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# Virtual Temptation: Fear of Missing Out, Protection Motivation and their Joint Impact on Loot Box Behavior

## Research Paper

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**Abstract.** In today's video gaming landscape, loot boxes are a common feature that allows gamers to enhance their gaming experience with special items or characters. By purchasing loot boxes, gamers can receive advantages in the game, through items that have objectively better properties. This study explores the mechanisms behind the loot box purchase intention in multiplayer games by conceptualizing a framework based on the social fear of missing out and factors from the Protection-Motivation Theory. Data collected from 205 gamers of multiplayer games was analyzed using ordinary least squares multiple regression. The findings reveal that social fear of missing out and protection motivation contribute to gamers' intentions to purchase loot boxes. These results highlight the validity of concerns regarding loot boxes, as social and individual, game-related factors can influence purchase behavior, warranting further investigation.

**Keywords:** Fear of Missing Out, Loot Boxes, Protection Motivation Theory, multiplayer games, e-Sports.

## 1 Introduction

E-sports and video games are creating a steadily growing global market. In 2024 this market is predicted to reach a revenue of \$282.3bn USD. This revenue is expected to increase by 8.76% to a volume of \$363.20bn USD in the upcoming three years (Statista, 2024). Some video games feature the option to buy loot boxes, which offer the chance to improve skills in the game while the purchase increases the publisher's revenue.

Loot boxes offer a range of additional content for the games, from purely cosmetic items to game-impacting exclusive items. They can usually be bought with real-world currency and typically contain a mix of useful or valuable items for the gamers and less useful items. What makes them controversial is that the outcome of the box is unknown to the gamer, and usually, only the rarest items are the advertised, desirable outcomes. One of the most prominent gaming publishers using a loot box system is Electronic Arts (EA). EA is mostly known for its famous multiplayer sports game series like "FIFA/EA FC" (soccer), "Madden NFL" (football), and "NHL" (ice hockey). Those games use loot boxes with "pay-to-win" elements. Pay-to-win means the possibility of

gaining in-game advantages, like better players, which otherwise are (nearly) unobtainable. The loot boxes in the games are found in the highly popular Ultimate Team game mode. In the loot boxes, in-game players who have objectively better skills can be obtained. The chances of drafting objectively better players are lower than drafting not-as-good players (Electronic Arts, 2021, 2022). This incentive is further enhanced as Ultimate Team is the official e-sports game mode. Additionally, loot boxes are also increasingly attracting political attention. Countries such as the Netherlands or Belgium have banned them as a whole or partly (Drummond et al., 2019). Generally, offering loot boxes in a game is a highly controversial business practice.

To better understand the gamers' loot box purchase intention it is necessary to understand the complexity behind multiplayer games. In multiplayer games, gamers are interacting with the game by themselves and also, on a socially, with other gamers.

Social interactions between gamers involve playing against each other as well as sharing and viewing achievements. Loot boxes tempt gamers with the potential content they offer and trigger a fear of missing out (FoMO) the positive experience that others have while playing with that content. FoMO emerged in the context of social media (Przybylski et al., 2013) and is characterized as the fear that others experience worthwhile events from which oneself is absent (Przybylski et al., 2013). While previous research in the information system (IS) discipline focused on FoMO in the field of social media or smartphone usage (Abel & Buff, 2016; Al-Saggaf & O'Donnell, 2019; Przybylski et al., 2013), little is known about the influence of FoMO in a gaming context.

While loot boxes shape the social dynamic between gamers, they also influence the individual experience they have with the game. If gamers do not purchase loot boxes, they potentially miss out on available content and experiences with the game. In marketing, potentially missing out on a product-related experience is associated with the consumers' fear of regret and a need to protect against the prospect of missing out on the product-related experience (Good & Hyman, 2021). As we anticipate more protection motivation influencing purchase intention, we also included the protection motivation theory (PMT) in our research model, as it postulates that individuals are motivated to protect themselves from perceived threats with coping strategies.

FoMO is driven by external social factors and PMT is driven by internal cognitive processes. Therefore, the present combines FoMO and PMT as framework for the case of loot boxes in video games by attempting to investigate the question:

*RQ: How do social FoMO and protection motivation influence loot boxes purchase intention?*

To answer this question, we created an online survey in which 205 gamers were asked about their motivation and intention for buying loot boxes in multiplayer games. Our results contribute to IS in two ways. First, we are able to show that both factors, the social (FoMO) and individual game-related ones (PMT), are significant in the context of gaming. Gamers in multiplayer games do not want to miss out on the interaction between gamers nor the interaction of themselves and the game. We contribute to theory advancement by utilizing PMT to provide a new perspective on players' decision-making processes in relation to loot box purchases. By combining PMT and FoMO, we expand the theoretical understanding of how individuals assess threats and coping

mechanisms, and provide insights into the psychological underpinnings of loot box engagement. Second, our research provides a starting point for future research targeting the ethics of loot boxes in gaming and e-sports. Ethical consequences arise in connection with the influences that affect gamers' purchasing decisions. We identify that gamers fear to miss on interaction and want to protect themselves against this. We propose that it is essential to understand the underlying mechanisms behind the purchase decision considered by publishers, governments and policy makers. In games that are targeting gamers of all ages, our findings are relevant for the protection of minors.

## **2 Theoretical Background**

### **2.1 Fear of Missing Out**

The concept of FoMO was first introduced by Przybylski et al. (2013). In their research, FoMO is described as the situation when an individual fears that others will have more rewarding experiences than the individual themselves or that others will experience something good from which the individual is absent (Przybylski et al., 2013).

For the individual, FoMO is related to a variety of negative consequences. It has been linked to problematic social media usage, depressive symptoms, less mindful attention, and physical symptoms, such as stress (Baker et al., 2016; Beyens et al., 2016; Elhai et al., 2016; Oberst et al., 2017; Przybylski et al., 2013). Research in psychology pointed out that FoMO can predict addiction to social media (Blackwell et al., 2017).

FoMO in previous research (Przybylski et al., 2013) is primarily linked to social interactions that can be missed out on. However in marketing, fear appeals and a possible protection motivation are suggested to provoke FoMO for a more product-related cause (Good & Hyman, 2021; Hodgkinson, 2019). The suggested protection motivation against missing out on product purchases (Good and Hyman, 2021) is grounded in PMT.

### **2.2 Protection Motivation Theory**

What a person fears and perceives as a threat is highly individual, and anything can be feared. Not participating on something subjectively important through inaction can be threatening for some people and is therefore feared (Good and Hyman, 2021, Richard et al., 1996). Fear is a strong motivator that influences human action and is supposedly even more important than reason (Williams, 2012). People can fear a variety of situations, and therefore act to prevent negative effects on their well-being (Williams, 2012). Stimuli that trigger fear can consequently eliminate established response patterns that would lead to harmful consequences by establishing an alternative pattern that might prevent the bad consequences (Rogers, 1975).

According to PMT, an individual can activate a protection motivation when a situation poses a threat in order to deal with the threat. Thus, a conclusion is drawn as to whether the possible solution will be enacted or not (Good & Hyman, 2021; Rogers,

1975, 1983). In IS, PMT has been studied in the area of IS security to explain behavior (Herath & Rao, 2009; Moody et al., 2018; Pahnla et al., 2007).

PMT offers an explanation of how fear and the components of fear appeals can lead to behavioral change by building a protection motivation (Rogers, 1975). If an individual is confronted with a potential threat, two mechanisms come into effect. Those mechanisms are the threat and coping appraisal processes (Rogers, 1983). Within the framework of these two processes, there are different constructs that can have an effect. In the threat appraisal process, the individual evaluates three components to estimate the overall level of threat: First, the severity of the threat; second, the vulnerability to the threat; and third, the maladaptive rewards, or benefits, of not acting against the threat (Rogers, 1983). High severity and vulnerability positively affect the protection motivation, while the maladaptive rewards are negative for the protection motivation.

In the coping appraisal process, the individual evaluates how good a response to the threat is by assessing three components. Firstly, self-efficacy, i.e. how capable the person considers themselves to be of carrying out the required response. Secondly, response efficacy, i.e. how high the perceived effect against the threat is, and thirdly, the costs and barriers to carrying out the response to the threat (Rogers, 1983). Both self-efficacy and response efficacy act positive towards the protection motivation while the costs and barriers have a negative effect. Both processes are theorized to lead to a combined protection motivation. If it is strong enough, protection motivation leads to actual behavioral change (Rogers, 1983).

PMT is crucial for understanding loot box purchases in games as it provides a framework for analyzing decision-making processes. PMT explains how players evaluate and react to perceived threats, such as financial losses or benefits, associated with loot boxes. It assesses the severity of these threats and players' susceptibility to these threats (threat appraisal) as well as their ability to cope with these threats through effective responses and self-control (coping appraisal).

### **3 Hypothesis**

FoMO and PMT are different but complementary concepts. FoMO is a phenomenon of social anxiety in which people fear that others will have rewarding experiences without them. It focuses on the emotional impact of feeling left out and the desire to stay connected with others. PMT, on the other hand, is a psychological theory that explains how individuals respond to threats by adopting protective behaviors. The main difference between the two theories is that FoMO deals with social and emotional drivers motivated by the fear of exclusion and the need for social inclusion, whereas PMT deals with cognitive evaluations of threats and the motivation to protect oneself from perceived risks. While FoMO is driven by external social factors, PMT is driven by internal cognitive processes.

Based on previous literature on FoMO (Przybylski et al., 2013) and the theoretical lens of PMT (Rogers, 1975, 1983), we developed a contextualized research model that represents gamers' loot box purchase intention. Multiplayer games include interactions of the gamer with the game and with their competitors. Building on social media research,

FoMO can provide insights on the social interaction of gamers in regards to their loot box purchase intention in multiplayer games. The factors based on PMT are theorized to provide additional information regarding the individual experience of the gamer and the game, identifying additional underlying mechanisms of a loot box purchase intention in a multiplayer game. In addition to the social and individual, game-related factors, we controlled for the demographic variables gender and age.

At the time of our research, the games FIFA, Madden NFL, and NHL included a comparable loot box system (EA as publisher), relevant for Ultimate Team, one of their most popular multiplayer game modes. The loot boxes allow gamers to spend real-world currency to get a chance to obtain rare players for their team, equipped with objectively superior performance values. If gamers choose to play Ultimate Team mode, they have no influence on who they compete against in the competitive ladder besides their in-game ranking. Gamers who spend real-world currency and buy loot boxes play on the same competitive ladder as those who do not purchase them.

### **3.1 Social Factors**

First, we address social factors according to FoMO. Gamers in a multiplayer context want to continually stay connected with what others are doing (Przybylski et al., 2013). In a multiplayer game, gamers can easily see how their friends and others play the game. Especially in e-sports broadcasts it is shown how professionals play and discussed why they play with certain in-game players. Consequently gamers may feel that they are missing out on an experience that others have that is more rewarding. Especially if opponents have objectively better in-game players due to loot box purchases, playing against them might not be fun for either side without comparatively strong in-game players. Subsequently, the more gamers feel that they are missing out, the more inclined they are to buy loot boxes so they do not miss out in the future. We therefore hypothesize:

H1: An increased FoMO leads to a higher intention to purchase loot boxes.

### **3.2 Individual Game-related Factors**

Second, we address individual, game-related factors according to PMT. PMT aspects previously have been suggested in marketing literature in to influence customers' decisions, related to missing out on the purchase of a product and the upcoming protection motivation to protect against the fear of missing out (Good & Hyman, 2021; Hodgkinson, 2019). Good in-game players available in the loot box have an objective advantage over the players that are obtainable without buying the loot boxes. Gamers who play Ultimate Team without utilizing loot boxes are at a competitive disadvantage when they play against gamers with superior players, obtained from loot boxes. Without purchasing loot boxes the gamer would miss out on the experience of playing with better (e.g., faster, more durable, better at shooting) in-game players. In the case of equally skilled gamers, the gamer with the objectively superior in-game players is expected to win. Subsequently the individual in-game experience of winning can be compromised due to the lack of purchased loot boxes.

Thus, we expect that gamers perceive the prospect of playing without the use of loot boxes to be a severe threat to their own individual experience. Gamers who perceive the threat of playing without loot boxes as severe may establish a protection motivation against the threat (Rogers, 1983). In order to follow their protection motivation, they are expected to be inclined in their buying intention towards loot boxes. We therefore hypothesize:

H2: An increased severity of the threat to play without loot boxes leads to a higher intention to buy loot boxes.

When gamers play Ultimate Team, their gaming experience depends on the composition of their team. For players looking to build a serious profile or enter competitive esports, the risk of a diminished gaming experience becomes more apparent if they choose not to purchase loot boxes. This vulnerability to a potentially negative gaming experience without loot boxes may lead players to mitigate this risk by purchasing loot boxes (Rogers, 1983). We therefore hypothesize:

H3: An increased vulnerability to the threat of playing without loot boxes increases the intention to buy loot boxes.

Playing Ultimate Team without loot boxes means playing without the advantageous content included in them (Lemmens, 2022). In particular this means to play with average free-to-play in-game players. The players with the desired and advantageous features (e.g. faster) are locked behind loot boxes. However, the chance of obtaining the desired players through loot boxes is still random. Therefore, gamers who purchase loot boxes cannot be sure that the purchase will lead to their desired improvement. If players feel threatened to play without the advantageous loot box players, they may be inclined to buy loot boxes (Good and Hyman, 2021, Richard et al., 1996). Therefore, gamers with a higher response efficacy may demonstrate a higher purchase intention. We hypothesize:

H4: Increased response efficacy to the threat of playing without loot boxes leads to a higher intention to buy loot boxes.

Buying loot boxes is not possible for every gamer. For example, the cost of loot boxes may be too high for some (James et al., 2022), while for others, the process of buying and selecting one of the various available loot boxes may be too challenging. If gamers can buy loot boxes and they do not experience barriers, they may have a higher intention to do so. We therefore hypothesize:

H5: An increased self-efficacy in the loot box buying process leads to a higher intention to buy loot boxes.

H6: Higher perceived costs and barriers to buying loot boxes lead to a decreased intention to purchase loot boxes.

Finally, the intensive purchase of loot boxes can cause financial issues for the gamers (Garrett et al., 2022). While some gamers have the money to buy loot boxes, they could rather benefit from it by not spending it on loot boxes but on other things. If they perceive that the benefits of saving money or spending it on other things outweighs the benefits of buying loot boxes, they may have a lower intention to purchase loot boxes. Subsequently we hypothesize:

H7: A higher perceived reward of not spending money on loot boxes leads to a decreased intention to purchase loot boxes.

## 4 Methodology

We surveyed gamers from games with similar loot box business models to test our hypotheses. The survey was published on MTurk and hosted by Qualtrics. To recruit the target group, the participants had to pass the screening criteria (1) play one of the games, FIFA, Madden NFL, or NHL, and (2) play the Ultimate Team Mode, where loot boxes are available to participate in the survey. Participants on MTurk were filtered based on established quality criteria. We only allowed participants with a >95% HIT approval rate and >5000 HITs completed (Peer et al., 2014). A total of 1070 hits were counted for the survey, of which 286 participants passed the selective screening questions and completed the survey. In order to ensure high data quality, we performed established data cleaning methods. We removed participants failing more than 50% of the attention checks (Harmon & Walden, 2021) and participants who were straight-liners (Cram et al., 2020). The data cleaning was carried out in accordance with the recommendations for dealing with participants from the Mturk platform (Hauser et al., 2019). We had to remove 81 participants, leaving us with a final sample of N = 205 participants who passed all criteria.

The measured constructs were adapted from former research and shown in Table 1. They were measured by 7-point Likert scales ranging from “1 = Totally Disagree” to “7 = Totally Agree”. We controlled for age, gender and whether the participants previously purchased ultimate team packs.

**Table 1.** Construct Overview

Construct	Reference	Sample Item
Costs and Barriers (4 Items)	Milne et al. (2002)	The costs of buying an Ultimate Team Pack(s) outweigh the benefits.
Intention to Buy (4 Items)	Animesh et al. (2011)	I intend to purchase Ultimate Team Pack(s).
Response Efficacy (4 Items)	Milne et al. (2002)	Buying an Ultimate Team Pack(s) will improve my team.
Rewards (4 Items)	Myyry et al. (2009)	Not buying Ultimate Team Packs saves me time
Self-Efficacy (4 Items)	Johnston and Warketin (2010)	Buying an ultimate team pack is something I am capable doing
Severity (4 Items)	Johnston and Warketin (2010)	If I would not buy an Ultimate Team Pack(s), the consequences would be serious for my gaming experience.
Social FoMO (9 Items)	Przybylski et al. (2013)	I fear others have more rewarding experiences than me.
Vulnerability (4 Items)	Johnston and Warketin (2010)	I am at risk for having a negative gaming experience when I don't purchase an Ultimate Team Pack(s).

We used ordinary least squares (OLS) multiple regression in SPSS (version 29) to conduct our analysis. Based on the Harman's one-factor test, no common method bias could be identified.



## 5 Results

The participants were of varying ages, with an average age of 32.82. Of our total sample of 205 participants, 60 identified as female and 145 as male. Table 1 summarizes the statistical measurements of our constructs.

**Table 2.** Statistical Measurements

Construct	Mean	SD
Age	32.82	8.65
Costs and Barriers	4.86	1.40
Intention to Buy	5.12	1.30
Response Efficacy	5.60	0.89
Rewards	4.86	1.23
Self-Efficacy	5.76	0.75
Severity	4.97	1.33
Social FoMO	4.58	1.15
Vulnerability	4.94	1.36

For the measures, no multicollinearity issue with a correlation of over 0.8 could be identified (Kraemer et al., 2005). The linear regression model, which evaluates the hypothesized relationships, is displayed in Table 2. It has a significant  $R^2$  value ( $F = 28.798$ ,  $p < 0.001$ ).

**Table 3.** Multiple Linear Regression Model

Construct	Coefficient	Std. Error	Hypothesis	Supported
Costs and Barriers (H6)	-0.245***	0.062	H6	Yes
Response Efficacy (H4)	0.250*	0.097	H4	Yes
Rewards	-0.152*	0.071	H7	Yes
Self-Efficacy (H5)	0.178 <sup>+</sup>	0.104	H5	Indicated
Severity (H2)	0.169*	0.074	H2	Yes
Social FoMO (H1)	0.592***	0.064	H1	Yes
Vulnerability (H3)	0.001	0.070	H3	No
Age	0.015*	0.007	Control	Significant
Gender	-0.109	0.142	Control	Not Significant
Past Purchase Behavior	0.193	0.193	Control	Not Significant
R-Squared		0.571		
F-Statistic		28.798***		

<sup>+</sup> =  $p < 0.1$ , \* =  $p < 0.05$ , \*\* =  $p < 0.01$ , \*\*\* =  $p < 0.001$

Our results demonstrate a significant positive influence of social fear of missing out on the intention to purchase loot boxes with a unstandardized coefficient (b) of 0.6 with a p-value of less than 0.001, supporting H1. Also, a positive significant effect of severity on the intention to purchase loot boxes ( $b = 0.172$ ,  $p < 0.05$ ) could be identified. The

data supports H2. The results demonstrate a positive significant effect of response efficacy on the intention to purchase loot boxes was measured ( $b = 0.255, p < 0.01$ ), which supports H4. H5, which is concerned with the effect of self-efficacy on the intention to purchase loot boxes received marginal support by the data showing a marginal positive correlation ( $b = 0.192, p < 0.1$ ). A significant negative influence of could be measured by costs and barriers ( $b = -0.251, p < 0.001$ ) as well as rewards ( $b = -0.149, p < 0.05$ ), which supports H6 and H7. Of the included control variables, a positive significant influence on the intention to purchase loot boxes could be identified in age ( $b = 0.016, p < 0.05$ ), while gender did not show a significant influence. A summary of the hypotheses, results and evidence is presented in Table 3.

## **6 Discussion**

### **6.1 Discussion of Findings**

Our results from  $N = 205$  multiplayer gamers demonstrate that both, social factors and individual, game-related factors drawn from PMT show a significant influence on loot box purchase behavior. On the social side, gamers who demonstrated a higher social FoMO had a higher intention to purchase loot boxes (H1). This takes into account that multiplayer gaming is highly social. Gamers are often informed about which in-game players others, especially their friends, use. Especially when multiplayer games are e-sports titles, the publishers are inclined to broadcast the events and provide coverage. Here, gamers directly see what the professional gamers are using and why. Obviously, professional gamers play only with the best in-game players available and a full team can cost around 1700€ in loot box purchases (Rothstein, 2019). The gamers who subsequently perceive a higher social FoMO are more likely to purchase loot boxes because they fear on missing out.

On the individual, game-related side, gamers who perceive a higher severity of the threat of playing without buying loot boxes have a higher intention to purchase loot boxes (H2). The results suggest, that gamers care for their gaming experience and that playing without loot boxes poses a significant threat to their gaming experience because they would have a competitive disadvantage. Gamers who perceive a higher response efficacy against the threat to their game-related experience reported a higher intention to purchase loot boxes (H4). The results, based on PMT, suggest that gamers who perceive buying loot boxes as improvement to their team, will subsequently be able to have a positive interaction with the game, by playing with objectively better in-game players. It becomes evident that gamers value their individual experience with the game and are more willing to purchase loot boxes if they perceive it will improve their experience. Gamers also need to be able to grasp the values of the loot boxes and perform the purchase process. Our results indicate a trend that gamers who reported a higher self-efficacy in the loot box purchase process are more willing to purchase loot boxes (H5). When loot boxes are offered, they are usually offered in various options, each having different benefits for the gamers. Additionally, they are usually not purchasable directly but through a proxy currency. We suggest that this might be confusing for the gamer.

We conclude that if they cannot fully understand the loot box system and purchase process, they tend to be less likely to purchase loot boxes. Costs and Barriers act as factors significantly reducing gamers' intention to purchase loot boxes. If the gamers cannot purchase the loot boxes, because they lack financial resources or their available payment options are not supported, they have a lower intention towards buying loot boxes (H6). Similarly, as demonstrated by the significant effect of rewards for not buying the loot boxes (H7), gamers who see more value in not spending the money on loot boxes will not do so. This might be due to gamers weighing the pros and cons of purchasing loot boxes and making a decision afterwards. Therefore, the perceived loot box value emerges as a key aspect in increasing the purchase intention.

In our results, H3 did not demonstrate a significant influence. The influence of vulnerability may depend on the ambitions of the gamer, as the non-use of loot boxes may not threaten casual gamers to the extent that it will influence the purchase intention. We argue that casual gamers are not as interested in climbing the competitive rankings and are therefore more comfortable with the fact that their in-game team holds them back. This could mean aspiring competitive gamers may be more vulnerable to the perceived impact of loot boxes on their success in the game because they value every advantage they can get to climb the competitive rankings

Further, the significant effect of age on loot box purchase intentions may be dependent on the relationship of age and available leisure time. Older gamers may have more time consuming obligations and less time available to spent in-game. They may have less options to profit from promotions, such as free loot boxes for a certain in-game time, and are more dependent on the content from the purchasable loot boxes.

## **6.2 Implications for Research**

The presented results provide theoretical implications for future research. Our findings demonstrate that individual, game-related factors related to PMT from both, the coping appraisal and the threat appraisal, need to be considered in addition to social factors in the form of social FoMO when researching purchase intention in multiplayer games. Since multiplayer gaming involves interactions among gamers and interactions of the gamer with the game, it is necessary to acknowledge the complex structures. With our research, we emphasize the requirement of a holistic perspective on multiplayer gaming. For future research in the context of products or individual experiences that are at risk of being missed out on, we suggest considering factors of PMT in addition to social FoMO.

Since gamers are used to playing opponents based on a matchmaking system, player skill and in-game team strength should, combined, be equal to the opponent's. Therefore, an experimental approach in which gamers experience a match against the same opponent while using both high- and low-value team compositions could provide valuable and more detailed insights into the severity and vulnerability dynamic of forming protection motivation in multiplayer gaming.

Next to the purchasable ones, in some games, gamers can generate loot boxes by spending time on Twitch streams waiting for so-called "drops." As the time spent obtaining a loot box brings further factors into the dynamic, we suggest widening the

scope on loot boxes in IS research to gain a deeper understanding of the underlying mechanisms. Thus, further investigation should focus on a diverse range of games and more loot box systems, such as loot boxes that do not necessarily increase skill levels but provide so-called skins for aesthetic reasons.

### **6.3 Implications for Practice**

The design and implementation of loot box systems in video games raises important issues for both publishers and gamers. Firstly, publishers should consider their target audience when setting the price of their loot boxes to ensure that prices are not a barrier for their gamers. Loot boxes that are too expensive can deter potential buyers, while those with competitive prices can encourage participation without alienating customers.

Transparency of loot box structures is equally important in promoting player confidence and self-efficacy. Gamers should have a clear understanding of the contents and probabilities associated with each loot box to make an informed purchase decision.

In addition, the effectiveness of loot boxes depends on the perceived value they provide to players. Publishers need to ensure that purchasing loot boxes offers significant in-game benefits, justifying the investment for gamers. Including desirable rewards and incentives in loot boxes can increase the purchase intention and thus encourage gamers to participate and contribute. By offering rewards that outshine alternative methods of acquiring game content, such as saving or earning by playing, publishers can incentivize loot box purchases and increase gamer satisfaction.

Along with the protection motivation, the social aspect of loot boxes plays an important role in gamer engagement. By creating opportunities for social interaction and connection, publishers can capitalize on gamers' inherent desire for social validation and belonging, further motivating them to participate in loot box systems. In summary, minimizing barriers, promoting transparency, improving efficacy and rewards, and encouraging social interaction are essential components for the design of loot box systems.

Our research acts as a starting point for considering ethical and fairness aspects for business models including loot boxes. By shedding light on the mechanisms that influence loot box purchasing decisions, our findings can provide guidance to both publishers and governments. This orientation is crucial, especially when developing measures to protect gamers. The integration of ethical considerations into these business models is of great importance as well, as they ensure the integrity of the gaming environment. Loot boxes are already banned in some countries as they can create the potential for addiction and FoMO and PMT factors can contribute to this. Here, the ethical considerations are needed for the protection of the gamers, especially minors. The temptation of loot boxes, which is often compared to gambling, carries significant risks, including the potential for financial exploitation, impulsive spending and the promotion of addictive behavior. Ethical gaming business practices should prioritize the well-being of players and promote a safe and fair environment. It is therefore also important that gamers are sufficiently educated by publishers and are aware of the underlying mechanics behind loot boxes. Next to the disclosure of transparent odds, the implementation

of spending limits can act as a protection measure, as well as the securing of age-appropriate access. By emphasizing these ethical considerations, our research advocates for a e-sports industry that upholds fairness, transparency and the protection of its community.

Further, in the context of fair sports competitions, it is desirable that the outcome of a game depends on the skills of the gamers and not on their financial investments. The integrity of e-sports is threatened when monetary influence overshadows talent and active engagement, like training. Publishers, like EA, who want to offer a genuine e-sports experience should critically examine whether the introduction of pay-to-win elements such as loot boxes are compatible with ethical standards and the principle of fair play.

## **7 Limitations**

We acknowledge that the present study has some limitations. First, the influence of socioeconomic status on loot box purchasing behavior was not examined in depth. Socioeconomic factors such as income level, education, and employment status can impact a person's likelihood of buying loot boxes.

The presented research is limited in its setting because loot boxes were only investigated in the context of FIFA, Madden NFL, and NHL. In this way, we ensured comparable loot boxes since the games all incorporate the Ultimate Team concept. Different games may introduce loot box systems with different features, rewards, and pricing models, influencing gamers' behavior and attitudes toward loot purchases. Extending the study to a wider range of games would contribute to a more comprehensive understanding of the phenomenon.

## **8 Conclusion**

To summarize, our research aims to shed light on the complex interplay in multiplayer games relevant to the intention to buy loot boxes. We investigated the role of social FoMO and PMT factors on gamers' behavior in the multiplayer gaming context with a survey.

Our results show that social factors in the form of social FoMO and individual, game-related factors from PMT, such as severity and costs and barriers, significantly influence the intention to purchase loot boxes. By demonstrating that both social and individual, game-related factors have a significant influence, our results emphasize the need to take a closer look at loot box purchase behavior. We show that there are psychological mechanisms in the form of FoMO and protection motivation that influence the intention to buy loot boxes. Considering that those mechanisms are effective ways to increase purchase intention and the individual, game-related factors can mainly be influenced by the publishers (e.g., the price and content of loot boxes), we provide a starting point for considering loot boxes from an ethical viewpoint. Further research in this area is essential to develop responsible gaming practices and consumer experience in the rapidly evolving landscape of digital entertainment.

## References

- Abel, J. P., & Buff, C. L. (2016). *Social Media and the Fear of Missing Out: Scale Development and Assessment* (Journal of Business & Economics Research-First Quarter, Issue).
- Al-Saggaf, Y., & O'Donnell, S. B. (2019). *The Role of State Boredom, State of Fear of Missing Out and State Loneliness in State Phubbing* Australasian Conference on Information Systems, Perth.
- Baker, Z. G., Krieger, H., & LeRoy, A. S. (2016). Fear of missing out: Relationships with depression, mindfulness, and physical symptoms. *Translational Issues in Psychological Science*, 2(3), 275-282. <https://doi.org/10.1037/tps0000075>
- Beyens, I., Frison, E., & Eggermont, S. (2016). "I Don't Want to Miss a Thing": Adolescents' Fear of Missing Out and its Relationship to Adolescents' Social Needs, Facebook Use, and Facebook Related Stress. *Computers in Human Behavior*, 64, 1-8.
- Blackwell, D., Leaman, C., Tramosch, R., Osborne, C., & Liss, M. (2017). Extraversion, neuroticism, attachment style and fear of missing out as predictors of social media use and addiction. *Personality and Individual Differences*, 116, 69-72. <https://doi.org/10.1016/j.paid.2017.04.039>
- Cram, W. A., Wiener, M., Tarafdar, M., & Benlian, A. (2020). Algorithmic Controls and their Implications for Gig Worker Well-being and Behavior. ICIS,
- Drummond, A., Sauer, J. D., & Hall, L. (2019). Letters to the Editor: Loot Box Limit Setting: A Potential Policy to Protect Video Game Users With Gambling Problems? *Addiction*, 114, 934-936.
- Electronic Arts. (2021). *Pack Probability in FIFA Ultimate Team*. Retrieved 10.11.2022 from <https://www.ea.com/en-gb/games/fifa/news/fifa-pack-probabilities>
- Electronic Arts. (2022). *FIFA 22 ULTIMATE TEAM ITEM GUIDE*. Retrieved 10.11.2022 from <https://www.ea.com/en-gb/games/fifa/fifa-22/ultimate-team/item-guide>
- Elhai, J. D., Levine, J. C., Dvorak, R. D., & Hall, B. J. (2016). Fear of missing out, need for touch, anxiety and depression are related to problematic smartphone use. *Computers in Human Behavior*, 63, 509-516. <https://doi.org/10.1016/j.chb.2016.05.079>
- Garrett, E. P., Sauer, J. D., Drummond, A., & Lowe-Calverley, E. (2022). Problem gambling and income as predictors of loot box spending. *International Gambling Studies*, 22(3), 432-443.
- Good, M. C., & Hyman, M. R. (2021). Direct and indirect effects of fear-of-missing-out appeals on purchase likelihood. *Journal of Consumer Behaviour*, 20(3), 564-576. <https://doi.org/10.1002/cb.1885>
- Harmon, K. A., & Walden, E. A. (2021). Comparing three theories of the gender gap in information technology careers: The role of salience differences. *Journal of the Association for Information Systems*, 22(4), 1099-1145.
- Hauser, D., Paolacci, G., & Chandler, J. (2019). Common concerns with MTurk as a participant pool: Evidence and solutions. In *Handbook of research methods in consumer psychology* (pp. 319-337). Routledge.
- Herath, T., & Rao, H. R. (2009). Protection motivation and deterrence: a framework for security policy compliance in organisations. *European Journal of Information Systems*, 18(2), 106-125. <https://doi.org/10.1057/ejis.2009.6>

- Hodkinson, C. (2019). 'Fear of Missing Out' (FOMO) marketing appeals: A conceptual model. *Journal of Marketing Communications*, 25(1), 65-88. <https://doi.org/10.1080/13527266.2016.1234504>
- James, A., Gordon, R., & Mills, S. (2022). Between gaming and gambling: Children, young people, and paid reward systems in digital games.
- Kraemer, K. L., Ganley, D., & Dewan, S. (2005). Across the digital divide: A cross-country multi-technology analysis of the determinants of IT penetration. *Journal of the Association for Information Systems*, 6(12), 10.
- Lemmens, J. S. (2022). Play or pay to win: Loot boxes and gaming disorder in FIFA ultimate team. *Telematics and Informatics Reports*, 8, 100023.
- Moody, G. D., Siponen, M., & Pahlila, S. (2018). Toward a Unified Model of Information Security Policy Compliance. *MIS Quarterly*, 42(1), 285-311. <https://doi.org/10.25300/misq/2018/13853>
- Noack, S. (2021). *Geldmaschine Ultimate Team – EA Sports vermeldet neue Rekordzahlen*. Retrieved 10.11.2022 from <https://www.esports.com/de/geldmaschine-ultimate-team-ea-sports-vermeldet-neue-rekordzahlen-220865>
- Oberst, U., Wegmann, E., Stodt, B., Brand, M., & Chamorro, A. (2017). Negative consequences from heavy social networking in adolescents: The mediating role of fear of missing out. *Journal of Adolescence*, 55, 51-60.
- Pahlila, S., Siponen, M., & Mahmood, A. (2007). Employees' behavior towards IS security policy compliance. Hawaii International Conference on System Sciences (HICSS'07),
- Peer, E., Vosgerau, J., & Acquisti, A. (2014). Reputation as a sufficient condition for data quality on Amazon Mechanical Turk. *Behavior research methods*, 46(4), 1023-1031. <https://doi.org/10.3758/s13428-013-0434-y>
- Przybylski, A. K., Murayama, K., Dehaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human Behavior*, 29(4), 1841-1848.
- Rogers, R. W. (1975). A Protection Motivation Theory of Fear Appeals and Attitude Change. *The Journal of Psychology*, 91, 93-114.
- Rogers, R. W. (1983). Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In *Social Psychophysiology: A Sourcebook* (pp. 153-176). Guilford.
- Rothstein, T. (2019). *FIFA 20: Profi verrät, wie viel Geld er in FUT steckt, um gegen Euch Vorteile zu haben*. <https://mein-mmo.de/fifa-20-profi-fut-geld/>
- Statista. (2024). *Video Games - Worldwide*. Retrieved 26.06. from <https://www.statista.com/outlook/dmo/digital-media/video-games/worldwide>
- Williams, K. C. (2012). Fear appeal theory.