MOTIVATIONAL FACTORS ON PURCHASE INTENTION OF IN-GAME HERO SKINS IN MOBA GAMES

Thesis Presented

by

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ABSTRACT:

Multiplayer online battle arena (MOBA) games are increasing in popularity. These MOBA games are known to provide players with in-game purchasable add-ons. However, to date the impact of such in-game purchases, particularly hero skins, on player's motivation is unexplored. We use self-determination theory to develop a survey for measuring players' motivation when purchasing in-game hero skins of Defense of the Ancient 2 and League of Legends. 133 participants were surveyed on multiple factors related to intrinsic and extrinsic motivation, including, competence, autonomy, relatedness, money, rewards, praise, reputation and purchase intention. Results show that competence, praise, and rewards can independently predict the purchase intention and when combining competence, praise and rewards, only competence and praise can influence purchase intention. Thus, our study highlights that player’s competence and need for praise especially influences their intent to purchase in-game hero skins. While further validation is warranted, the survey presented in this thesis can assist to contribute to measuring the motivation on in-game hero skins purchases.
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1. INTRODUCTION

Multiplayer online battle arena games (MOBA; (Yang, Harrison, & Roberts, 2014) are becoming increasingly popular and include games like Dota 2 and League of Legends. Previous work argued that MOBA games could enhance teamwork, competition, and the mastery of sophisticated gameplay experience (Johnson, Nacke and Wyeth, 2015). Also, earlier work showed that MOBA games could provide players with equal opportunities for developing in the gameplay individually, as well as coordinate teams of players to meet shared goals (Tyack, Wyeth and Johnson, 2016). MOBA games are appealing to game companies that want to make revenue, but also provide possibilities for academic research. One feature that makes MOBA games appealing to players are in-game purchases, which extend gameplay and allow for character customization. Among the available in-game purchases, virtual cosmetics are becoming popular among gamers for customizing the appearance of in-game characters (Winn, 2015); these are often referred to as skins or hero skins. Besides allowing to change in-game characters appearance, hero skins also offer extra game features. For instance, players receive extra virtual gold after finishing a gameplay wearing a hero skin.

While hero skins are becoming increasingly popular in MOBA games, players' motivation to purchase hero skins, their use, and their effect on players' perception of gameplay are mostly unexplored. Previous work explored which factors influence microtransaction in MOBA games, and found that achievement, social, and immersion motivation may be influencing factors (Millar, 2017). Furthermore, Millar's (2017) work showed that understanding why players purchase hero skins, and the impact of their use on players' gameplay (and decision-making) may
allow for better design of MOBA games. However, while previous work investigated players' motivation for virtual purchases in various video gaming contexts (e.g., platformer, RPG), few investigated the above in the context of MOBA games (Millar, 2017).

We investigate players' motivation to purchase and use hero skins in MOBA using surveys designed after the basic needs satisfaction in self-determination theory (R. M. Ryan & Deci, 2000). We build our survey using seven point Likert-scales for 34 items, which are grouped based on previous questionnaires measuring the latent factors of intrinsic motivation (Azadvar & Canossa, 2018). From the 34 items in our questionnaire we generate eight factors, including competence, autonomy, relatedness, rewards, reputation, money, praise, and purchase intention. However, after the reliability analysis we account for only five elements, namely competence, rewards, praise, money, and purchase intention. Then, we perform regression analysis to find relationship between motivational factors and purchase intention of in-game hero skins in MOBA games. We contribute the following to MOBA games and studies of motivation: (1) a survey tool for measuring players' motivation for purchasing in-game hero skins in MOBA games and the impact on gameplay, (2) a discussion of how understanding players' motivation for buying in-game extensions can help designing more appealing MOBA games, and (3) a process of learning players' basic needs satisfaction when they purchase in-game hero skins in MOBA games and when they play MOBA games.
2. BACKGROUND

2.1 Intrinsic motivation and self-determination theory

Intrinsic motivation is defined as "doing of an activity for its inherent satisfactions rather than for some separate consequence" or as "the inherent tendency to seek out novelty and challenges" (R. M. Ryan & Deci, 2000a). Deci (1975) suggests that intrinsic motivation may lead people to voluntarily perform actions (e.g., learning to play a musical instrument) without the need for an external rewards (e.g., being paid with money). Moreover, Deci and Ryan (1980) argue that intrinsically motivated people do not need rewards to perform specific tasks (e.g., learning how to play a musical instrument), rather they perform tasks based on their "inherent satisfaction" (i.e., learning to play musical instruments as a self-rewarding activity). Deci (1975), also notices that intrinsic motivation can sometimes be influenced by extrinsic factors, such as deadlines or rewards. However, they also highlight how initially intrinsically motivated behaviours, which become controlled by external factors, may undermine the satisfaction of basic psychological needs, for instance like autonomy.

Self-determination theory (SDT) is "an approach to human motivation and personality that uses traditional empirical methods while employing an organismic metatheory that highlights the importance of humans' evolved inner resources for personality development and behavioral self-regulation" (R. M. Ryan & Deci, 2000a). The SDT encompassesthree basic psychological needs, namely autonomy, competence, and relatedness, which are considered "essential for well-being and psychological growth" (R. M. Ryan & Deci, 2000b). Next, we explain each basic psychological need into further detail.
2.2 Competence

Competence is generally defined as "feeling effective, capable, and optimally challenged" (Ryan & Deci, 2000). Previous work showed that players enduring through the gameplay of specific video games, even if not feeling satisfied by the game, will eventually experience competence, and hence score positively on well-being (Richard M. Ryan, Rigby, & Przybylski, 2006); such results suggest that competence may be related to resilience (Tichon & Tornqvist, 2016).

Previous work defined competence as "a sense of accomplishment and a desire for the mastery of action", and notice that players who have more experience and willing to spend more time playing the game will show higher competence (Melhart, Azadvar, Canossa, Liapis, & Yannakakis, 2019). Several ways can identify high competence. First, insist on playing the game will increase the level of competence (Neys, Jansz, & Tan, 2014). Second, games with high skills and logic will involve with high competence (Azadvar & Canossa, 2018). Third, since players need to get responses from the game to maintain their competence of the game, high satisfaction of challenges and positive feedback can increase the level of competence (Przybylski, Rigby, & Ryan, 2010). MOBA games require high competence because players need to practice several gaming skills, including learning how to control heroes, cast spells, as well as knowing the in-game items.

As such, Johnson, Nacke, and Wyeth (2015) define competence as the "mastery of complex game experience", which can generate positive outcomes in player experience. However, besides acquiring complex gameplay skills, the player experience can be influenced by other factors,
including the purchase of virtual items, such as game extensions (or DLCs), special objects not previously present in-game (e.g., weapons, skins), or additional in-game characters; these may also impact players' competence (Guo & Barnes, 2007). In MOBA games, hero skins are virtual items which can be purchased directly in the virtual game store or used in-game currencies that earned by completing matches in the game. However, not all hero skins can be purchased from the game store. Instead, some of them called exceptional skins are offered within a limit time and event. Therefore, having exceptional skins can increase players' competence since they will feel satisfied with having exceptional skins since not all players can own these hero sets. For instance, in Dota 2, when players equip the rarest skin, it will visually change the hero's spell. The player can use the spell with a new visual effect in the game and let others notice during the gameplay. For instance, before equipping the hero set, the color of the spell is blue. After putting on the hero skins, the color will change to green. Moreover, after purchasing the in-game hero skins, the game will offer several in-game tasks for the players to upgrade this hero's skin. If players complete all the tasks, the hero skin will change color from silver to gold. Rubick Arcana released on 19th December 2019 can be a good example. When players purchased this skin set, it will first change the appearance of the original hero. Then, spells with new special visual effects will be unlocked permanently when players finish the tasks from the hero skins, including wearing the skins to win certain numbers of games and achieve certain numbers of assistance. Players' level of competence will be increased based on the satisfaction and eager of unlocking all the spells with new visuals.
2.3 Autonomy

Autonomy has been defined as a skill that "one can volitionally in accordance with personal values and desires that are harmoniously integrated into social demands and a meaningful impact in one's environment" (Conway & Elphinstone, 2017). Azadvar and Canossa (2018) define autonomy as players playing a game in their preferred way. Also, previous work showed that the more experience and more time players spend playing a game, the higher will be their sense of autonomy (Melhart et al., 2019). There are many aspects that define and impact autonomy in games. Previous work showed that in-game elements like items, game mechanics, and game systems in RPG games such as Zelda and Final Fantasy (Przybylski et al., 2010), may all influence the sense of autonomy in players. Game mechanics, such as combat setting, is an example of fulfilling autonomy because it can lead players to "create strategies" on their own, "select goals" of fighting ways based on their preference (Przybylski, Ryan, & Rigby, 2009). MOBA games let players to choose their own preferred characters when the game starts. Players can choose their character from the characters' pool based on their own analysis of the game, including opponents' hero selections and their roles in the game, such as support or carry. Usually, MOBA games will offer more than 50 characters for players. Moreover, when the hero upgrades each level, players can choose the spell that they want to learn instead of getting skills steady. By choosing players' preferred characters and spells, players can use their ways to create an avatar in the game and this can be referred to as high autonomy (Birk, Atkins, Bowey, & Mandryk, 2016).
Furthermore, customization is part of the autonomy (Cho, 2013). For hero skins in MOBA games, players can customize their skins once they owned them. Ki and Kim (2016) showed in their research that customization, which terms as "seeking personal style," creates a positive relationship with autonomy. Besides purchasing an entire hero skins, in Dota 2, players can one part of the hero skin, such as head, hands, legs and weapon. Therefore, players are allowed to customize their hero skins to achieve their needs for autonomy. Earlier work showed that customization was most relevant to autonomy among three basic psychological needs satisfaction in Self-determination theory (Kim et al., 2015). According to Millar's (2017) analysis of players' perception of skin use, players use skins because to look different in-game and enjoy the process of customization.

2.4 Relatedness

Relatedness pertains creating connections to other players and a feeling of belonging to a specific environment (Ryan and Deci, 2000). Previous work argued that relatedness may generate positive effects on players' enjoyment of a game, as it encourages prosocial behaviors as in "players want to meet new friends and strangers" (Vella, Klarkowski, Johnson, Hides, & Wyeth, 2016). Partala (2011) argues that relatedness is essential in video games like Second Life, highlighting how the level of in-game relatedness may reflect how players' feel relatedness in real-life. Previous work showed that massively multiplayer online games (MMOG) generally require high competence (Ryan, Rigby, and Przybylski, 2006), and that MOBA games may decrease relatedness due to the competitive nature of the game and the difficulties and frustration players go through during the gameplay (Johnson, Nacke, & Wyeth, 2015). However, MOBA
games should promote relatedness, as earlier work show that social interaction can elicit positive motivational connection within players and enhance the virtual purchase on in-game content (Hamari et al., 2017). Ki and Kim's (2016) refer to relatedness as "social consciousness", which may increase players' motivation to purchase expensive in-game extensions to achieve a "higher" status among players of a particular community. Ki and Kim's work may relate to in-game hero skin purchase, which we consider in this thesis, where players may purchase rare hero skins to achieve a higher player status; such players may be inclined to purchase hero skins more frequently than other players in MOBA games, hence showing higher relatedness.

2.5 Extrinsic motivation and Maslow's hierarchy of needs

Extrinsic motivation means that people do things "without inherent satisfaction" and they will finish their tasks "in order to receive something positive or to avoid something negative that is separate from the activity" (Tichon & Tornqvist, 2016). There are three levels of extrinsic motivation: (1) external regulation, (2) introjection, and (3) identification. In this thesis, we focus on external regulation, namely people's extrinsic motivation that is affected by external contingencies, including rewards, fame, praise, and money (Pelletier et al., 1995). Maslow's hierarchy of needs argues that there are five basic human needs: (1) physiological, (2) safety, (3) love, (4) self-esteem, and (5) self-actualization (Maslow, 1943). In MOBA games, we find that needs like self-esteem and love can contrast in certain gaming situations, for instance when high-ranking players may lose ranking when playing together with real-life friends that have lower ranking. Therefore, high-ranking players may start looking for new friends online who collect hero skins as well and keep their ranking. When players start collecting hero skins, the
game will reward players and show their achievements to the community when receiving popular hero skins; this likely increases players' self-esteem. Using in-game purchased hero skin in MOBA games may help increase players' status, including "esteem from self" and "esteem from others" (Taormina & Gao, 2013). In this thesis, we use Maslow's hierarchy of basic human needs to construct the measurement of rewards, reputation, money, and praise in MOBA games.

2.6 Rewards

Rewards turn out to be a powerful motivator (Phillips, Johnson, Klarkowski, White, & Hides, 2018). Rewards can engage players' involvement, contribution, and presence within the game (Johnson et al., 2018). Previous literature showed how rewards brought positive influences on players. Rewards are a great motivation, whether the rewards are clear to see or not (Phillips et al., 2018). On the other hand, Carnagey and Anderson (2005) argues that rewards in violent games can increase players' aggressiveness, including 'aggressive cognition' and 'behavior' within the game. Therefore, rewards can offer both positive and negative influence on player experience.

The reason why players receive rewards varies depending on the type of game. Players will attempt to purchase or use these rewards based on their features, which achieve positive outcomes, such as receiving great comments from teammates and unlocking extra contents. According to Wang and Sun (2012), rewards can be divided into several parts, including earning scores for the scoring system of the game, receiving virtual objects from the game, rare items, and 'positive feedback' fulfilling in-game achievements. Phillips et al. (2013) use Wang and
Sun's model as reference and further detail the model based on gaming rewards, and separate rewards into six variables, including access, (i.e., players can unlock in-game content) facility, (i.e., increased in-game persona), sustenance (i.e., pressure release from the game), glory (i.e., the players' score), sensory feedback (i.e., the affective, visual, aural, or tactile feedback), and positive feedback (i.e., commend and flattery from other players). In MOBA games, after players purchased in-game hero skins, they can receive different rewards. First, in Dota 2, when players buy an arcana hero skin, they can unlock extra visual effects for spells, which can be termed as access rewards. Second, when players wear beautiful skins, they will be noticed by other players who will commend the skins after the game. These praise can be termed as sensory feedback.

2.7 Praise

From the previous literature, Maslow (1943) showed that psychological needs are the factors that people want to get complimented, including love needs, esteem needs, and self-actualization. Compliment, feedback, and praise are used to define the general meaning of praise since it is hard to use the definition to introduce praise (Fanndal, Jóhannsdóttir, & Others, 2017). Starting with the compliment, people use it to increase better images of themselves and make the listeners feel more positive (Danziger, 2018). For the esteem needs, having high esteem can generate several benefits (Baumeister, Campbell, Krueger, & Vohs, 2003). First, people with high esteem are "more likable and attractive" by others (Baumeister et al., 2003). Second, groups will like high-esteem people more and "let them speak up in groups" (Baumeister et al., 2003). In MOBA games, designers generate several features that can let players get complimented. For instance, in Dota 2, players can get commented after the game ends. Their teammates and opponents can
comment on these players for their excellent in-game skills, performance, and character appearance. Players are allowed to display the number of comments in their profile, and the public sees this information.

2.8 Reputation

Pfeiffer et al. (2012) show that the definition of reputation "is public information that summarizes how a person behaves toward others." The research indicates that players are willing to cooperate with others who have a high reputation by using the game called Prisoner's Dilemma (PD). People will be more willing to work with the partner who have the list of previous activities, which can be termed as reputation and additionally, people are eager to teamwork with partners who offer a full list of former events even though the cost of the collaboration is high (Bolton, Katok, & Ockenfels, 2005). Therefore, having a good reputation can let more other players receive assistance when they have trouble in the game.

Furthermore, reputation is surrounded by social relations (Ritzer, 2007). Previous study designed an experience between the buyer and the seller in the online freelance marketplace, and the outcome showed that the buyers "place significant weight on seller reputation" (Yoganarasimhan, 2013). Therefore, when a player increases their reputation in the game, it will attract others to have business trade with them. "A good reputation is a valuable currency," which can be increased from social interactions and can be delivered to other social groups (Semmann, Krambeck, & Milinski, 2005). Hence, having a high reputation will allow players to make more friends in the group and the team which they desire to join in the future. Reputation influences in business field as well. The bank who has a high reputation will have more
underwriters spread than the bank, who has a low reputation (Fernando, Gatchev, May, Megginson, & Others, 2015). That is, industries or people with a high reputation will let others consider more reliable than those with losing status. Transferring to the game world means that players will be more willing to trust players who have a high reputation. Previous study showed that reputation can determine whether players need cooperation or not and can also avoid players to be a minority (Brandt, Hauert, & Sigmund, 2003).

2.9 Money

"Monetary incentives" is a commonly used way to motivate people (Bonner & Sprinkle, 2002). Within the video games, making profits of currency is another extrinsic motivation for players (Blair, 2011). When virtual items are useful for players, they will own a price in the real world (Urschel, n.d.). Based on the MOBA game world, money is the benefits that players can receive once they purchase the in-game hero skins. In Dota 2, players can trade their hero skins directly from a third-party website. Since some skins are time-limited and released with a tiny amount, players who love the skin but do not have chances to own them are willing to pay more money to purchase from other players. Therefore, generating profits is a feature that purchasing in-game hero skins can offer for the players. Besides the real-time making, players can also receive virtual currency after they are buying the in-game hero skins. In League of Legends, when players own in-game hero skins, they will win double golds, which are the virtual currency after they complete each match. Hence, earning bonus in-game gold is another drive that lets players purchase the in-game hero skins.
2.10 The intention of purchase

When analyzing the intention of people purchasing virtual items, Hamari and Keronen (2016) mention two variables, including "intention of purchase" and "actual purchasing behavior" as measurement. The independent variable of Hamari and Keronen's research is real buying behavior, and the dependent variable is the intention of purchase. Since the research model is the same as us, the model, therefore, can be used for this research. Real buying behavior is intrinsic motivation, and extrinsic motivation of players purchasing the in-game hero skins and intention of purchase as dependent variable remains the same. Moreover, Domina Lee and Macgillivray (2012) use different elements that may influence whether people will purchase the item as an independent variable and the intention to purchase as a dependent variable to analyze the factors that can bring effects on players choosing whether they will buy virtual items.

2.11 Gender and age group difference

From the video games perspective, Erfani et al. (2010) show that gender offers a significant influence on the performance of video games and mention that the number of males who complete games are higher than women. What's more, Griffiths, Davies, and Chappell prove that males predominantly play games. Meanwhile, for the online purchase perspective, Negahdari (2014) mentions that gender difference brings effect on online purchasing and shows that male has a more significant influence on merchandising security, and company, which are constructs of online purchasing, than female by using surveys.
Moreover, Balakrishnan and Griffiths use ANOVA to prove that male and female has a significant influence on purchase intention. On the other hand, Wekeza and Sibanda (2019) argue that gender, as a factor of demographic characteristics, can influence purchase intention, and they use gender as a dummy variable to generate a hypothesis that gender can bring either positive or negative effect on purchase intention. And the result shows that gender does not influence purchase intention.

According to the statistics of Entertainment Software Association (2019), it shows that 40 percent of people who play video games are from the age group between 18 to 35 years old, 18 percent of players are from age group between 36 and 49 years old, and 21 percent of players are from the age group of 50 and older than 50 years old. That means different age groups may have an influence on playing video games. Wekeza and Sibanda (2019) also show that the diverse age group has no effects on purchase intention. However, previous study argued that age difference creates an enormous influence on purchase intention (Sethi.U & Sethi.R, 2016). Therefore, the age group may have either a positive or negative impact on the in-game purchase of MOBA games.

2.12 Time spent on games on purchase intention

Balakrishnan and Griffiths (2018) analyzed the relationship between game addiction and purchase intention and proves that "online mobile game addiction enhanced the intention to purchase online mobile in-game apps" by using seven standards of addiction measurement, including salience, tolerance, mood modification, withdrawal, relapse, conflict, and problems.
Within the seven factors, it means that when players start to play games more often and spend more time playing the game (Lemmens, Valkenburg & Peter, 2009). Lemmens, Valkenburg and Peter (2009) mention that hours of playing can be used as a scale of game addiction, and they argued that "a strong correlation between time spent on games and the game addiction scale was considered as evidence of concurrent validity" since "addicted players are expected to spend more time on games than those who are not addicted".

### 2.10 Research model

Since the motivational factors mentioned above may have effects on purchase intention of in-game hero skins in MOBA games, three intrinsic motivation, including competence, autonomy, and relatedness, and four extrinsic motivation, including rewards, reputation, money and praise, defined as independent variables on the dependent variable purchase intention. The null hypothesis is that none of the factors, including competence, autonomy, relatedness, rewards, reputation, money, and praise have influence on purchase intention of in-game hero skins in MOBA games and the formal format is presented below:

\[ H_0: \text{Competence, autonomy, relatedness, rewards, reputation, money, and praise has no influence on purchase intention of in-game hero skins in MOBA games.} \]

### 3. METHODOLOGY

#### 3.1 Participants
A total of 133 participants were recruited through convenience and snowball sampling and from several social media, including Facebook, WeChat, Weibo, and Instagram; 92 participants completed the survey. However, since 80 participants had previous experience with MOBA games, we only included their responses. Among the participants who completed the survey, 21 were identified as female, 54 were as male, 2 chose as other, and 3 selected ‘preferred not to say.

3.2 Procedure

Participants received the link to the online survey through social media or email. All questions in the survey were in English; hence, we focused on recruiting participants that could comfortably understand English. At the end of the survey, participants were asked to provide their demographics.

3.3 Measure

We built our survey based on basic needs satisfaction in self-determination theory to analyze players' motivation. Previous study showed that survey that used to analyze motivation was adapted from former work. Azadvar and Canossa adaptively used Basic Need Satisfaction in General to generate a new questionnaire called Ubisoft Perceived Experience Questionnaire, to analyze the relationship between basic need satisfaction, including competence, autonomy, and relatedness and player's enjoyment of engagement of the game (Azadvar & Canossa, 2018). As a result, the new model can predict the connection between basic needs satisfaction and the player's enjoyment and engagement. Furthermore, another questionnaire based on basic needs satisfaction is the Player Experience of Need Satisfaction (PENS) developed by Ryan, Rigby,
and Przybylski (2006). This questionnaire can independently predict how basic needs satisfaction influences the player experience (Richard M. Ryan, Rigby, & Przybylski, 2006). However, there are also limitations to both questionnaires. Azadvar and Canossa (2018) argued that the formatting process of UPEQ is using the "transformation of existing SDT based surveys in other fields," and the issue of this questionnaire is "semantic overlap of constructs" because of the broad definition of individual needs satisfaction and the interconnection between needs satisfaction. For instance, a strong weapon in the game could either increase the level of competence, or decrease the level of autonomy (Azadvar & Canossa, 2018).

Besides UPEQ and PENS, the application that used to analyze motivation is using questionnaires and adaptively from the previous survey and results of recent literature. And these questionnaires are used to analyze the motivation in different fields. Li (2012) uses a questionnaire when figuring out the motivation for virtual goods transactions, separates the motivation into diverse factors, including "achievement motivation," "discovery motivation," and "expression motivation," and the items of the factors are based on the previous literature. What's more, Hamari et al. (2017) argued that the need for players to make virtual purchases includes "continuing play," "personalization," and so forth. Ki and Kim (2016) explore the motivation of people's purchase behavior on luxury and sustainable items by using self-determination theory and argued that basic consumer needs include discovering personalization and the latest fashion.
Therefore, the survey of this study will adapt from the questionnaires of previous work. 10 factors, including competence, autonomy, relatedness, rewards, money, reputation, praise, gender, age, and hours of play, will be covered by the survey.

3.4 Questionnaire development:

3.4.1 Competence:

The factor competence included 5 items scale:

<table>
<thead>
<tr>
<th>Construct: Competence</th>
</tr>
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<tbody>
<tr>
<td>Definition: &quot;Competence refers to feeling effective, capable, and optically challenged&quot; (Deci &amp; Ryan 2000).</td>
</tr>
<tr>
<td>Measurement items adapted from previous literature:</td>
</tr>
<tr>
<td>Item 1: I feel that my gaming skills increase if I purchase hero skins. Adapted from &quot;my gaming abilities have improved since the beginning&quot; (Azadvar &amp; Canossa, 2018).</td>
</tr>
<tr>
<td>Item 2: I do not play well when I wear hero skins. Adapted from &quot;I felt competent at [playing]&quot; (Azadvar &amp; Canossa, 2018).</td>
</tr>
<tr>
<td>Item 3: I feel confident when I purchase hero skins. Adapted from &quot;I was good at [playing]&quot; (Azadvar &amp; Canossa, 2018).</td>
</tr>
<tr>
<td>Item 4: I feel accomplished when I purchase hero skins. Adapted from &quot;Most days I feel a sense of accomplishment from what I do&quot; (Johnston &amp; Finney, 2010).</td>
</tr>
</tbody>
</table>
Item 5: Other players like my hero. Adapted from "People I know tell me I am good at what I do" (Johnston & Finney, 2010).

3.4.2 Autonomy:

The factor autonomy included 4 items scale:

<table>
<thead>
<tr>
<th>Construct: Autonomy</th>
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<tbody>
<tr>
<td>Definition: Autonomy shows that a feeling that &quot;one can volitionally in accordance with personal values and desires that are harmoniously integrated into social demands and a meaningful impact in one's environment&quot; (Conway &amp; Elphinstone, 2017).</td>
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</table>

Measurement items adapted from previous literature:

| Item 1: I cannot dress up my in-game character with hero skins the way I want. Adapted from "I was free to decide what I wanted to [play]" (Azadvar & Canossa, 2018). |
| Item 2: I am pleased when I purchase in-game hero skins. Adapted from the reverse of "I feel pressured in my life" (Azadvar & Canossa, 2018). |
| Item 3: The in-game hero skins allow me to dress up the way I want. Adapted from "I feel like I am free to decide for myself how to live my life" and "I feel like I can pretty much be myself in my daily situation", the reverse of "There is not much opportunity for me to decide for myself how to do things in my daily life" (Johnston & Finney, 2010). |
Item 4: I struggled to decide which hero skins I wanted to purchase. Adapted from the reverse of "The game allowed me to [play] the way I wanted to" (Azadvar & Canossa, 2018).

3.4.3 Relatedness:

The factor relatedness included 4 items scale:

<table>
<thead>
<tr>
<th>Construct: Relatedness</th>
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<tbody>
<tr>
<td>Definition: Relatedness &quot;refers to having a sense of belongingness and meaningful connection to others&quot; (Deci &amp; Ryan, 2000).</td>
</tr>
</tbody>
</table>

Measurement items adapted from previous literature:

Item 1: Players who own hero skins are friendly to me. Adapted from "People are generally pretty friendly towards me" (Johnston & Finney, 2010).

Item 2: Other players do not like me when I wear hero skins. Adapted from the reverse of "people in my life care about me" (Johnston & Finney, 2010).

Item 3: I pay attention to other players hero skins. Adapted from "I was paying attention to other players' actions" (Azadvar & Canossa, 2018).

Item 4: Other players hero skins influence my game-play. Adapted from "What other players did in the game had an impact on my actions" (Azadvar & Canossa, 2018).
3.4.4 Rewards:

Rewards can bring diverse features for players and the demand of players to get rewards are based on these features. Hence, the players basic needs satisfaction is generated based on the features that rewards can offer to the players. Rewards in questionnaire included 5 subscale.

<table>
<thead>
<tr>
<th>Construct: Rewards</th>
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<tbody>
<tr>
<td><strong>Item 1:</strong> I purchased in-game hero skins because I want to unlock extra content. Adapted from basic needs of access rewards which can &quot;make the game content unlocked&quot; (Phillips, Johnson, &amp; Wyeth, 2013).</td>
</tr>
<tr>
<td><strong>Item 2:</strong> I purchase hero skins because to increase my proficiency. Adapted from basic needs of facility of rewards which can &quot;increasing players' in-game experiences of their avatar&quot; (Phillips et al., 2013).</td>
</tr>
<tr>
<td><strong>Item 3:</strong> I purchase hero skins to get extra gold and points. Adapted from basic needs of glory rewards which focusing on the system of score (Phillips et al., 2013).</td>
</tr>
<tr>
<td><strong>Item 4:</strong> I purchase hero skins to enhance my heros' spells. Adapted from facility of rewards (Phillips et al., 2013).</td>
</tr>
<tr>
<td><strong>Item 5:</strong> I purchase hero skins to get positive comments from other players. Adapted from basic needs of positive feedback rewards which is &quot;flattery and appraise&quot; (Phillips et al., 2013).</td>
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</table>
3.4.5 Reputation:

Reputation included 4 subscales.

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<thead>
<tr>
<th>Construct: Reputation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item 1: I purchase hero skins to make more in-game friends. Adapted from <em>&quot;a good reputation is a valuable currency&quot;</em>, which can be increased from social interactions and can be delivered to other social groups (Semmann, Krambeck, &amp; Milinski, 2005).</td>
</tr>
<tr>
<td>Item 2: Purchasing hero skins makes it easier to join new groups of players (Semmann et al., 2005).</td>
</tr>
<tr>
<td>Item 3: Trading hero skins with other players is hard. Adapted from the reverse of sellers of great reputation will be more easier to attract buyers (Yoganarasimhan, 2013).</td>
</tr>
<tr>
<td>Item 4: Purchasing hero skins increases my status in real life. Adapted from &quot;I feel that posting my content in this community improves my status as a content creator&quot; (Yoganarasimhan, 2013).</td>
</tr>
</tbody>
</table>

3.4.6 Money:

Money included 2 subscale and all of them were from money features in video games.

<table>
<thead>
<tr>
<th>Construct: Money</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item 1: I purchase hero skins to trade them for gold.</td>
</tr>
</tbody>
</table>
Item 2: I purchase hero skins to earn extra virtual gold (Blair, 2011).

### 3.4.7 Praise:

Praise includes 6 subscales and all the items were generated from previous literature.

<table>
<thead>
<tr>
<th>Construct: Praise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item 1: I purchase hero skins to increase a positive image of myself (Baumeister, Campbell, Krueger, &amp; Vohs, 2003).</td>
</tr>
<tr>
<td>Item 2: Purchasing hero skins make me feel more likable and attractive to others. Adapted from people with high esteem are &quot;more likable and attractive&quot; by others (Baumeister et al., 2003).</td>
</tr>
<tr>
<td>Item 3: Purchasing hero skins allows me to speak up and be like by groups of players (Baumeister et al., 2003).</td>
</tr>
<tr>
<td>Item 4: Other players think higher of me when I purchase hero skins (Semmann et al., 2005).</td>
</tr>
<tr>
<td>Item 5: My friends like me more if I purchase hero skins. Adapted from people use it for increasing a better images of themselves and make the listeners feel more positive (Danziger, 2018).</td>
</tr>
<tr>
<td>Item 6: Purchasing hero skins make me feel the person I always wanted to be (Baumeister et al., 2003).</td>
</tr>
</tbody>
</table>
3.4.8 Intention to buy in-game hero skins:

Intention to buy in-game hero skins included four items and generated from previous literature.

| Construct: Intention of Purchase |
|-------------------------------|--------------------------------|
| Item1: I would consider purchasing hero skins when playing MOBA games. Adapted from "I am likely to consider the purchase of virtual gifts from Facebook" (Huang 2012) |
| Item 2: I would like to try hero skins in MOBA games. Adapted from "I would like to try a product from company's website" (Beldad, Hegner, & Hoppen, 2016). |
| Item 3: I would definitely purchase hero skins in MOBA games. Adapted from "I will surely buy a product from company's website" (Beldad et al., 2016). |
| I would recommend hero skins to my friends and other players (Huang 2012). |

3.5: Data Analysis:

I use RStudio to analyze our data in three steps. First, we clean the data set by ruling out incomplete and invalid data (e.g., partially or non-completed surveys). Second, we calculate the survey's internal reliability using Cronbach's Alpha. Third, we conduct exploratory factor analysis using a polychoric correlation to further verify the validity of the survey at measuring latent factors of intrinsic motivation (Almeida & Mouchart, 2014). The reason for using polychoric correlation was the non-parametric data for this study since the significance level of the Shapiro-Wilk test was found $p < 0.05$, thus rejecting the null hypothesis. If a new factor was
added or the former factor was removed, the Cronbach's Alpha for the new questionnaire, including new factors, would be calculated. Once the reliability and validity of the questionnaire were proved, the regression would be used to figure out the relationship between multiple factors and purchase intention of in-game hero skins in MOBA games.

4. RESULTS

4.1 Descriptive data

The first question of the questionnaire would ask whether participants had previous MOBA experience before. 12 participants (13.04%) participants reported that they did not have previous experience. Therefore, these participants would not continue the questionnaire. 80 participants (86.96%) reported that they had MOBA experience. Therefore, these participants could continue the questionnaire. In the questionnaire, all questions were required to answer. Participants would not continue to answer the question if they left a blank answer.

From 80 participants who had previous MOBA experience, 11.65% of the participants played MOBA games more than once a month. 42.9% of the participants played MOBA games more than once a week. 7.9% of participants played MOBA games once a month, 7.9% of participants played MOBA games once a week, and 31% of the participants played 31.65% of participants played MOBA games every day (Figure 1).
Figure 1 Bar graph for MOBA Play Time Frequency

From figure 2, the purchase intention of females is higher than the purchase intention of males. Due to the limit participants for other (N = 2) and ‘prefer not to say’ (N = 1), it was difficult to conclude with the rest of the data. Furthermore, figure 3 shows that Age group 18 - 25 (N = 34) has higher purchase intention than Age group 25 - 32 (N = 42). Age group 32 - 29 (N = 2) and Age-group 39 - 46 (N = 2) could not represent the general purchase intention for the group of people due to the small number of participants.

Figure 2 Box plot for Gender and intention
*intention means purchase intention
4.2 Reliability:

The competence subscale consisted of 5 items ($\alpha = .53$), which was not a satisfactory internal consistency. For Q4, "I do not play well when I wear hero skins," the inter-item corrected correlation is below .3, which indicated that the item did not correlate well with the factor. Moreover, Cronbach's Alpha if deleted Q4 ($\alpha = .76$), which argued that item might not have good internal consistency with other items in the same factor since when deleting the rest of items in the factor individually, the Cronbach's Alpha decreases. Therefore, Q4 is questionable and considered to remove from the questionnaire. However, in this study, we decided to choose whether items were discarded after the factor analysis.

The autonomy subscale consisted of 4 items ($\alpha = .28$), which was an unacceptable internal consistency. Q11 is questionable and considered to be discarded since the Cronbach's Alpha if deleted ($\alpha = .41$), the item increases as well as others when deleted individually, causing
Cronbach's Alpha to decrease. However, since the Cronbach's Alpha is low, the items of the factor were considered to recode or removed from this study. In this study, we decided to choose whether items were discarded after the factor analysis.

The relatedness subscale consisted of 4 items (α = .16), which was an unacceptable internal consistency. Hence, the items of the factor should be recoded or removed from this study.

The reputation subscale consisted of 4 items (α = .58), which was an acceptable internal consistency. When deleting Q23, "Trading hero skins with other players is hard," the Cronbach's Alpha increased (α = .85) and the low corrected inter-correlation (<.3) showed that this item might not correlate with other items. As a result, Q23 was considered to be discarded. However, in this study, we decided to choose whether items were discarded after the factor analysis.

The rewards subscale of 5 items (α = .86), the money subscale consisted of 2 items (α = .87), the praise subscale consisted of 6 items (α = .92), and the purchase intention subscale consisted of 4 items (α = .86) which had high internal consistency.

4.3 Validity:

To discover the factorial structure of motivation of in-game hero skins in MOBA games, 34 items were analyzed using a polychoric correlation with Varimax rotation. The KMO (Kaiser-Meyer-Olkin) confirmed the sampling was adequate, KMO = .82. The significant level of Bartlett's test of sphericity x2 (80) = 1880.57, p < .01, indicating that it was useful to conduct
factor analysis for this questionnaire. 8 factors were identified since their eigenvalues are larger than 1 with parallel analysis. However, three factors were included items with low correlation so that these were discarded for further factor analysis (Figure 4).

Figure 4. Eigenvalues and parallel analysis
For Factor 1 (Table 1), five items, from Q18 to Q22, were grouped due to the high loading (>0.50), which explained 35.82% of the variance. Items in factor 1 were generated from the hypothetical factors of rewards and reputation. With deep discover of the items, the result showed that all five items can be termed as in-game and out-game rewards because making more in-game friends was the reward that players can receive once the purchased skins in the game and making easier to join new groups of players can be a reward for players in the real world. Therefore, factor 1 would be termed as rewards (M = 3.66, SD = 1.45).

Table 1. Factor Loading Table by using polychoric correlation

<table>
<thead>
<tr>
<th>Factor Analysis Table for motivation to purchase Intention</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1: I purchase hero skins to make more in-game friends</td>
<td>0.14 -0.70 0.08</td>
</tr>
<tr>
<td>Q9: I purchase hero skins to get positive comments from other players</td>
<td>0.68 0.03 0.11</td>
</tr>
<tr>
<td>Q2: Purchasing hero skins makes it easier to join new groups of players</td>
<td>0.35 0.03 0.08</td>
</tr>
<tr>
<td>Q8: I purchase hero skins to get extra gold and points</td>
<td>0.68 0.03 0.11</td>
</tr>
<tr>
<td>Q11: My friends like me more if I purchase hero skins</td>
<td>0.25 0.03 0.08</td>
</tr>
<tr>
<td>Q12: I would definitely purchase hero skins in MOBA games</td>
<td>0.11 0.02 0.05</td>
</tr>
<tr>
<td>Q13: I would like to try hero skins in MOBA games</td>
<td>0.35 0.03 0.08</td>
</tr>
<tr>
<td>Q4: I feel accomplished when I purchase hero skins</td>
<td>0.43 0.03 0.08</td>
</tr>
<tr>
<td>Q6: I am pleased when I purchase in-game hero skins</td>
<td>0.22 0.02 0.05</td>
</tr>
<tr>
<td>Q7: I purchase hero skins to make them for gold</td>
<td>0.49 0.02 0.05</td>
</tr>
<tr>
<td>Q14: I would like to consider purchasing hero skins when playing MOBA games</td>
<td>0.68 0.03 0.11</td>
</tr>
<tr>
<td>Q15: Other players like my hero skins</td>
<td>0.35 0.03 0.08</td>
</tr>
<tr>
<td>Q16: I felt confident when I purchase hero skins</td>
<td>0.22 0.02 0.05</td>
</tr>
<tr>
<td>Q17: I purchase hero skins because I want to unlock extra content</td>
<td>0.49 0.02 0.05</td>
</tr>
<tr>
<td>Q18: Player's hero skins influence my game-play</td>
<td>0.35 0.03 0.08</td>
</tr>
<tr>
<td>Q19: I feel that my gaming skills increased if I purchase hero skins</td>
<td>0.43 0.03 0.08</td>
</tr>
<tr>
<td>Q20: I purchase hero skins to earn extra game gold</td>
<td>0.22 0.02 0.05</td>
</tr>
<tr>
<td>Q21: I do not play well when I wear hero skins</td>
<td>0.49 0.02 0.05</td>
</tr>
<tr>
<td>Q22: I am more confident when I purchase hero skins</td>
<td>0.35 0.03 0.08</td>
</tr>
<tr>
<td>Q23: I purchase hero skins to make my in-game heroes</td>
<td>0.49 0.02 0.05</td>
</tr>
<tr>
<td>Q24: I purchase hero skins to make them for gold</td>
<td>0.35 0.03 0.08</td>
</tr>
<tr>
<td>Q25: I purchase hero skins to make my in-game heroes</td>
<td>0.49 0.02 0.05</td>
</tr>
<tr>
<td>Q26: I purchase hero skins to make them for gold</td>
<td>0.35 0.03 0.08</td>
</tr>
<tr>
<td>Q27: I purchase hero skins to make my in-game heroes</td>
<td>0.49 0.02 0.05</td>
</tr>
<tr>
<td>Q28: I purchase hero skins to make them for gold</td>
<td>0.35 0.03 0.08</td>
</tr>
<tr>
<td>Q29: I purchase hero skins to make my in-game heroes</td>
<td>0.49 0.02 0.05</td>
</tr>
<tr>
<td>Q30: I purchase hero skins to make them for gold</td>
<td>0.35 0.03 0.08</td>
</tr>
</tbody>
</table>

Eigenvalue: 12.18

% of Total Variance: 65.82

Total Variance: 41.00
For Factor 2 (Table 1), five items, from Q27 to Q31, were grouped with the high loading (>0.50) and from the hypothetical factor of praise. The variance explained by this factor was 10.01%. Therefore, factor 2 would be termed as praise (M = 4.01, SD = 1.49).

For Factor 3 (Table 1), three items, from Q33 to Q35, were grouped with high loading (>0.50) and from the hypothetical factor of purchase intention. The variance explained by this factor was 5.80%. Hence, since factor 3 was grouped as the same as a factor from the hypothetical structure, it would be termed as purchase intention (M = 5.31, SD = 1.16).

For Factor 4 (Table 1), three items, which combined from competence and autonomy, were grouped with high loading (>0.50). The variance of the factor was 5.17%. Although two items were from factor competence and one item was from autonomy, the coding of the items showed that these adjectives, "accomplished," "pleased," and "confident" of items explained the same feeling, which was the competence. Therefore, three items were grouped and would be termed as competence (M = 4.85, SD = 1.39).

For Factor 5 (Table 1), two items, from Q25 to Q26, were grouped with high loading (>0.50) and from the hypothetical factor of money. The variance explained by this factor was 4.89%. As a result, since factor 4 was grouped as the same as a factor from the hypothetical structure, it would be termed as money (M = 3.11, SD = 1.66).
The communiality for all items with high loading is beyond the low acceptance level, which is between .0 to .4. That means items were correlated with other items. Furthermore, none of the items were loaded with different factors. Therefore, 4 factors were independent.

4.3 Reliability - Cronbach's Alpha of factors yielded from factor analysis:

The rewards subscale consisted of 5 items (α = .89), the praise subscale consisted of 5 items (α = .92), the purchase intention (α = .85), and the money consisted of 2 items (α = .87) which all have high internal consistency. Since all the items were all loaded high as well as had high internal consistency, reliability, and validity of the questionnaire were proved. The new items of the questionnaire are presented below:

<table>
<thead>
<tr>
<th>Factor 1: Rewards:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I purchase hero skins to make more in-game friends</td>
</tr>
<tr>
<td>2. I purchase hero skins to get positive comments from other players</td>
</tr>
<tr>
<td>3. Purchasing hero skins makes it easier to join new groups of players</td>
</tr>
<tr>
<td>4. I purchase hero skins to enhance my heros spells</td>
</tr>
<tr>
<td>5. I purchase hero skins to get extra gold and points</td>
</tr>
</tbody>
</table>
Factor 2: Praise

1. Other players think higher of me when I purchase hero skins

2. I purchase hero skins to increase a positive image of myself

3. Purchasing hero skins make me feel more likable and attractive to others

4. Purchasing hero skins allows me to speak up and be liked by groups of players

5. My friends like me more if I purchase hero skins

Factor 3: Purchase intention

1. I would definitely purchase hero skins in MOBA games

2. I would like to try hero skins in MOBA games

3. I would consider purchasing hero skins when playing MOBA games

Factor 4: Competence

1. I feel accomplished when I purchased hero skins
2. I feel pleased when I purchase in-game hero skins

3. I am pleased when I purchase hero skins

Factor 5: Money

1. I purchase hero skins to trade them for gold

2. I purchase hero skins to earn extra virtual gold

All factors are independent. Therefore, the independent variable for this study would be rewards, praise, competence, and money and the dependent variable would be purchase intention. The hypothesis would be reframed as:

\[
\text{Intention} = a + b_1 \times \text{Rewards} + b_2 \times \text{Praise} + b_3 \times \text{Competence} + b_4 \times \text{Money}
\]

Null hypothesis: \( H_0: b_1 = b_2 = b_3 = b_4 = 0 \)

4.4 Regression analysis:

Single Linear regression was used to test if rewards, praise, competence, and money individually predicted purchase intention and to prove that further multiple linear regression was valid to use.

4.4.1 Single Linear regression between rewards and purchase intention:
Single linear regression analysis (F(1, 78) = 10.55, p < .01), complying with R squared of .12, was used to examine if the rewards significantly predicted purchase intention. The results of the regression showed that rewards (β = .001, p < .001) could predict purchase intention and it was proved by the scatter plot (Figure 5) as well.

4.4.2 Single linear regression between praise and purchase intention:

Single linear regression analysis (F(1, 78) = 18.93, p < .001) with R squared of 0.20, was used to examine if the praise significantly predicted purchase intention. The results of the linear regression showed that Praise (β = 4.06e-05, p < .001) could significantly predict purchase intention and was confirmed by scatter plot (Figure 6).
4.4.3 Single Linear Regression between competence and purchase intention:

Single linear regression analysis (F(1, 78) = 18.93, p < .001) with R squared of 0.30, was used to examine if the competence significantly predicted purchase intention. The results of the linear regression showed that competence (β = 1.16e-07, p < .001) could significantly predict purchase intention and was confirmed by scatter plot (Figure 7).
4.4.4 Single linear regression between money and purchase intention:

A nonsignificant regression was explored since p-value is .42 (p > .05)

Therefore, since money was nonlinear with purchase intention, it could not be used for further multiple linear regression analysis. Hence, the new hypothesis for multiple linear regression would be:

\[ \text{Intention} = a + b_1 * \text{Rewards} + b_2 * \text{Praise} + b_3 * \text{Competence} \]

Null hypothesis: \( H_0: b_1 = b_2 = b_3 \)

4.4.5 Single Linear regression between hours of play per week and purchase intention:

Hours of play per week has no linear relationship with purchase intention due to the low p-value .60 (> .50).
4.4.6 Multiple linear regression:

Multiple linear regression was the tool that examines if rewards, praise, competence significantly predicted purchase intention of hero skins in MOBA games. The results indicated the significant regression (R-squared = .36, F(3, 76)=11.72, p < .001). It was found that competence significantly predicted purchase intention (β = 3.86e-05, p < .001) and praise predicted purchase intention (β = .40, p < .05) whereas and rewards (β = .57, p = n.s) could not predict purchase intention. Furthermore, the Q-Q plot (Figure 8) showed that the residuals were approximately normally distributed.

![Normal Q-Q plot for standardized residuals](image)

*Figure 8* Normal Q-Q plot for standardized residuals

Since the significance value is 0, we rejected the null hypothesis which meant that there was at least one factor would generate influence on purchase intention:
\[ \text{Intention} = a + b_1 \times \text{Rewards} + b_2 \times \text{Praise} + b_3 \times \text{Competence} \]

Null hypothesis: \( H_0: b_1 = b_2 = b_3 = 0 \)

Alternative hypothesis: \( H_a: \text{at least one of } b_1, b_2, b_3 \text{ is not } 0 \)

\[ \text{Intention} = 2.66 + 0.37 \times \text{competence} + 0.20 \times \text{praise} \]

5. DISCUSSION

We showed that motivational factors impact purchase of in-game hero skins. Our results also show that building a survey tool for measuring latent factors related to in-game purchases presents challenges due to the limited participants, coding of items, and previous study's questionnaire adaption. Next, we discuss what our results mean to game design and research on motivational factors more broadly.

5.1 Purchase intention and motivational factors in MOBA

The difference between the two is that Millar’s work offered specific reasons of why players make microtransaction whereas our study offered factors with general definition, including competence and praise. Millar’s work (2017) showed that people playing MOBA games make microtransactions for the following reasons: ‘giving gifts to friends’, ‘personalization’, ‘speeding up timers’, ‘becoming the best’, ‘showing off achievements’ and ‘showing off to friends’. From our study, the results showed that competence and praise could predict purchase intention. Previous work showed that players increase their level of competence through attribution and satisfaction of success and ‘becoming the best’ could be an example of it (Touati & Baek, 2018).
Therefore, ‘becoming the best’ can be part of competence rather than represent the general definition of competence.

Competence can either individually and mutually significantly predict the purchase intention based on the result. The results show that the primary goal of players who buy in-game hero skins in MOBA games is achieving their inherent goals, such as the challenges and optimism. For instance, for Q4, players report that they "agreed that purchasing hero skins could make them feel pleased (M = 5.28, SD = 1.56)". Previous work defined the feeling of satisfaction as "personal competence", which means that players complete in-game challenges within the game based on their own satisfaction (Kretschmann, 2010). Furthermore, players reflected that they felt accomplished (M = 4.78, SD = 1.70) when they purchase in-game hero skins. Previous study showed that players increased their competence level based on their achievement and the attribution of success, such as becoming the best that mentioned in Millar’s (2017) work (Touati & Baek, 2018). Furthermore, praise is the second motivational factor that can individually and mutually predict the purchase intention. Players always hope to get great comments from other players which can help to build a good reputation for players within the game since previous work showed that players were willing to collaborate with team members who had great reputation (Bolton, Katok, & Ockenfels, 2005). Third, from the result, it showed that the motivation of making money could not predict purchase intention. That is, the aim of players who purchased hero skins is not making money. Instead, a possible reason can be that players purchase expensive hero skins because of their passion. On the other hand, players who purchase hero skins in order to make money still exist. And the goal for these players is making profits
instead of playing games. These players could know nothing about this game and only purchased the items that they consider are valuable within the game. As a result, for the game designers, they should not be worried about releasing good skins with high prices because players may not consider the price. Instead, they will focus on the qualities of skin. For players who only sell hero skins for earning profits, game designers and companies should think about how to balance the in-game and out-game market. Offering items with high prices through the out-game market by the businessmen lead to a decreased number of royal players.

Fourth, the assumption of multiple linear regression shows that all independent variables should have a linear relationship with the dependent variable, and the results are supposed to show that rewards, competence, and praise all have a linear relationship with purchase intention. However, when all three factors combined, the result showed that competence ($\beta = 3.86e-05$, $p < .001$) significantly predicted and praise ($\beta = .40$, $p < .05$) predicted the purchase intention whereas rewards ($\beta = .57$, $p = n.s$) could not predict purchase intention. Hence, a possible reason is that competence, praise, and rewards have an intimate relationship with each other. Furthermore, previous literature showed that players received the sense of competence from their own satisfaction, such as attribution of success (Touati & Baek, 2018). Therefore, one hypothesis could be players only increase their competence feelings based on their own activities instead of seeking for others’ activities, such as praise.

**Design recommendation:**
Game designers can take advantage of the results and use them to assist their in-game design. First, game designers can let players get skins through in-game challenges because becoming the best and completing all the challenges can increase their level of competence (Millar, 2017). For instance, players can purchase hero skins when achieving certain levels of proficiency. Furthermore, adding skin challenges that can unlock extra content after purchasing the hero skins can be another tool to improve players' personal competence (Wang and Sun, 2012). On the one hand, players can keep playing and having fun with the game until they get the skins. On the other hand, rare skins can let players to get praise by other players. Once players continue receiving diverse skins, adding collection function can be the third method to increase players’ level of competence. Previous games, such as Pokemon and Diablo II, were excellent examples to prove collection, which can make players feel accomplished. Players will always seek new Pokemon and feel accomplished when they get new pokemon. Once players own new Pokemon, they are willing to spend time and money selecting skins for these Pokemon. In Diablo II, exploring and owning rare virtual items are always fun for players because they can help players to build their own avatar within the game (Wang & Sun, 2011). The process of collection will offer a feeling of challenge and satisfaction for players because not all players can collect all items within the game. The last recommendation is that adding the comment system in hero skins. In Dota 2, players can get commended after the game if their teammates or opponents think their hero skins are beautiful and their play skills are excellent. Furthermore, MOBA games offer a particular place for players to show off their new skins. However, none of them offer a particular comment system for hero skins separately. Therefore, a new function that can be added is that other players can leave comments under the place where players show off their hero skins.
5.1 Limitation:
The items of seven Likert-scale questionnaire were adapted from several questionnaires of previous literature, which also analyzed motivation. However, these questionnaires measured motivation in different fields, including game, business, and people's life in general. As a result, whether the items of this study's questionnaire were enough to determine all dimensions of motivation becomes a problem. Meanwhile, since the questionnaire was used to measure motivation in a specific area, it would be questionable whether the survey of our questionnaire could be used in other fields.

5.2 Future work:
After reliability and validity, several factors were discarded. Therefore, future work could concentrate on continue designing items for these factors and integrate them with the current reframed structure. The coding of the current questionnaire items could be improved and more easily understood by participants. Furthermore, the results show that competence, praise, and rewards may have an intimate relationship with each other. Therefore, the regression model can be a possible method to explore these factors' inner connection. Second, we strategize to merge intrinsic and extrinsic motivation. Therefore, the balance between both the intrinsic and extrinsic motivation and company’s revenue becomes another field to investigate. Previous work focused on one motivation instead of using both. Therefore, in order to increase the level of intrinsic motivation and extrinsic motivation, game designers will spend a large time designing the
challenges for the hero skins so that they have a small amount of time to fix the core mechanics since the patch of MOBA games changed frequently.

6. CONCLUSION

This study examined the relationship between motivational factors, including competence, autonomy, relatedness, money, reputation, praise, and rewards, and purchase intention of in-game hero skins in MOBA games. A 7-point Likert-scale questionnaire with 34 items was developed based on existing questionnaires that also analyzed the motivation. After analyzing the reliability with Cronbach's Alpha and validity with factor analysis based on polychoric correlation, the results show that items of the questionnaire had high loadings on 5 factors, including competence, rewards, praise, money, and purchase intention. Multiple regression analysis showed that competence and praise could predict purchase intention of in-game hero skins.

The result of the study could be used in game design. Designers could use the results to figure out the purchase system that players want to build for the game. For instance, game designers can offer comment system for in-game hero skins. Players who expect to earn more praise are willing to purchase hero skins more once they engage in this feature. The questionnaire still needs to be improved since the motivational factors proposed to measure were different than those proved by reliability and validity. Possible reasons could be the coding process of the items and the limit number of participants.
REFERENCES


Amotivation in Sports: The Sport Motivation Scale (SMS). *Journal of Sport and Exercise Psychology*, Vol. 17, pp. 35–53. [https://doi.org/10.1123/jsep.17.1.35](https://doi.org/10.1123/jsep.17.1.35)


**APPENDIX A**

7 Likert-scale Questionnaire

7 Likert-scale Questionnaire:

Q1. Do you have previous experience with MOBA?
   A. Yes
   B. No

Q2. I play MOBA
   a. Once a month
   b. More than once a month
   c. Once a week
   d. More than once a week
   e. Every day

Competence:

Q3: I feel that my gaming skills increase if I purchase hero skins
Q4: I do not play well when I wear hero skins
Q5: I feel confident when I purchase hero skins
Q6: I feel accomplished when I purchase hero skins
Q7: Other players like my hero skins

Autonomy:

Q8: I cannot dress up my in-game character with hero skins the way I want
Q9: I am pleased when I purchase in-game hero skins
Q10: The in-game hero skins allow me to dress up the way I want
Q11: I struggled to decide which hero skins I wanted to purchase

Relatedness:

Q12: Players who own hero skins are friendly to me
Q13: Other players do not like me when I wear hero skins
Q14: I pay attention to other players' hero skins
Q15: Other players' hero skins influence my game-play

Rewards:

Q16: I purchase hero skins because I want to unlock extra content
Q17: I purchase hero skins because to increase my proficiency
Q18: I purchase hero skins to get extra gold and points
Q19: I purchase hero skins to enhance my heros' spells
Q20: I purchase hero skins to get positive comments from other players

Reputation:

Q21: I purchase hero skins to make more in-game friends
Q22: Purchasing hero skins makes it easier to join new groups of players
Q23: Trading hero skins with other players is hard
Q24: Purchasing hero skins increases my status in real life

Money:
Q25: I purchase hero skins to trade them for gold
Q26: I purchase hero skins to earn extra virtual gold

Praise:
Q27: I purchase hero skins to increase a positive image of myself
Q28: Purchasing hero skins make me feel more likable and attractive to others
Q29: Purchasing hero skins allows me to speak up and be liked by groups of players
Q30: Other players think higher of me when I purchase hero skins
Q31: My friends like me more if I purchase hero skins
Q32: Purchasing hero skins make me feel the person I always wanted to be

Purchase intention:
Q33: I would consider purchasing hero skins when playing MOBA games
Q34: I would like to try hero skins in MOBA games
Q35: I would definitely purchase hero skins in MOBA games
Q36: I would recommend hero skins to my friends and other players

Q37. I identify myself as:
   a. Male
   b. Female
   c. Other
   d. Prefer not to say

Q38. What is your age?
   a. 18 – 25
   b. 25 – 32
   c. 32 – 39
   d. 39 – 46
   e. 46 – 53
   f. Above 53