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Evers, Ellen; van de Ven, N.; Weeda, D.

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## **The Hidden Cost of Microtransactions: Buying In-Game Advantages in Online Games Decreases a Player's Status**

Ellen R. K. Evers<sup>1</sup>, Niels van de Ven<sup>2</sup>, Dorus Weeda<sup>2</sup>

<sup>1</sup>UC Berkeley, USA; <sup>2</sup>Tilburg University, Netherlands

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**Abstract:** With the advent of the internet, computer games have undergone substantial changes. Many games now contain some form of social interaction with other players. Furthermore, many games offer players the opportunity to buy upgrades using microtransactions. Based on social psychological theories on social comparisons, deservedness, and envy, we tested whether the use of these microtransactions would affect how players perceive another player using them. In one survey and two experimental scenario-studies with active gamers as participants (total  $N = 532$ ), we found evidence supporting the idea that a player using microtransactions will be judged more negatively. More specifically, we find that gamers dislike it more when microtransactions allow the buying of functional benefits (that provide an in-game advantage) than when they are merely ornamental, and players who buy these functional benefits are respected less. In Studies 2 and 3 we found that players who use microtransactions are perceived as having a lower skill and status. This happens both when the microtransaction-using player is an enemy who bought a competitive advantage, as well as in games where one cooperates with the microtransaction-using player and the advantage is thus effectively shared. The findings have important practical implications for game design. They indicate how microtransactions can be implemented so that they have fewer negative social consequences, demonstrate the value of social psychological theories in predicting online behavior, and provide several avenues for further theoretical exploration.

**Keywords:** Microtransactions, free-to-play, real money transactions, social comparisons, status, multiplayer gaming

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### **Introduction**

The social aspect of gaming has changed drastically. A few decades ago the gamer was essentially playing alone or in a very small group. Now, the internet made it easy for gamers to connect, and gaming is very much imbedded in social networks (Smith & Kollock, 1999). This ranges from massive multiplayer online communities (MMO's) of up to 10 million players (MMOData, 2012) who cooperate or compete in a shared environment, to games that are technically single player games but that incorporate social rankings to share the experience of the game (e.g., many games on Steam and Facebook allow players to see their relative ranking or share in-game items).

Besides this shift towards social gaming, the way the industry generates revenue has also changed. Whereas companies used to be limited to selling a game on a disk to customers via stores or mail order, the internet has opened up online outlets for selling games, but also forced changes to the "old system" due to illegal downloading. A recent development has been the usage of microtransactions. Microtransactions are usually low-cost expansions for existing games. These expansions can range from either buying new content for a game (for example extra

game-areas can be bought in *Fallout 3*), or buying in-game extras (like buying better shells that can penetrate armor in *World of Tanks*). It has been estimated that in 2007 alone, a profit of \$2.1 billion was made purely on the sales of in-game items for real money (Lehdonvirta, 2009). Thus, gamers can use real money to change their gaming experience, and for some games they can even spend money to improve their strength in the game by buying upgrades.

In this research project we investigate how the use of microtransactions to gain in-game advantages is perceived by other players. On the basis of social psychological theories, as explained in more detail below, we expected that gamers who use microtransactions for in-game benefits will be perceived as being less skillful and having lower status than those not using microtransactions. Furthermore, we expected that other players will be less likely to want to cooperate and affiliate with players who use microtransactions for in-game improvements, and feel more pleasure when those players fail. Below we will first elaborate on the theory behind these predictions, after which we report three studies that empirically test them.

#### *Buying in-game advantages and social comparisons*

Psychological researchers have long been interested in the effects of social comparisons; people comparing their own situation to that of others. Festinger (1954) argued that people are motivated to form accurate impressions of themselves and do so by comparing themselves to others. In other words, to evaluate one's performance, people look to others and evaluate how they rank compared to them. If people do better than others they feel good about themselves (Wills, 1981). However, if others are better off (in something they find important) they can feel more negative about themselves and feel frustrated (Tesser, 1988). When a player of an online computer game uses microtransactions to buy an in-game advantage, this can effectively make the player better off than others. In these situations, other players become relatively worse off and thus make upward social comparisons that can make them feel frustrated.

What are the likely results of upward social comparisons when someone buys such in-game advantages? We propose that in online games these upward comparisons are likely to have five main consequences. Other players will not like it if others buy an advantage that provides an in-game benefit, they will attribute lower status towards those who buy advantages, they would want to avoid them in the game, they would like it if those buying advantages would fail, and we think it is likely that other players might become less motivated themselves to improve their own position (compared to when they see another player who has earned an advantage). For each of these expected effects we will formulate a hypothesis and discuss the reasoning behind these predictions.

#### *Effects of buying ornamental or functional in-game benefits*

A key prediction of social comparison theory is that people should only feel frustrated about their own relative position if another player buys an advantage that actually makes them better off (Festinger, 1954). People can feel inferior when the superior other makes one realize that one's performance could have been better (Collins, 1996). Especially when a person compares him or herself to someone who started at an initially similar position but then becomes better off can trigger negative feelings such as envy; the feeling that arises when a person lacks another's superior quality, achievement, or possession and either desires it or wishes that the other lacked it (Smith & Kim, 2007). This also implies that only advantages that would actually improve the quality of an online character (e.g., better weapons or armor, additional skills, etc.) would make people feel that they are worse off than those who bought this advantage. Researchers have identified a distinction between functional and ornamental items (Oh & Ryu, 2007; Lehdonvirta, 2009) that can be bought via microtransactions. Functional items are those that provide a clear benefit in the game, such as buying a powerful weapon. Ornamental items are decorative items that have no clear in-game benefit, but allow a player to make a more unique character by for example buying a pet in *World of Warcraft*. Only the functional benefits make a player better off and thus create a threat to another player's position. When another player buys an ornamental item that has no functional benefit it does not make the player better off as it does not affect the strength of a character (e.g., a vanity pet in *World of Warcraft*). This leads to the following hypothesis:

*H1. Players will disapprove more of the possibility to buy functional in-game items using microtransactions, than they do for ornamental items.*

This prediction is derived from the social psychological theories we base our studies on, but differs from a prediction that would be made based on the literature on games. Earlier theorizing on games stated that players see games as "magic circles", as worlds in itself with clear boundaries (Salen & Zimmerman, 2003). A magic circle perspective predicts that gamers dislike any outside influence that penetrates the game world. This implies that acquisition of both ornamental and functional items breaks the magic circle, and is perceived negatively.

*Perceived status of those who buy in-game advantages*

If the game allows microtransactions, buying an advantage is technically fair as a player just follows the rules created by the game developer. However, we argue that this still likely feels rather undeserved. Negative actions that lead to positive outcomes (or positive actions that lead to negative actions) are perceived as undeserved (Feather, 2003). An outcome can be fair, but still undeserved. For example, in an organization with the rule that someone with the longest tenure will be promoted, it is fair that the employee with the longest tenure gets promoted. But for someone with shorter tenure but better performance this will be perceived as being undeserved. In computer games, developing one's skill by playing the game is the norm. Buying such an improvement might be technically fair as the game allows it, but is seen as a shortcut that feels undeserved.

When people gain an undeserved advantage over others, this often leads to feelings of resentment (Smith, 2000; Feather & Sherman, 2002). Feather (1999) developed a theory that highlights the importance of deservingness in evaluating the position of a superior other. He argues that when others are undeservedly better off, they are liked less and thought to be unfit for their high status. Players who buy an in-game advantage become relatively better off than others, but we expect that other players will perceive this advantage as undeserved. Based on the work of Feather (1999) and Smith (2000) on deservingness and upward social comparisons, we therefore predict that players who buy an in-game advantage might be objectively better off (e.g., the quality of their online avatar improves), but despite this increase of in-game quality they will actually be assigned a lower status and they will be respected less by the other players.

*H2. A player who buys an in-game functional advantage using microtransactions will be respected less by other players.*

*Perceived status of those who buy in-game advantages*

If players like and respect those who buy in-game advantages using microtransactions less, they may also want to affiliate less with them (e.g., Fiske, Cuddy, Glick, & Xu, 2002). We therefore predict that players are less likely to want to team up with players who bought an in-game advantage. This would be especially interesting, as in many cases it is beneficial to have someone in your team with better items.

*H3. Players want to cooperate less with a player who bought a functional in-game advantage using microtransactions.*

*Ill will towards those who buy in-game advantages*

As explained before, players who gain an undeserved advantage are likely to be resented by other players (Feather & Sherman, 2002). Undeserved advantages by others can also trigger (malicious) envy (Smith, Parrott, Ozer, & Moniz, 1994; Van de Ven, Zeelenberg, & Pieters, 2012). Both envy and resentment have been found to lead to experiences of schadenfreude; the joy one feels when another suffers a misfortune (Feather & Sherman, 2002; Van de Ven, Hoogland, Smith, Breugelmans, & Zeelenberg, 2015). Based on these theories on deservedness and envy, we predicted that a player who buys an in-game advantage using microtransactions is likely to elicit ill will in other players who would therefore like to see the other fail.

*H4. Players feel ill will towards a player who bought a functional in-game advantage using microtransactions.*

*Becoming motivated to improve oneself by those who earn in-game advantages*

When people are better off, experiences such as envy can emerge. As we explained before, when people are seen to be undeservedly better off malicious envy is likely to result which can result in schadenfreude or ill will towards the other (Van de Ven et al., 2015). At the same time, when others do better it could also give rise to benign envy, which is the type of envy that motivates people to want to improve themselves (Van de Ven, Zeelenberg, & Pieters, 2009, 2011). When the better other has earned the better-off position, this is seen as deserved and more likely to trigger benign envy resulting in a motivation to improve (Van de Ven et al., 2012). In computer games, improving can be accomplished by spending more time to improve your gaming skills or by improving a character through grinding (continuously playing to get better in-game materials). This leads to our final hypothesis;

*H5. Gamers will be more motivated to improve themselves after encountering a better-off other who has earned, rather than bought, this advantage.*

*The current studies*

We tested these five hypotheses in three studies with gamers as participants. We tested how players of three different games respond to other players who buy in-game items using real money. Hypotheses 1 to 3 were tested

in Study 1 using players of the game MapleStory. Study 2 (Diablo 3) and Study 3 (World of Tanks) used scenario studies in which we asked participants to imagine being in a certain in-game situation and to answer questions about how they would feel and behave in that situation. Furthermore, in these latter two studies we manipulated whether players rated how they felt towards either another player who was deservedly better off (through improving by playing the game) or more undeservedly better off (by buying functional advantages through microtransactions). Hypotheses 2 to 5 were tested in both Study 2 and 3.

### Study 1

As mentioned in the introduction, we expected players to react negatively to others using microtransactions, because using microtransactions to gain an in-game advantage feels like an undeserved way for other players to rise on the social ladder. As a consequence, we should predominantly find negative reactions to items bought with microtransactions that actually provide such a functional advantage (items that provide a clear benefit in the game, such as buying a powerful weapon). We compare a participant’s responses to a player who buys a functional item with their responses to a player who buys an ornamental item (items that have no clear in-game benefit, but allow a player to make a more unique character by for example buying a vanity pet in World of Warcraft). This study was mainly designed to test Hypothesis 1 that players indeed respond differentially to players who bought a functional advantage compared to an ornamental one. Furthermore, we tested Hypotheses 2 and 3; whether players respect those who bought functional advantages less and are less willing to cooperate with them.

#### Method

Players of the game MapleStory were approached on an online forum dedicated to this game and asked to voluntarily participate in a study. Out of 73 people starting the questionnaire, 40 completed it fully (29 males, 11 females,  $M_{age} = 23.1$ ,  $SD_{age} = 9.2$ ). The participants were MapleStory players for an average of 3.4 years ( $SD = 2.8$ ) and play this game 11.8 hours ( $SD = 16.4$ ) per week on average. Of the 40 participants, 24 (60%) indicated having spent money on in-game items. The average amount of money spent in this group was \$1083 ( $SD = \$1702$ ),<sup>1</sup> the median was \$350.

MapleStory was selected for this study because it has a large marketplace in which gamers can buy over 2000 different in-game items for real money. Some of these items are functional as they provide a benefit that makes the game easier and/or the in-game character stronger, others are purely ornamental as they only provide aesthetical benefits. Before answering the questions related to our hypotheses, participants first answered general questions about their background and playing behavior.

Table 1a  
*Questions in Study 1–Maplestory*

Question	Scale	
	1	7
Do you approve or disapprove of the possibility to buy functional / ornamental items?	approve	disapprove
Does it annoy you that others buy functional / ornamental items? Items that are bought with real money should be:	annoys me frequently permanent	never annoys me temporary
Do you think different of a stronger player that bought functional / ornamental items with real money compared to a player who never bought functional/ornamental items?	I respect them the same	I respect someone who bought items less
If in the game you encounter other players who bought functional / ornamental items with real money I tend to like them.	not at all	very much so
If in the game you encounter other players who bought functional / ornamental items with real money I like to cooperate with them.	not at all	very much so
If in the game you encounter other players who bought functional / ornamental items with real money I tend to ignore them.	not at all	very much so

<sup>1</sup>One participant indicated having spent \$30.000 on MapleStory, the average was calculated excluding this participant because it greatly skewed the average.

The questions that test our hypotheses are presented in Table 1a.<sup>2</sup> We asked each question regarding both functional and ornamental items. For example, we asked whether players would feel annoyed when another player bought a functional item, but also whether they would feel annoyed if another player bought an ornamental item. This created a within-subject design for our study in which we could compare whether people feel different about the buying of functional or ornamental items. Questions were about how players felt and thought about functional or ornamental items in general (H1), whether they respected those buying functional benefits less (H2), and whether players wanted to cooperate with those buying functional items less (H3). Finally, we also asked all participants whether they would like it to be visible whether items were bought or not. These results will be discussed in the general discussion.

*Results and Discussion*

Table 1b contains all the means and paired t-tests to test for differences. As Table 1b shows, Hypothesis 1 is confirmed as gamers disapproved more of the use of microtransactions to buy functional benefits than ornamental ones. These results support the idea that players do not disapprove of the use of an outside influence (money) on a game-world per sé, only when this outside influence makes another objectively better off is the use of microtransactions perceived more negatively.

Table 1b  
*Results of Study 1–MapleStory*

	Functional		Ornamental		Statistics		
	<i>M</i>	( <i>SD</i> )	<i>M</i>	( <i>SD</i> )	<i>t</i> (39)	<i>p</i>	<i>d</i>
H1: Disapproval of buying functional items							
Disapprove of the possibility to buy items	3.73	(2.28)	2.23	(1.66)	3.16	.003	0.50
Does not annoy me that others buy items	4.72	(2.11)	6.23	(1.37)	4.03	<.001	0.66
Items that are bought with real money should be permanent(1) / temporary(7)	3.08	(2.51)	1.93	(1.62)	3.06	.004	0.51
H2: Respect for player who bought items							
Disrespect for a stronger player who bought items with real money	3.50	(2.28)	2.35	(1.75)	3.11	.003	0.50
Tend to like other players who bought items	3.55	(1.48)	4.05	(1.69)	1.92	.062	0.31
H3: Cooperate with player who bought items							
Like to cooperate with players who bought items	4.03	(1.46)	4.25	(1.46)	0.92	.362	0.14
Tend to ignore players who bought items	3.10	(1.84)	3.15	(1.98)	0.16	.874	0.03

*Note.* *N* = 40. Exact questions and scale labels in Table 1a.

Participants were also more annoyed if others bought functional benefits. In both these cases, the means indicate that the buying of ornamental items was quite acceptable and people seemed to approve of the possibility and were not that much annoyed by it. For functional benefits, players were much more ambivalent about this; they scored around the midpoint of the scale for both disapproval and annoyingness. We also found that where players thought ornamental items that were bought should be permanent, for functional items people preferred them to be more temporary. Furthermore, Hypothesis 2 is confirmed as players respected those who buy in-game functional advantages less than those who bought ornamental items. There was also a marginally significant effect that players who bought the functional items were liked less. The pattern thus seems clear that people respect those who buy in-game advantages less. Our third hypothesis, that players would want to avoid those who buy functional items, was not supported. Players did not indicate to avoid those buying functional items more nor did they indicate to ignore them more.

We found that gamers disapprove more of functional items than ornamental items being bought with real money, confirming Hypothesis 1. Note that because we used a within-subjects design, it is possible that participants were more extreme in their answers than they normally would be, because they automatically contrasted the two types of microtransactions. If this happened, the directions of the effects are not affected (gamers are more positive towards the buying or ornamental vs. functional items), but the degree to which they like ornamental items more than functional ones may be overestimated.

<sup>2</sup>Throughout the manuscript we present the exact questions and scale anchors in Tables 1a, 2a, and 3a, for Studies 1 to 3 respectively. The questions in these tables are presented in the order they were answered by the participants. The results are presented in Tables 1b, 2b, and 3b, where they are clustered by the hypotheses they were designed to test. This gives the exact information on how studies were conducted while making interpretation of results easiest.

## Study 2

In Study 1 we clearly found that people disapprove more of the buying of functional items than of ornamental items. In Study 2 and 3 we will further investigate the consequences of buying functional items, and tested whether players who buy upgrades using real money are perceived more negatively as compared to players who have earned the same upgrades via in-game mechanics. This study was conducted with participants who were regular players of World of Tanks. World of Tanks is a strategy oriented MMO featuring team battles with historical tanks. In this game, two teams of ten players enter a battle with the goal of capturing an objective of the opposing team (i.e., flag or base) or to destroy all enemy tanks. Players begin with a weak low level tank but accumulate points that can subsequently be used to buy a new tank or to customize their current tank. World of Tanks uses a freemium business model, meaning that the game is free to play but that players can spend money to gain advantages. Gamers can buy in-game gold with real money, which can subsequently be used to buy tanks or special ammo that is more likely to damage an opponent, to increase the accumulation of experience points, or to buy an increased rate of earning credits (another in-game currency). Hypothesis 2 to Hypothesis 5 were tested in this study.

### Method

We approached players of World of Tanks via several online message boards dedicated to this game. In total 368 people started the online questionnaire with 256 (250 males, 3 females, 3 unknown,  $M_{age} = 29.6$ ,  $SD_{age} = 8.6$ ) finishing it to the end (a 70% retention rate). As we did not offer any form of compensation for their participation, these are decent retention rates. Of the players who filled out the questionnaire, 216 currently had, or used to have, a premium account. On average, players spent \$124 ( $SD = \$419$ ) on the game, with a median of \$40.

Participants were randomly assigned to one out of four conditions. In two of the conditions participants read that the opposing player had bought a tank with in-game credits, in the other two participants read that the tank was bought using real money (earned vs. bought conditions). Furthermore, we also orthogonally manipulated whether the opposing player had a tank of equal level, or one of a higher level. This means that in total there were four different conditions; bought-higher, bought-equal, earned-higher, and earned-equal. We expected that in both situations in which the other had bought the tank, players would respond more negatively towards the other. After all, either they were undeservedly better off by having bought a better tank, or they were undeservedly better off because they had bought a tank of the same level as the player (who had to have played a great many hours to be able to buy such a tank with earned in-game credits).

The questionnaire asked participants to imagine being in a battle that had almost ended with only the player and one opponent left alive. They were told that they had an unspecified level 5 tank with full health. Depending on the condition, they read that their opponent had a tank that was only available for purchase with real money (“Churchill” in equal condition and “Löwe” in the higher condition) or one that could be bought using credits that are earned through gameplay (“KV-1” in the equal conditions, or “IS-3” in the higher condition). Appendix A contains the exact scenario.

After reading this scenario, participants indicated how they perceived the opposing player by answering seven questions (see Table 2a for the exact questions). These questions tapped into the four domains we predicted to be affected by the opponent buying an advantage rather than earning it; decreased respect for the opponent (H2), decreased desire to cooperate with the opponent (H3), desire to bring the opponent down (H4), and a lower motivation to improve oneself (H5).

Table 2a  
Questions of Study 2–World of Tanks

Question	Scale	
	1	7
How skilled do you think your opponent is?	Not skilled at all	Exceptionally skilled
Would you like to have this opponent in your team in a future game?	Not at all	Very eager to
Do you think your opponent has a high status in the general World of Tanks community?	Very low status	Very high status
Do you think your opponent has a high status?	Very low status	Very high status
How motivated are you to destroy your opponent’s tank?	Normally motivated	Very motivated
Does your opponent motivate you to improve your tank?	Doesn’t motivate me	Motivates me very much
Does your opponent tempt you to buy a tank with gold? <sup>a</sup>	Doesn’t motivate me	Motivates me very much

<sup>a</sup>gold is the in-game currency that is bought using actual money.

Results and Discussion

Because the effect of earned vs. bought did not differ between conditions in which the enemy had a superior tank as compared to one of the same level (interaction: Wilk’s  $\Lambda = .98$ ,  $F = 0.72$ ,  $p = .658$ ), we combined these conditions leaving us with only two conditions; earned vs. bought.<sup>3</sup> It is striking to see that it did not matter whether the player who bought an in-game benefit bought something that really made them better than the participant, or whether the other player bought an item that put them at the same level as the participant. We initially expected upward comparisons to only occur when the other player bought items to outrank the gamer and is actually better off. However, we now think that a player who extensively played the game to earn a certain tank in World of Tanks and who is then confronted with another player who simply bought a similar tank can still make an upward social comparison in another domain: although the outcome is the same for both players, the other is better off by spending far less time getting to the same outcome. In hindsight, this fits with equity theory, one of the major frameworks in the social comparison literature (see Adams, 1965).

All means, standard deviations and statistical test comparing the conditions are reported in Table 2b. Consistent with Study 1, the results confirm Hypothesis 2; participants judge the opponent who bought a tank to have lower skill and status in the World of Tanks community. A similar trend was found on perceptions of status in general, though not significantly ( $p = .10$ ). Unlike Study 1, we now did find that participants had a weaker desire to have the person who bought their tank in their team as compared to the person who earned their tank (H3).

Table 2b.  
Results of Study 2–World of Tanks

	Bought Tank		Earned Tank		Statistics		
	M	(SD)	M	(SD)	F(1,124)	p	$\eta_p^2$
H2: Respect for player							
Think opponent is skilled	4.00	(1.01)	4.47	(0.99)	6.92	.010	.05
Opponent has high status in WoT community	3.21	(0.96)	3.72	(0.97)	8.78	.004	.07
Opponent has high status	3.50	(1.00)	3.80	(1.00)	2.78	.098	.02
H3: Cooperate with player							
Like opponent in team in future game	3.39	(1.14)	4.19	(1.19)	14.85	.001	.11
H4: Wish player would fail							
Motivation to destroy opponent’s tank	4.79	(2.16)	5.08	(2.13)	0.57	.452	.01
H5: Player motivates me							
Opponent motivates to improve own tank	3.98	(1.93)	4.33	(1.99)	0.97	.326	.01
Opponent tempts me to buy a tank	2.34	(1.53)	1.78	(1.30)	4.88	.029	.04

Note. N = 256. Exact questions and scale labels in Table 2a.

We did not find support for Hypothesis 4, that participants would be more motivated to destroy the opponent’s tank when it was bought rather than earned. Retrospectively, it seems likely that some players may be extra motivated to do their utmost best when playing against a player they perceive to be highly skilled. This means that people may be both motivated to destroy someone who bought an advantage (because they find it unfair) but also like to destroy really skilled opponents who did not buy an advantage (because this would imply good skill for oneself as well). In Study 3 we will therefore use a slightly different measure to test for negative behavior towards the player who bought an in-game advantage and use more indirect measures.

Finally, for Hypothesis 5 we found that players were not more likely to work harder to improve their own tank when the other player had earned instead of bought an advantage. They did become more tempted to spend actual money to buy a better tank themselves when the other had bought the tank. So players who are confronted with another player who engages in the negatively perceived behavior of buying an advantage (as can be seen on the previous questions), actually became more tempted to buy such an advantage for themselves as well. This may be because the other served as an example of how one can also improve in the game and perhaps shows that buying a tank is quite normal behavior. Based on the social psychological theories discussed in the introduction, we still expected players to be more motivated by seeing someone who earned a good position than by someone who

<sup>3</sup>We did find a main-effect of higher level vs. same level on some of the individual questions; people who played against an opponent with a higher level tank thought this opponent to be more skillful ( $M_{15} = 3.88$ ,  $SD = 1.16$  vs.  $M_{18} = 4.24$ ,  $SD = 1.02$ ,  $p = .010$ ); were less motivated to destroy the opponent ( $M_{15} = 5.73$ ,  $SD = 1.88$  vs.  $M_{18} = 4.94$ ,  $SD = 2.14$ ,  $p = .002$ ); thought the opponent had a higher status ( $M_{15} = 3.43$ ,  $SD = 0.91$  vs.  $M_{18} = 3.65$ ,  $SD = 1.01$ ,  $p = .067$ ); were more motivated to improve their tank ( $M_{15} = 3.06$ ,  $SD = 1.90$  vs.  $M_{18} = 4.16$ ,  $SD = 1.96$ ,  $p < .001$ ); and were more tempted to buy gold ( $M_{15} = 1.69$ ,  $SD = 1.31$  vs.  $M_{18} = 2.06$ ,  $SD = 1.44$ ,  $p = .035$ ). In general, this indicates that stronger opponents are evaluated to be more skillful and have a higher status, and that stronger opponents increase the motivation to perform and improve.



bought such a position. Because there were theoretical reasons to expect such increased motivation, we still included measures of a participant’s motivation to improve in Study 3 to explore this idea further.

### Study 3

In Study 2 we found that players who buy items are perceived as having lower status (H2), would be avoided in gameplay (H3), but also tempt players to buy something oneself. We did not find an effect on the motivation to beat the other player, perhaps because players might also become extra motivated to beat players who have an advantage that they earned, as that would be more of a challenge. Besides replicating our previous findings, a main goal of this third study is therefore to see whether players who buy an advantage do elicit more negative feelings and motivations, but perhaps more indirectly so. We therefore now focus on more schadenfreude related items (would players be amused if another player who had bought an advantage suffers a misfortune in the game?) and more ambiguous motivations (if you could only save one other player, would you save your teammate who had bought an advantage or another one?). We expected that the negative feeling towards the player who buys an in-game advantage that we found in Studies 1 and 2 would be likely to manifest itself on items such as those.

A second contribution of Study 3 is that we tested whether our hypotheses are also confirmed in situations where the player using microtransactions is an ally instead of an enemy. It might be possible that the findings of Study 2 only arose because the other player was presented as an enemy in the game, and our respondents were just searching for any negative information they could use to talk negatively about an opponent. That another player bought an advantage would be easy information to use to paint a negative picture of the opponent. Do note, however, that even if this were the case, it still implies that buying an advantage is seen as something negative. Furthermore, when an opponent uses microtransactions, this negatively influences the probability of winning by the participant as they face a tougher opponent. When an ally uses microtransactions, on the other hand, this actually increases the probability of winning as the team of the participant becomes more powerful. Still, based on the social psychological literature discussed in the introduction, we would still expect gamers to react negatively to an ally buying in-game advantages.

Table 3a.  
*Questions in Study 3–Diablo 3*

Question	Scale	
	1	7
How skilled do you assume the Wizard is?	Not skilled at all	Exceptionally skilled
Do you respect players such as the Wizard?	Do not respect them at all	Respect them very much
Do you approve of players who buy items with: gold they earned playing/ real life money?	Don’t approve of them at all	Approve of them completely
If you had to choose, would you rather have the Wizard in your team than the Demon hunter?	Yes / No	
Imagine that you enter a PVP area, would you like to have the Wizard in your team instead of in the opponent’s team?	Yes / No	
Do you hope that the Wizard would fail in a later stadium of the game?	Don’t hope he fails	Hope he fails
Would you find it amusing if the Wizard would die eventually?	Not amusing at all	Quite amusing
Does the Wizard motivate you to grind for better gear?	Doesn’t motivate me	Motivates me very much
Are you more motivated to do your utmost best in this quest with the Wizard in your party?	Not more motivated	More motivated
If you could only save the Wizard or the Demon Hunter at one point, who would you rather save?	Wizard / Demon Hunter	

### Method

Several weeks before the release of Diablo 3 we approached members of different Diablo 3 anticipation forums to participate in our study. Even though Diablo 3 was not released yet, we chose this game because of the much anticipated and discussed new auction house that allowed players to buy and sell items for in-game gold as well as real-life money.<sup>44</sup> In total, 236 gamers (225 males, 9 females, 2 unknown,  $M_{age} = 24.8$ ,  $SD_{age} = 4.8$ ) participated in

<sup>44</sup>Please note that because Diablo III was not released yet at the time of this study, the scenario did resemble expectations of the game-play at that time, but there are differences between the scenario and the game as it was finally introduced.

this study. All participants read a scenario in which they were asked to imagine being a certain character in the game (a witch doctor) who teamed up with several others including a wizard. We created two between-subjects conditions. In both conditions participants read that the wizard had very nice gear that he bought from the auction house. Crucially, in one condition it was stated that he bought this gear using a credit card whereas in the other it was stated that it was bought using gold that was earned in the game. Appendix B contains the exact scenario. After reading this scenario, participants answered 10 questions about how they perceived this player and how they would act towards him (see Table 3a for the exact questions).

Just like in Study 2, these questions were designed to test Hypotheses 2 to 5, but because some of the questions in Study 2 turned out to be difficult to interpret, they were slightly adjusted and expanded. Hypothesis 2 (players who buy an advantage are respected less) was tested with items tapping into the perceived skill of the other player, respect for the other player, and approval of how items were acquired. Hypothesis 3 detailed whether people wanted to cooperate with a player who either bought or earned an advantage, was tested with questions on whether players would want the other in their team and a question on whether they would save the player (when given a choice between saving that player or another one). Hypothesis 4 refers to ill will towards the other, and was tested with a question about whether they hoped the other would fail later in the game and a question on whether they would be amused if the other would fail. Finally, Hypothesis 5 was tested with a question whether they would be motivated to improve their own position through gameplay (grinding) and whether they would be motivated to perform well with the other player in their party. We also tested whether gamers approved of players who buy items with gold they earned/bought. Finally, we tested whether they wanted to be able to see if other gamer’s items are gained through real money or experience. Results of the latter question will be discussed in the general discussion.

*Results and Discussion*

The results of Study 3 globally replicated the findings of Study 2; see Table 3b for all means and standard deviations of the questions testing our hypotheses. The results show that gamers respect the other less and think they have lower skill when that other person bought their advantage rather than earned it, and disapprove more of buying than earning items (H2). Gamers also indicated to generally be more likely to avoid the other and cooperate less with them when the other player bought an advantage rather than earned it (H3). They were less likely to want the other on their team when an advantage was bought (on one of the two questions measuring this), and are less likely to save the player when he was at risk of dying.

Table 3b.  
*Results of Study 3–Diablo 3*

	<b>Bought</b>		<b>Earned</b>		<b>Statistics</b>		
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>	<i>F / χ<sup>2</sup></i>	<i>p</i>	<i>η<sub>p</sub><sup>2</sup>/Φ</i>
H2: Respect for player							
Perception of skill of Wizard	3.91	(1.19)	4.62	(1.20)	20.36	.001	.08
Respect of Wizard	4.16	(1.43)	4.64	(1.40)	6.70	.010	.03
Approve of player getting items that are ...	4.78	(1.87)	6.02	(1.38)	32.64	.001	.12
H3: Cooperate with player							
Would like Wizard in team	64%		70%		1.12	.292	.07
In PVP area, prefer Wizard in own team instead of in opponent’s team	53%		70%		6.30	.013	.16
If you could save one of two players, would you save the Wizard?	60%		76%		6.78	.009	.17
H4: Wish ill will toward player							
Hope Wizard would fail later in game	3.29	(2.03)	2.74	(1.78)	4.90	.028	.02
Find it amusing if Wizard would die	4.65	(2.10)	4.23	(2.15)	2.25	.135	.01
H5: Motivated by other player							
Wizard motivates to grind for better gear	3.59	(2.06)	4.37	(1.99)	8.74	.003	.04
Motivated to do well with Wizard in team	3.87	(1.82)	4.12	(1.88)	1.10	.295	.01

*Note.* *N* = 236. Exact questions and scale labels in Table 3a. Wizard refers to the other player’s avatar, who was either better off through earned gameplay or by having bought an in-game advantage.

Even though the other was an ally in this case rather than the enemy, and the other doing well is thus beneficial to our respondents, participants still were more likely to hope that the other would fail when the improvements were bought (H4). They also indicated that they would find it slightly funnier if the other failed, but this difference was not significant. Finally, we found (mixed) support for players being more motivated to improve by a player who earned an advantage instead of buying it (H5). Respondents indicated that seeing the other player with earned

items would motivate them to grind (play more) to obtain such items themselves. Participants also indicated to be more motivated to do well with the other player in the team when that player earned his advantage, but this difference was not statistically significant.

## Discussion

The combination of two important contemporary aspects of gaming, namely the use of microtransactions to buy in-game benefits and the strong social aspects of games, leads to some hidden costs. In three studies we find that people respond negatively to players who buy functional benefits in games. Based on psychological theories on social comparison, we predicted and found that players who acquire in-game benefits through the use of microtransactions are seen as less skilled and are respected less. We even found that players have ill will towards the microtransaction-using gamer. It is unclear whether these negative reactions decrease cooperation: No difference was found between whether players wanted to cooperate with those buying functional or ornamental objects in Study 1, but in Studies 2 and 3 three of the four cooperation measures showed that people were less willing to cooperate with another player who bought a functional advantage compared to a player who earned that advantage through gameplay.

The theories on social comparisons helped to identify situations in which the negative response was expected to be stronger than other situations. First of all, we predicted that using real money to buy in-game goods would mainly evoke negative responses if these goods offered functional benefits. This moderating role of functionality was confirmed in Study 1.

Following this, in Study 2 we find that gamers are generally more negative towards an opponent who bought, rather than earned, a functional in-game advantage. If these effects mainly exist because people care about how their performance compares to others (as social comparison theory predicts), people are even predicted to dislike *allies* who bought their advantage, even though this bought advantage indirectly helps the gamer as well. The reason for this is that also allies who are (undeservedly) better off than oneself reflect badly on oneself (as one's own relative standing is lowered). This was confirmed in Study 3, where allies who bought an advantage were still reacted to negatively.

It is important to note that we do not wish to claim that these perceptions of players who buy an advantage are necessarily incorrect. For example, a person who spends hours grinding experience points to get a level 8 tank might actually become a better player while doing so compared to a player who buys a level 8 tank with a credit card. Furthermore, status depends on how people see and evaluate each other. In computer games, the status of a player is determined by how they are perceived by other players and our results suggest that players who buy an advantage are seen to have less status by other players. Players can thus be correct in assigning lower status to these players.

Ironically, our research also shows that despite people's negative attitudes towards other players who use microtransactions, people actually become tempted to spend money on microtransactions themselves if they are confronted with other players who use them. Study 2 finds that players in *World of Tanks* indicated to become more tempted to buy a better tank themselves, when they had been playing against a player who had bought such an advantage. Possibly, gamers are not consciously aware of their negative attitudes towards others who use microtransactions for functional benefits, or they may believe the gains outweigh the negative consequences.

Of course, we are not the first to point out that players may respond negatively towards other players who buy an in-game advantage using real money. For example Bartle (2004) argues that players will probably see the use of real money (or other ways outside of the game itself) to gain in-game advantages as cheating. He supports this assertion by mentioning derogatory terms used by gamers to describe people acquiring in-game advantages by outside mechanisms, such as "twinks" or "ebayers". Similarly, others also argue that buying in-game items with real money is perceived as cheating the game (Lehdonvirta, 2008). Games could be seen as magic circles (Huizinga, 1955; Salen & Zimmerman, 2003), worlds of play that are shielded from the outside world with their own special rules. Outside rules and systems are not supposed to have a place in these magic circles of games, and any penetration by outside influences of a magic circle is seen as a norm-violation (Salen & Zimmerman, 2003). However, our findings do not seem to support the general argument of "*magic circles*" where outside influences should not be able to enter the game realm: If gamers would feel negativity towards microtransactions only because they believe outside influences should not affect game-worlds, then they should feel negative towards microtransactions used for functional benefits as well as ornamental ones.

### *Limitations*

In our studies we only looked at games in which the social aspect is a shared world in which gamers play the game. One can wonder whether similar effects emerge when the social component is shared outside of the game-world, as is often the case with social network games (such as most games on Facebook where one can show off achievements to others) and achievement ranking on game-platforms such as Steam and Xbox Live. Based on social comparison theory, we would expect similar effects to emerge there. However, we do expect the moment of envy to differ between these two situations. More specifically, while envy is experienced during gameplay in games such as World of Tanks and Diablo 3 (as in these experiments), in social network games envy is experienced most likely when one stops playing the game and compares one's status (or ranking) to that of the others. Furthermore, it is often easier to avoid information about others in social network games than it is in shared online environments (for example, in Steam only the Steam-level of others is visible in the home-screen). When information is experienced negatively and easy to avoid, gamers may avoid this information altogether and thus avoid experiencing the effects of upward social comparisons.

In our studies, the participants were almost exclusively males, which is a direct consequence of the games we investigated being predominantly played by males. The only study in which we can cast a quick glance at possible gender-differences is Study 1, where 28% of participants was female. The sample size is small, but if anything, females seemed to be more affected by others buying advantages than males were: females were more annoyed by others buying items, and respected those buying functional items less than males did. That said, because the player-base of most games is predominantly male, our results most likely provide the most accurate estimate of the average effect of microtransactions in real gaming situations.

Finally, our studies used samples recruited from internet discussion forums for the specific games we studied. This likely led to a self-selection of only the most involved players of games entering our study as participants. Similarly, although we had decent retention rates in our studies, it is also likely that it were the most involved players who finished our studies. Whether our results are as strong for less involved players is an interesting question, but we expect that especially for highly involved players in-game status is important and our findings are thus relevant.

### *Practical implications*

Our work is, to the best of our knowledge, the first work that has experimentally tested the social effects of using microtransactions. It is, however, consistent and compatible with other work on microtransactions. For example, Oh and Ryu (2007) have investigated two successful MMO's using microtransactions and came to the conclusion that whereas ornamental items can be made permanent, a game developer would be wise to make functional items that can be bought with real money only useable for a limited amount of time. Our results agree with the majority of the conclusions of their case-study. We found that players do not have a problem with ornamental items being bought with real money, but think that items that provide a functional benefit need to be "deserved" by playing the game. In Study 1 and Study 3 we also asked participants whether they would like to be able to see which items are bought, on a scale from 1 ("should be visible") to 7 ("should not be visible"). Responses to this question are presented in Figure 1a and Figure 1b (see appendix C). What is interesting to note is that gamers seem to have strong feelings about the visibility about bought items with the majority of participants choosing the extremes of the scale. Participants seem almost evenly split, with a large group strongly supporting bought items being visible, and another large proportion being strongly against it. One possible explanation could be that those who use microtransactions realize that people may act negatively towards them and therefore prefer it to be hidden (since as long as no-one knows they used microtransactions, they will not be judged). However, we do not find a correlation between money spent in the game and the degree to which gamers think the use of microtransactions should be hidden or visible, ( $r(40) = .08, p = .64$  in Study 1). The strong differences in attitudes towards whether the use of microtransactions should be visible to others suggests that looking into this more may shed further light on how different gamers approach and perceive game-worlds, and the norms in it in general.

While making microtransactions invisible to other players might prevent negative consequences for the one using them, it also makes it impossible for players to reliably assess the status and skills of others. If people do not know whether someone earned their powerful character through gameplay or by buying it, it becomes less clear whether a powerful character should be assigned high status or not. Reliable status hierarchies are important to people, for both the person with high status as they are helped more by others (Nelissen, 2008), and those with low status as it helps them to determine which role models to follow and affiliate with (Henrich & Gil-White, 2001). When it is unclear whether players earned or bought their status, the status hierarchy becomes less reliable and as a result players will find the status hierarchy less important. This likely reduces the motivation for players to want to achieve a high position, as the potential benefits of a high status will be lower (Searcy & Nowicki, 2005). Making

microtransactions invisible to other players might thus make the status hierarchy of the game less reliable and in turn make players less motivated to play the game to increase their own status.

An important question that remains is whether the same negative response can be found if gamers do not buy the reward, but buy the means to gain the reward. For example, in *World of Tanks* a player can buy a new tank, but players can also spend real money to increase the rate with which experience points and in-game credits are accumulated. Would gamers also hold negative views against this method of improving one's in-game standing position? Based on psychological theories, we would expect they find this much less aversive. If the outcome appears to be more deserved, as is the case when the gamer has worked for it, negative judgments should be attenuated. So the amount of "work" the gamer has to do before earning the benefit is likely to be an essential factor in the responses it will elicit, one that game-designers would do well to take into account.

#### *Theoretical implications and further research questions*

An important question is whether the negative feelings towards microtransactions-using players actually transfers to the game itself. Perhaps the dislike of others using microtransactions for functional items is so strong that it actually deters players from playing the game. If this is the case, the hidden cost of microtransactions might not only be social in nature (that they see those who use them as having lower status), but might also affect how satisfied a player is with the game itself. How would a player feel if they lose a battle in *World of Tanks* from a player who bought an advantage, compared to a player who had earned the advantage? We think the former might lower satisfaction with the game. This would be consistent with ideas derived from the case-study of Oh and Ryu (2007), but also with our finding in Study 3 that players confronted with someone who bought an advantage were less willing to grind to get good items themselves. Future research could give insights in how to use microtransactions to increase revenue, without deterring players from the game.

An interesting avenue for further study is to see whether gamers themselves expect these hidden costs. A large group of the gaming population can be characterized as having an achievement-motivation (Yee, 2006). Gamers with an achievement motivation care about achieving progress, power, status, and domination. It can therefore be expected that such gamers are more likely to buy in-game benefits to gain progress and increase their in-game status (but see, Guo & Barnes, 2009). Our results suggest that microtransactions can help these players with an achievement motivation in their goal to gain progress, but doing so actually hurts their goal of achieving status: Instead of gaining status by improving their character via microtransactions, such players may actually actively harm their status instead.

#### **Conclusion**

To conclude, we find that players who use microtransactions to buy functional advantages are respected less by other players. Furthermore, on some measures we found that players prefer not to cooperate with them, and we also found that players hope that those who buy functional advantages will fail later in the game. The current research reveals the hidden costs that microtransactions have, as players respond negatively to other players using them. Our findings and theoretical perspective provide insights in how game developers might minimize the negative effects.

#### **References**

- Adams, J. S. (1965). Inequality in social exchange. In L. Berkowitz (ed). *Advances in Experimental Psychology*. (267–299). New York: Academic Press.
- Bartle, R. (2004). Pitfalls of virtual property. Retrieved on January 28, 2015, from <http://mud.co.uk/richard/povp.pdf>
- Collins, R. L. (1996). For better or worse: The impact of upward social comparison on self-evaluations. *Psychological Bulletin*, 119, 51–69. doi:10.1037/0033-2909.119.1.51
- Feather, N. T. (1999). Judgments of deservingness: Studies in the psychology of justice and achievement. *Personality and Social Psychology Review*, 3, 86-107. doi:10.1207/s15327957pspr0302\_1
- Feather, N. T. (2003). Distinguishing between deservingness and entitlement: Earned outcomes versus lawful outcomes. *European Journal of Social Psychology*, 33, 367-385. doi:10.1002/ejsp.152

- Feather, N. T., & Sherman, R. (2002). Envy, resentment, Schadenfreude, and sympathy: Reactions to deserved and undeserved achievement and subsequent failure. *Personality and Social Psychology Bulletin*, 29, 953–961. doi:10.1177/014616720202800708
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117–140. doi:10.1177/001872675400700202
- Fiske, S. T., Cuddy, A. J. C., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology*, 82, 878–902. doi:10.1037//0022-3514.82.6.878
- Guo, Y. & Barnes, S. (2009). Virtual item purchase behavior in virtual worlds: An exploratory investigation. *Electronic Commerce Research*, 9, 1–2. doi:10.1007/s10660-009-9032-6
- Henrich, J., & Gil-White, F. J. (2001). The evolution of prestige. Freely conferred deference as a mechanism for enhancing the benefits of cultural transmission. *Evolution and Human Behavior*, 22, 165–196. doi:10.1016/s1090-5138(00)00071-4
- Huizinga, J. (1955). *Homo ludens: A study of the play element in culture*. Boston: Beacon Press.
- Lehdonvirta, V. (2008). Real-money trade of virtual assets: New strategies for virtual world operators. *Virtual Worlds*, ed. Mary Ipe, Icfai University Press, 113–137. doi:0.2139/ssrn.1351772
- Lehdonvirta, V. (2009). Virtual item sales as a revenue model: identifying attributes that drive purchase decisions. *Electronic Consumer Research*, 9, 97–113. doi:10.1007/s10660-009-9028-2
- MMODData. (2012). <http://users.telenet.be/mmodata/Charts/Subs-1.png>, retrieved on 22-07-2015.
- Nelissen, R. M. A. (2008). The price you pay: Cost dependent reputation effects of altruistic punishment. *Evolution and Human Behavior*, 29, 242-248. doi:10.1016/j.evolhumbehav.2008.01.001
- Oh, G. & Ryu, T. (2007). Game Design on Item-selling Based Payment Model in Korean Online Games, *Proceedings of the DiGRA 2007 Conference*.
- Salen, K., & Zimmerman, E. (2003). *Rules of play: Game design fundamentals*. Cambridge, MA: MIT press.
- Searcy, W. A., & Nowicki, S. (2005). *The evolution of animal communication: Reliability and deception in signaling systems*. Princeton, NJ: Princeton University Press.
- Smith, M. & Kollock, P. (1999). *Communities in cyberspace*. London: Routledge.
- Smith, R. H. (2000). Assimilative and contrastive emotional reactions to upward and downward social comparisons. In J. Suls L. Wheeler (Eds.), *Handbook of social comparison: Theory and research* (pp.173–200). New York: Plenum.
- Smith, R. H. & Kim, S. H. (2007). Comprehending envy. *Psychological Bulletin*, 113, 46–64. doi:10.1037/0033-2909.133.1.46
- Smith, R. H., Parrott, W. G., Ozer, D., & Moniz, A. (1994). Subjective injustice and inferiority as predictors of hostile or depressive feelings in envy. *Personality and Social Psychology Bulletin*, 20, 705–711. doi:10.1177/0146167294206008
- Tesser, A. (1988). Toward a self-evaluation maintenance model of social behavior. *Advances in Experimental Social Psychology*, 21, 181–227. doi:10.1016/S0065-2601(08)60227-0
- Van de Ven, N., Hoogland, C., Smith, R. H., Van Dijk, W. W., Breugelmans, S. M., & Zeelenberg, M. (2015). When envy leads to schadenfreude. *Cognition and Emotion*, 29, 1007–1025. doi:10.1080/02699931.2014.961903
- Van de Ven, N., Zeelenberg, M., & Pieters, R. (2009). Leveling up and down: The experience of benign and malicious envy. *Emotion*, 9, 419–429. doi:10.1037/a0015669
- Van de Ven, N., Zeelenberg, M., & Pieters, R. (2011). Why envy outperforms admiration. *Personality and Social Psychology Bulletin*, 37, 784–795. doi:10.1177/0146167211400421

Van de Ven, N., Zeelenberg, M., & Pieters, R. (2012). Appraisal patterns of envy and related emotions. *Motivation and Emotion*, *36*, 195–204. doi:10.1007/s11031-011-9235-8

Wills, T. A. (1981). Downward comparison principles in social psychology. *Psychological Bulletin*, *90*, 245–271. doi:10.1037//0033-2909.90.2.245

Yee, N. (2006). The demographics, motivations and derived experiences of users of massively multiuser online graphical environments. *PRESENCE: Teleoperators and Virtual Environments*, *15*, 309–329.

**Appendix A**  
**Scenario used in Study 2 (World of Tanks)**

**Same level, bought tank:**

Imagine you are in the following situation: you are the only player left in your team situated in a begin point in an unspecified map. You have an unspecified tier 5 tank with full health and a fully trained crew. The opposing team also has only one player left.

Your opponent plays in a premium tier 5 tank, the Churchill. He also has full health and a fully equipped crew. The Churchill costs 1500 gold and is seen in the picture below.

Now please assess your opponent.

-----

**Same level, earned tank:**

Imagine you are in the following situation: you are the only player left in your team situated in a begin point in an unspecified map. You have an unspecified tier 5 tank with full health and a fully trained crew. The opposing team also has only one player left.

Your opponent plays in a tier 5 tank, the KV. He also has full health and a fully equipped crew. The KV costs 333 200 credits and is seen in the picture below.

Now please assess your opponent.

-----

**Higher level, bought tank:**

Imagine you are in the following situation: you are the only player left in your team situated in a begin point in an unspecified map. You have an unspecified tier 5 tank with full health and a fully trained crew. The opposing team also has only one player left.

Your opponent plays in a premium tier 8 tank, the Löwe. He also has full health and a fully equipped crew. The Löwe costs 12 500 gold and is seen in the picture below.

Now please assess your opponent.

-----

**Higher level, earned tank:**

Imagine you are in the following situation: you are the only player left in your team situated in a begin point in an unspecified map. You have an unspecified tier 5 tank with full health and a fully trained crew. The opposing team also has only one player left.

Your opponent plays in a tier 8 tank, the IS-3. He also has full health and a fully equipped crew. The IS-3 costs 2 568 500 credits and is seen in the picture below.

Now please assess your opponent.

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(for all questions and the order in which they were presented, see Table 2a)



**Appendix B**  
**Scenario used in Study 3 (Diablo III)**

**Earned-condition:**

Imagine that you are playing with a group of level 20 characters.

You are a Witch doctor.

The other members are: a Barbarian, a Demon hunter (DPS), and a Wizard (DPS).

You have seen the wizard before, and know that he is well equipped with very nice armor he bought in the auction house with gold he earned with playing.

Keeping this in mind, please answer the following questions:

-----

**Bought-condition:**

Imagine that you are playing with a group of level 20 characters.

You are a Witch doctor.

The other members are: a Barbarian, a Demon hunter (DPS), and a Wizard (DPS).

You have seen the wizard before, and know that he is well equipped with very nice armor he bought in the auction house with real money using his credit card.

Keeping this in mind, please answer the following questions:

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(For all questions and the order in which they were presented, see Table 3a)

Appendix C

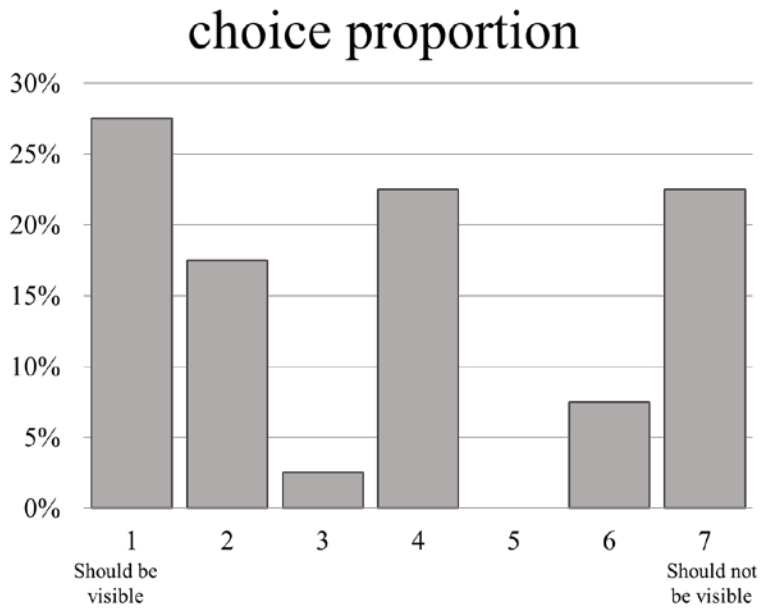


Figure 1a. Proportion of participants in Study 1 indicating whether they would like to see if an item was bought.

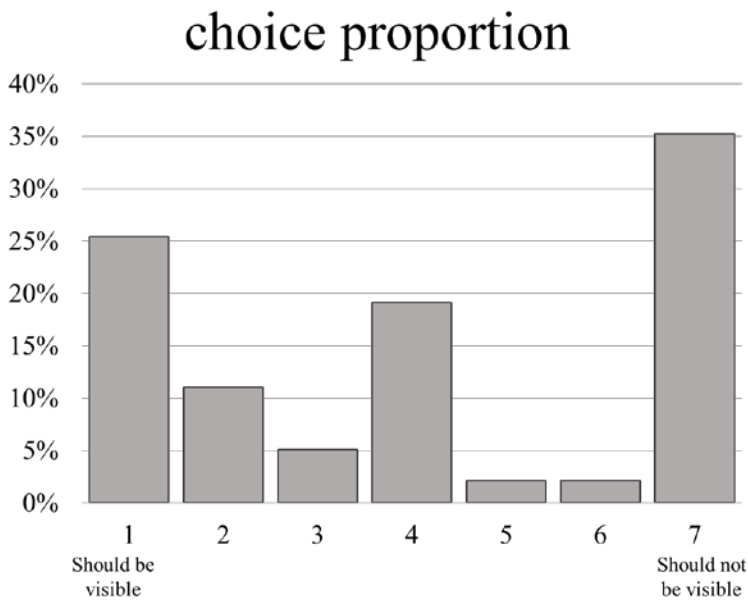


Figure 1b. Proportion of participants in Study 3 indicating whether it should be visible if an item was bought.