, the increasing prevalence of digital games, especially among children and adolescents, underscores the utility of these implications. For example, in Malta, where students as young as primary school receive government-issued devices to supplement learning, exposure to digital games, and eventually microtransaction-based games on personal devices, is nigh inevitable (Bonanno, 2025; Malta Digital Education Portal, n.d.). Integrating consumer awareness and ethical digital literacy into education thus becomes necessary. As the French concept of *noblesse oblige* implies, those in positions of power, such as educators, legislators, and developers, carry a moral obligation to protect the most vulnerable in society, such as (but not limited to) the youth. Equipping them with the knowledge to protect themselves is one way to achieve this; this dissertation argues it is the most practical and essential one.

Given the industry's position that the ethically questionable practices discussed in this dissertation are foundational in the success of these games and the likelihood that legal regulations will take time and be heavily contested (Bird&Bird, 2025; Datta, 2025; EGDF & VGE, 2025; Kaleva, 2025; Osborn, 2025; Shibuya et al., 2019), the individual-level educational approach is perhaps the single most effective strategy, and a parallel necessity to the regulatory actions being proposed by the BEUC (2024) and CPC (EC, 2025a).

Limitations

This study is not without limitations. The international nature of the study introduced logistical challenges related to currency reporting. The decision to use the Euro (€) as a standardised reference point required respondents using other currencies to convert their expenditure manually. This may have increased the

chance of response error. Additionally, it was not conducive to a user-friendly experience. In retrospect, this process could have been automated through backend currency conversion algorithms during data analysis to enhance precision and user experience. It is also important to mention how the study component was biased towards English-speaking participants.

A critical limitation concerns the variable regarding the estimated total expenditure. It is widely documented in the literature that individuals are notoriously inaccurate when it comes to approximation due to cognitive biases (Kahneman, 2011; Tversky & Kahneman, 1974). There were other variables in this study which presumably suffer from this same limitation, such as the variable concerned with the amount of time spent playing these games. However, the spending total variable is the most crucial to acknowledge, as a large portion of the study component hinged upon it. Despite increasing the likelihood of systematic error, in consideration of this study's commitment towards ethical research design and reluctance to ask for overly sensitive information, this approximation was deemed acceptable for such exploratory analysis.

The sampling method also had its limitations. Although convenience sampling was a practical way to reach a diverse player pool with the limited time and resources available to the study, it limits the broader application of the findings (McCombes, 2019). Such convenience samples tend to draw individuals who are already well connected to gaming communities, therefore involved enough to notice and act on recruitment notices (Etikan et al., 2016). This naturally creates a sampling bias towards dedicated players. More casual, fringe, or infrequently active players are likely underrepresented in every crucial way; therefore, it is prudent to assume that the results of this study are not generalisable to all players.

Another limitation is that, despite the study situating itself within the field of education, data on educational attainment was not collected. This was deliberate. The rationale behind this omission was twofold:

1. It would be an unfair metric for comparison between Younger and Older Players, since a sizable portion of the Younger Players were presumed to be in secondary school, a bottleneck in the educational attainment ceiling imposed due to age.
2. On the ethical grounds of not collecting any more data than necessary.

Retrospectively, this would have been interesting and relevant to the research questions, even if comparison was presumably only sensible within the Older Players group. Collecting this data in future research could enrich understanding of how formal education levels interact with spending behaviour within microtransaction-based games.

Technical expertise was also a limiting factor. While the analysis was robust, given the relatively large dataset, the study could have benefited from more advanced analytical techniques, such as the construction of accurately fit regression models that are representative of the natural world.

Lastly, this dissertation primarily aimed to investigate and cross-reference, rather than to introduce new theoretical concepts. The principles of gamification in pedagogical design are well established in the literature. This study contributes by bridging educational psychology and consumer behaviour, discussing parallels between the motivational mechanisms in learning and digital games.

Strengths

Despite these limitations, this study also possesses several notable strengths. It was an ambitious undertaking in scope with a robust working sample size of 1,265 participants. The study achieved a level of representation that is uncommon in local research at this level. The sample was also international and therefore heterogeneous; this diversity may strengthen the generalisation of the findings, as it captures a wider range of cultural and contextual attitudes toward gaming and spending. The large sample size also enhanced the statistical power of the analyses, reducing the likelihood of type II errors in most analyses carried out, increasing confidence in the observed relationships.

Another strength is that this project is a derivative of my undergraduate dissertation, which focused on Gacha games, a subset of microtransaction games involving randomised rewards. The present study deliberately builds on that foundation, addressing previous limitations, extending the inquiry to broader microtransactions and incorporating a larger, more diverse sample. Additionally, by building upon previous personal experience with this methodology, a stronger grasp on quantitative fundamentals has been achieved, resulting in a deeper level of quantitative analytical rigour through a more comprehensive application of statistical methods.

A strength relevant to the course this study is in partial fulfilment of is that it does not stop at the investigation of potential correlates of microtransaction spending; there is also an interpretation of findings within an educational framework, bridging theory and practice by linking consumer behaviour to pedagogical relevance.

Finally, this study is not just the culmination of what has been learned in this postgraduate program. It is the pinnacle of a varied academic history combined with personal interests. There is integration of educational theory gained from this course, but also theories and insights from undergraduate psychology and sixth-form level marketing, consumer rights, and computer science, representing a meaningful interdisciplinary contribution.

Future Research

Future research could build upon this work by refining methodological and analytical approaches. A deeper understanding of regression model fitting and advanced statistical analysis could enhance the precision in relation to the specific variables explored in this study. Additionally, expanding to other variables could lead to the identification of stronger correlates of spending within the microtransactions context.

Longitudinal designs would also be interesting. Instead of cross-sectionally analysing two different populations, which does not necessarily account for differences in populations, the same samples' exposure to microtransaction-based games, impulsivity, decision-making, and digital spending habits could be catalogued over time.

Exploration through the lens of qualitative analysis could uncover nuance by identifying common themes within differences or similarities between age groups or through phenomenological exploration in terms of thought processes and perspectives situated within a context of lived experience. This would especially be interesting for studying Whale players, who are often categorised as outliers. While quantitative analysis, the methodology used in this study, is a strong scientific tool

that, given the right conditions, could lead to generalisable findings, when it comes to the social sciences, there is an important and incalculably complex human element that would be difficult to mathematically analyse.

This topic would also benefit from meticulous multimodal analysis, where games of interest are chosen as case studies, and specific in-game assets, such as menus leading up to microtransactions, are intricately studied.

Finally, future studies could explore educational interventions designed to mitigate risky spending behaviours; for example, whether consumer literacy modules reduce susceptibility to monetisation strategies.

Conclusion

Beyond answering core research questions, the selection of this area was fundamentally driven by personal interest. Students and researchers may labour under the misapprehension that there is a fundamental disconnect between their passions and field of study. This research demonstrates that with a degree of contemplation and creative integration, a unique and meaningful research contribution may be possible. Ultimately, and beyond the contribution towards the fields of gaming and education, this study's enduring hope is to embolden such passion-driven research, both local and international, across multiple disciplines, not just in the areas of education or video games.

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Appendix A: Psychometric Tests Author Approval

L-Università ta' Malta

Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Permission to use FoMO Scale for University Study

3 messages

Aymen Galea <aymen.mahouachi.20@um.edu.mt> 2 July 2024 at 14:37
To: andy.przybylski@oii.ox.ac.uk

Dear Prof. Przybylski,

I hope this email finds you well. I am a Master's in Teaching and Learning student from the University of Malta.

I am currently working on my dissertation and I am once again considering utilising your work for my research.

I wanted to ask if I could get permission to make use of the Fear of Missing Out Scale for my study.

Thank you.

Regards,
Aymen Galea

Aymen Galea <aymen.mahouachi.20@um.edu.mt> 31 July 2024 at 19:34
To: andy.przybylski@oii.ox.ac.uk

Dear Prof. Przybylski,

I hope this email finds you well. I am writing to bring attention to my previous email in case it was missed.

Thank you.

Regards,
Aymen Galea
[Quoted text hidden]

Andrew Przybylski <andy.przybylski@oii.ox.ac.uk> 31 July 2024 at 19:35
To: Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Please do.

Prof. Dr. Andrew K. Przybylski
University of Oxford

From: Aymen Galea <aymen.mahouachi.20@um.edu.mt>
Sent: Wednesday, July 31, 2024 6:34:32 PM
To: Andrew Przybylski <andy.przybylski@oii.ox.ac.uk>
Subject: Re: Permission to use FoMO Scale for University Study

[Quoted text hidden]

Permission to use scales from the Handbook of Marketing Scales

4 messages

Aymen Galea <aymen.mahouachi.20@um.edu.mt> 2 July 2024 at 14:13
To: rgn3p@virginia.edu

Dear Prof. Netemeyer,

I hope this email finds you well. I am a Master's in Teaching and Learning student from the University of Malta.

I am currently working on my dissertation and I am once again considering utilising some of your work for my research.

I wanted to ask if I could get permission to make use of some of the scales published in the Handbook of Marketing Scales.

Thank you.

Regards,
Aymen Galea

Netemeyer, Richard G (rgn3p) <rgn3p@virginia.edu> 2 July 2024 at 15:41
To: Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Yes……you have my permission.

Best,

RN

[Quoted text hidden]

Aymen Galea <aymen.mahouachi.20@um.edu.mt> 1 August 2024 at 18:41
To: "Netemeyer, Richard G (rgn3p)" <rgn3p@virginia.edu>

Dear Prof Netemeyer,

Thank you very much for the reply. Additionally, I would like to confirm if you are able to grant this permission on behalf of all coeditors of these scales (specifically, the co-editors of the Susceptibility to Interpersonal Influence scale).

If any additional permissions or formalities are required from the other coeditors, please let me know how I should proceed.

Thank you.

Regards,
Aymen Galea

[Quoted text hidden]

Netemeyer, Richard G (rgn3p) <rgn3p@virginia.edu> 1 August 2024 at 20:21
To: Aymen Galea <aymen.mahouachi.20@um.edu.mt>

yes

[Quoted text hidden]

L-Università ta' Malta

Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Permission to use BIS

2 messages

Aymen Galea <aymen.mahouachi.20@um.edu.mt> 31 July 2024 at 19:27
To: dennis.rook@marshall.usc.edu

Dear Prof Rook,

I hope this email finds you well. I am a Master's in Teaching and Learning student at the University of Malta. I am currently working on a dissertation and would appreciate it if I could make use of some of the scales features in the Handbook of Marketing Scales.

I am writing to request permission to use the Buying Impulsiveness Scale in my research. Additionally, I would like to confirm if you are able to grant this permission on behalf of all coeditors of this scale. If any additional permissions or formalities are required from the other coeditors, please let me know how I should proceed.

Thank you for your time and consideration. I look forward to your response.

Regards,
Aymen Galea

Rook, Dennis <rook@marshall.usc.edu> 31 July 2024 at 20:02
To: Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Dear Aymen,

Please consider this email permission to use the Rook and Fisher Buying Impulsiveness scale. This has been sufficient for many years! Good luck with your research.

Regards,

Dennis Rook

From: Aymen Galea <aymen.mahouachi.20@um.edu.mt>
Sent: Wednesday, July 31, 2024 10:27 AM
To: Rook, Dennis <rook@marshall.usc.edu>
Subject: Permission to use BIS

[Quoted text hidden]

L-Università ta' Malta

Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Permission to use CNFU

2 messages

Aymen Galea <aymen.mahouachi.20@um.edu.mt> 1 August 2024 at 18:23
To: glhunte@ilstu.edu

Dear Prof Hunter,

I hope this email finds you well. I am a Master's in Teaching and Learning student at the University of Malta. I am currently working on a dissertation and would appreciate it if I could make use of some of the scales features in the Handbook of Marketing Scales.

I am writing to request permission to use the Consumer's Need for Uniqueness Scale in my research. Additionally, I would like to confirm if you are able to grant this permission on behalf of all coeditors of this scale. If any additional permissions or formalities are required from the other coeditors, please let me know how I should proceed.

Thank you for your time and consideration. I look forward to your response.

Regards,
Aymen Galea

Hunter, Gary <glhunte@ilstu.edu> 1 August 2024 at 18:29
To: Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Dear Aymen,

You are quite welcome to use the Consumers' Need for Uniqueness Scale as part of your research. All we ask is you cite the source of the scale.

Thank you!

Gary

Gary L. Hunter, PhD

Interim Chair and Professor

Department of Marketing

Illinois State University

ph: 309.438.7262

From: Aymen Galea <aymen.mahouachi.20@um.edu.mt>
Sent: Thursday, August 1, 2024 11:23 AM
To: Hunter, Gary <glhunte@ilstu.edu>
Subject: Permission to use CNFU

You don't often get email from aymen.mahouachi.20@um.edu.mt. Learn why this is important

This message originated from outside of the Illinois State University email system. Learn why this is important

Note: The full CNFU scale was only used in the pilot survey and was replaced with the CNFU-S in the full study.

L-Università ta' Malta

Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Permission to use CNFU-S

Zalaznik, Maja <maja.makovec@ef.uni-lj.si> 14 November 2024 at 07:54
To: Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Aymen, of course you can use the scale. For the permissions of other authors pls refer to them (generally I do not see a problem to use it).

Maja

[Quoted text hidden]

L-Università ta' Malta

Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Permission to use CNFU-S

2 messages

Aymen Galea <aymen.mahouachi.20@um.edu.mt> 19 November 2024 at 16:01
To: MBADEAN@broad.msu.edu

Dear Prof Ruvio,

I hope this email finds you well. I am a Master's in Teaching and Learning student at the University of Malta. I am currently working on a dissertation.

I am writing to request permission to use the short-form iteration of the Consumer's Need for Uniqueness Scale in my research. Additionally, I would like to confirm if you are able to grant this permission on behalf of all coeditors of this scale. If any additional permissions or formalities are required from the other coeditors, please let me know how I should proceed.

Thank you for your time and consideration. I look forward to your response.

Regards,
Aymen Galea

Broad.MBA.Dean <mbadean@broad.msu.edu> 25 November 2024 at 03:35
To: Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Hello, you have permission to use the scale.

Good luck,

Ayalla

Dr. Ayalla A. Ruvio
Associate Dean of MBA and Master's Programs

Broad College of Business
Michigan State University
632 Bogue Street, Room N520
East Lansing, MI 48824
W: 517-432-2322

WHO WILL MAKE BUSINESS HAPPEN?
Spartans Will.

[Quoted text hidden]

L-Università ta' Malta

Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Permission to use CNFU-S

Zalaznik, Maja <maja.makovec@ef.uni-lj.si> 25 November 2024 at 10:54
To: Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Dear Aymen, responses below.

Kindest regards, Maja

From: Aymen Galea <aymen.mahouachi.20@um.edu.mt>
Sent: Monday, November 25, 2024 9:58 AM
To: Zalaznik, Maja <maja.makovec@ef.uni-lj.si>
Subject: Re: Permission to use CNFU-S

Dear Dr Zalaznik,

I hope this email finds you well. I am pleased to let you know I managed to get permission to use this scale. I am writing this as I wished to clarify a few aspects of the scale:

1. Order of Questions: Does the order in which the items are presented to participants affect the reliability or validity of the results? Depends what you want to do – you can do both.
2. Are there any recommended best practices regarding the arrangement of items? We did not work on this - in this case.

3. Scoring Instructions: Should the responses be summed or averaged for each subscale and the overall score?

Usually averaged.

Also, are there any items that require reverse scoring? If so, could you kindly specify which items should be treated this way? Just look at the statements (positive or negative).

3. Likert Scale: I understand that the CNFU-S uses a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Could you confirm if this is the correct format? YES.

[Quoted text hidden]
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Appendix B: Survey Distribution Permission from Administrators/Gatekeepers

Email Correspondence

L-Università ta' Malta

Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Permission to Distribute Survey Amongst Gacha Society Members

2 messages

Aymen Galea <aymen.mahouachi.20@um.edu.mt> 9 October 2024 at 12:16
To: "pinnuo.du@city.ac.uk" <pinnuo.du@city.ac.uk>

Dear President of the City Gacha Society,

I hope this email finds you well. My name is Aymen Galea, and I am a student at the University of Malta currently working on my dissertation, which explores the topic of microtransactions in gaming. As part of my research, I am conducting an anonymous questionnaire to gather insight on users' experiences and perspectives regarding this subject.

I believe the members of the City Gacha Society would be an ideal group to participate in this study, given their interest in gaming and related activities. I am writing to request the permission of the Gacha Society committee to distribute this questionnaire to your members, through means such as the Society's official Discord server.

Please note that participation is completely voluntary, and all responses will be kept anonymous. No identifying information will be collected, and the data will be used solely for academic purposes.

If you require any additional details or documentation regarding my research, I would be happy to provide them. I appreciate your time and consideration and look forward to your response.

Thank you in advance for your support.

Best regards,
Aymen Galea

UG-Du, Pinnuo <Pinnuo.Du@city.ac.uk> 9 October 2024 at 15:57
To: Aymen Galea <aymen.mahouachi.20@um.edu.mt>

Hi Aymen Galea,

Thanks for your email, I approve that you can distribute the questionnaire to Gacha Soc members.

Kind regards,
President of Gacha Society - Pinnuo Du

From: Aymen Galea <aymen.mahouachi.20@um.edu.mt>
Sent: Wednesday, October 9, 2024 11:16:31 am
To: UG-Du, Pinnuo <pinnuo.du@city.ac.uk>
Subject: Permission to Distribute Survey Amongst Gacha Society Members

[Quoted text hidden]

Reddit Outreach Message

Dear moderators,

I hope this message finds you well.

I am a student at the University of Malta, and I am currently working on a dissertation relating to Microtransactions/Gacha games. As part of this research, I am to distribute an anonymous questionnaire relating to this topic, which I think is of interest to this community.

I am writing to you to ask for permission to distribute my survey to the members in the near future.

Thank you.

Note: Template message used when reaching out to Reddit community administrators. Online usernames redacted for privacy purposes across Reddit correspondence.

Reddit Moderator Correspondence

r/gachagaming MOD to [redacted] • 1 yr. ago

Hello! Yes, we would allow this to be posted here. Just please make sure that you include the [PROMO] tag at the beginning of your post title and use the General post flair.

It would also likely be helpful to include details in the post body that cover both what questions are planned to be asked, as well as what information (if any) needs to be collected.

Let us know if you have any questions!

r/TheSilphRoad MOD to [redacted] • 1 yr. ago

Dear [redacted],

feel free to post your questionnaire on our subreddit! We just ask for you to give us a heads-up right before you post, so we can make sure it makes it through auto-moderation without getting stuck and we can post a sticky to it that explains to the users that we approved your post! :)

We wish you good luck with your questionnaire, research, and dissertation and would love it if you shared your results and finished paper with us in the end, if at all possible!

r/pokemongo MOD to [redacted] • 1 yr. ago

Hello [redacted]

Can you send us the questionnaire so we may review it?

Have a nice day

[redacted] to r/pokemongo • 1 yr. ago

Thank you for the reply. This is the survey: https://forms.gle/[redacted]

The research aims to examine an array of factors that may influence spending in different age groups.

Thank you.

r/pokemongo MOD to [redacted] • 1 yr. ago

You may post your survey in the group.

Afterwards please reply here with the link to your post so we can give it a little stamp of approval.

Have a nice day

r/PokemonMasters MOD to [redacted] • 1 yr. ago

You're more than welcome to! Let us know if any issues come up with posting the link so we can fix it in case automod act up and removes it.

r/FGO MOD to [redacted] • 10 mo. ago

Yes you can. I can pin the post if you would like

r/RaidShadowLegends **MOD** to [redacted] • 10 mo. ago

Hi there,

Thanks for asking permission. You can feel free to post your questionnaire - I assume that it's a link to another site where you're hosting the survey?

r/battlecats **MOD** to [redacted] • 8 mo. ago

Sure, I think this is fine

r/NikkeMobile **MOD** to [redacted] • 8 mo. ago

Hi, that's fine. Good luck with he study!

r/limbuscompany **MOD** to [redacted] • 8 mo. ago

Hi,

Thank you for your message.
We are happy for you to post this provided sufficient information is given to users about the research.

Let us know if there's an issue!

r/Reverse1999 **MOD** to [redacted] • 8 mo. ago

Hello!

Yes, you are welcome to conduct a survey here. Please include your academic information and research purpose in your post. Also specify the duration of your survey (when the questionnaire collection period would be ended)

We would appreciate if you could share your findings later on.

Thank you for your cooperation

r/Reverse1999 Mod team

r/SoloLevelingArise **MOD** to [redacted] • 8 mo. ago

Hey mate, yeah sure you can do that as long as it doesn't violate the rules of the forum.

r/DBZDokkanBattle **MOD** to [redacted] • 8 mo. ago

You're fine to post it.

Just make sure you put [Permission granted by mods] in the title so people don't report the post.

Appendix C: Information letter

Dear Sir/Madam,

My name is Aymen Galea and I am a student at the University of Malta, presently reading for a Master's in Teaching and Learning. I am presently conducting a research study for my dissertation titled Consumer Behaviour in Young Consumers of Video Games with Microtransactions; this is being supervised by Dr Lucianne Zammit (lucianne.zammit@um.edu.mt) and Dr Olga Bogolyubova (o.bogolyubova@fgga.leidenuniv.nl). This letter is an invitation to participate in this study. Below you will find information about the study and about what your involvement would entail, should you decide to take part.

The aim of my study is to explore potential predictors of purchase behaviours within games with microtransactions and the potential differences across different age groups. Your participation in this study would help contribute to a better understanding of the underlying personality and interpersonal factors that may encourage or perhaps discourage players from spending money and how these may differ between the youth and adult populations. Any data collected from this research will be used solely for purposes of this study.

Should you choose to participate, you will be asked to provide some general information about yourself such as gender, age and approximate income. You shall also be asked questions about your personality characteristics, spending and gaming habits. Data collected is also anonymous.

Data collected will be anonymous and treated confidentially. All data will be stored securely in the University of Malta. Only my supervisors and I will have access to the data.

Participation in this study is entirely voluntary; in other words, you are free to accept or refuse to participate, without needing to give a reason. You are also free to withdraw from the study at any time, without needing to provide any explanation and without any negative repercussions for you.

If you choose to participate, please note that there are no direct benefits to you. Your participation does not entail any known or anticipated risks.

Thank you for your time and consideration. Should you have any questions or concerns, please do not hesitate to contact me by e-mail aymen.mahouachi.20@um.edu.mt; you can also contact my supervisors via email:

Sincerely,

Aymen Galea

aymen.mahouachi.20@um.edu.mt

Dr Lucianne Zammit

lucianne.zammit@um.edu.mt

Dr Olga Bogolyubova

o.bogolyubova@fgga.leidenuniv.nl

Appendix D: Parental Consent and Assent

My name is Aymen Galea and I am currently reading for a Master's in Teaching and Learning at the University of Malta.

I am currently conducting research that aims to explore potential predictors of purchase behaviours within games which involve microtransactions (purchases within games) and how these may vary across different age groups. The survey that you have been invited to complete forms part of this study. This will take you approximately 20 minutes to complete. Any data collected from this survey
will be used solely for purposes of this study and any publications resulting from it. There are no direct benefits or anticipated risks in taking part. Participation is entirely voluntary, i.e., you are free to accept or refuse to participate.

At no point will you be asked to provide your name or any other personal data that may lead to you being identified. Your IP address will not be collected. Furthermore, you may skip over any questions that you do not wish to answer.

If you wish to participate in this study, please click the "I agree to participate" button. If not, please close the browser window (or click "I do not wish to participate").

Should you have any questions or concerns, you may contact myself or my supervisor on the details provided below.

Yours Sincerely,

Aymen Galea

aymen.mahouachi.20@um.edu.mt

Dr Lucianne Zammit

lucianne.zammit@um.edu.mt

Research Supervisor

Dr Olga Bogolyubova

o.bogolyubova@fgga.leidenuniv.nl

Research Supervisor

Declaration by Respondent

I hereby confirm that:

If I am 18 years of age or older, I am participating voluntarily and with full informed consent on the conditions listed above.

OR

If I am a minor, by returning the completed questionnaire, my parent or legal guardian consents to my participation, and I understand and agree (assent) to participate in the study as described. Completing and submitting this anonymous questionnaire implies acceptance of these terms.

- I agree to participate – begin survey
- I do not wish to participate – exit the survey

Appendix E: Final Iteration of Questionnaire (Annotated)

Sociodemographic Information and Gaming Behaviour Questions

1. Please indicate your gender:
    - Female
    - Male
    - Other

2. Please indicate your age:

3. Please indicate your country of origin:

4. If different from above, please indicate your country of residence:

5. How satisfied are you with the (financial) situation of your family?

Not at all satisfied									Very satisfied
1	2	3	4	5	6	7	8	9	10

For the purposes of this questionnaire, "*microtransactions*" refers to small, optional purchases made within video games to unlock additional content, features, or virtual items. These types of purchases are often found in games that are free to download or start playing. These include Gacha games. Other terms for games involving microtransactions may also include *free-to-play games*, *mobile games*, *freemium games*, etc.

6. Which of the following best describes your relationship with free-to-play games?
    - I actively play/played only one free-to-play game
    - I actively play multiple free-to-play games
    - I no longer play free-to-play games
    - I have never played a free-to-play game

7. On average, how much time do/did you spend on free-to-play games in a day?
    - Less than 1 hour
    - 1-2 hours
    - 2-4 hours
    - 4-6 hours
    - 6+ hours

8. Approximately, at what age did you first start playing games containing microtransactions?

9. Approximately, how much money (real-world currency) have you spent on free-to-play games in total? €___

10. If more than €0, do you remember how much money you spent on your first purchase on free-to-play games?
    - Yes, I remember: €___
    - No, I do not remember

11. Since making this first purchase, did this make you feel more inclined to spend money on free-to-play games?
    - Yes, it made me more likely to spend money on free-to-play games in general.
    - Yes, it made me more likely to spend money within that specific game where the first purchase occurred.
    - No, it did not have an effect on my spending on free-to-play games.

12. What platform do you primarily use when playing free-to-play games?
    - PC
    - Mobile
    - Gaming Console

13. What is the reason/s why you play/played free-to-play games? (more than one can be chosen)
    - They are free to download
    - They are frequently updated with more content
    - The game I like/liked happened to have microtransactions
    - For the microtransaction/Gacha aspect itself
    - My friends play the same/similar games
    - The intriguing story/narrative elements
    - Sensory elements within the game such as art, graphics, character aesthetics, music
    - To collect all the characters/items
    - To engage with the community
    - To reduce stress
    - To be better than others at the game
    - Because I have already spent money on the game
    - I find satisfaction in constantly improving my account
    - The daily login bonus/rewards are important to me
    - Other: _____

14. What do you think of the microtransaction element in video games?
    - I like the microtransaction aspect
    - The microtransaction aspects do not affect me
    - I dislike the microtransaction aspect

15. Do you find that converting real money to in-game currency (e.g. Genesis Crystals, Oneiric Shards, Originite Prime, Lunite, and *other relevant examples*) makes it easier to spend more than originally planned?
    - Yes
    - No
    - Sometimes

16. Do you play other types of video games (not involving microtransactions)?
    - Yes
    - No

The following questions will shift from focusing specifically on microtransactions and/or Gacha games to more general questions about your behaviour, emotions, and psychological traits. Please continue to answer each question honestly and to the best of your ability. These general questions will help us understand broader patterns that may relate to your experiences with microtransactions, but they are not limited to that context.

Fear of Missing Out Scale (Przybylski et al., 2013)

Permission to use: This scale is provided free for personal and academic use. Permission also granted by Prof Przybylski via email.

Instruction to Participants: Below is a collection of statements about your everyday experience. Using the scale provided please indicate how true each statement is of your general experiences. Please answer according to what really reflects your experiences rather than what you think your experiences should be. Please treat each item separately from every other item. 1 = ‘‘Not at all true of me’’, 2 = ‘‘Slightly true of me’’, 3 = ‘‘Moderately true of me’’, 4 = ‘‘Very true of me’’, and 5 = ‘‘Extremely true of me’’.

Fear of Missing Out - The degree to which one feels apprehension that others might be having rewarding experiences from which they are absent.					
	1	2	3	4	5
I fear others have more rewarding experiences than me.					
I fear my friends have more rewarding experiences than me.					
I get worried when I find out my friends are having fun without me.					
I get anxious when I don’t know what my friends are up to.					
It is important that I understand my friends ‘‘in jokes’’.					
Sometimes, I wonder if I spend too much time keeping up with what is going on.					
It bothers me when I miss an opportunity to meet up with friends.					
When I have a good time it is important for me to share the details online (e.g. updating status).					
When I miss out on a planned get-together it bothers me.					
When I go on vacation, I continue to keep tabs on what my friends are doing.					

Susceptibility to Interpersonal Influence Scale (Bearden et al., 1989, 2011)

Permission to use: Granted by Prof Netemeyer via email.
Instruction to Participants: Mark your responses for each statement on a Likert scale where 1 referred to strongly disagree and 7 meant strongly agree.

Consumer Susceptibility to Interpersonal Influence - One's tendency to identify with or enhance one's image in the opinion of significant others through the acquisition and use of products and brands, the willingness to conform to the expectations of others regarding purchase decisions, and/or the tendency to learn about products and services by observing others or seeking information from others.							
Susceptibility to Normative Influence - One's tendency to comply to social norms regarding products, services, and brands; subscale of consumer susceptibility to interpersonal influence scale.	1	2	3	4	5	6	7
If I want to be like someone, I often try to buy the same brands that they buy.							
It is important that others like the products and brands I buy.							
I often identify with other people by purchasing the same products and brands they purchase.							
I rarely purchase the latest fashion styles until I am sure my friends approve of them.							
I often identify with other people by purchasing the same products and brands they purchase.							
When buying products, I generally purchase those brands that I think others will approve of.							
I like to know what brands and products make good impressions on others.							
If other people can see me using a product, I often purchase the brand they expect me to buy.							
Susceptibility to Informational Influence - One's tendency to learn about products, services, and brands by seeking information from others; subscale of consumer susceptibility to interpersonal influence scale.							
I often consult other people to help choose the best alternative available from a product class.							
To make sure I buy the right product or brand, I often observe what others are buying and using.							
If I have little experience with a product, I often ask my friends about the product.							
I frequently gather information from friends or family about a product before I buy.							

Impulsiveness: Buying Impulsiveness Scale (Rook and Fisher 1995)

Permission to use: Granted by Prof Rook via email.
Instruction to Participants: Mark your responses for each statement on a Likert scale where 1 referred to strongly disagree and 5 meant strongly agree.

Impulsiveness: Buying Impulsiveness Scale - One's tendency to buy spontaneously, unreflectively, immediately, and kinetically.					
	1	2	3	4	5
I often buy things spontaneously.					
"Just do it" describes the way I buy things.					
I often buy things without thinking.					
"I see it, I buy it" describes me.					
"Buy now, think about it later" describes me.					
Sometimes I feel like buying things on the spur of the moment.					
I buy things according to how I feel at the moment.					
I carefully plan most of my purchases.					
Sometimes I am a bit reckless about what I buy.					

Consumers' Need for Uniqueness: Short-form (Ruvio et al., 2008)

Permission to use: Granted by Dr Ruvio and Prof Zalaznik via email.
Instruction to Participants: Mark your responses for each statement on a Likert scale where 1 referred to strongly disagree and 5 meant strongly agree.

Consumer's Need for Uniqueness - One's tendency of pursuing differentness relative to others through the acquisition, utilization, and disposition of consumer goods for the purpose of developing and enhancing one's self-image and social image					
Creative Choice/Counterconformity	1	2	3	4	5
I often combine possessions in such a way that I create a personal image that cannot be duplicated.					
I often try to find a more interesting version of run-of-the-mill products because I enjoy being original.					
I actively seek to develop my personal uniqueness by buying special products or brands.					
Having an eye for products that are interesting and unusual assists me in establishing a distinctive image.					
Unpopular Choice/Counterconformity					
When it comes to the products I buy and the situations in which I use them, I have broken customs and rules.					
I have often violated the understood rules of my social group regarding what to buy or own.					
I have often gone against the understood rules of my social group regarding when and how certain products are properly used.					
I enjoy challenging the prevailing taste of people I know by buying something they would not seem to accept.					
Avoidance of Similarity					
When a product I own becomes popular among the general population, I begin to use it less.					
I often try to avoid products or brands that I know are bought by the general population.					
As a rule, I dislike products or brands that are customarily bought by everyone.					
The more commonplace a product or brand is among the general population, the less interested I am in buying it.					