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Does avatar's character and emotional bond expose to gaming addiction? Two studies on Virtual self-discrepancy, avatar identification and gaming addiction in Massively Multiplayer Online Role-Playing Game players.

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Running head: VSD, AVATAR IDENTIFICATION AND GAMING ADDICTION

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Abstract

This study aims to analyze virtual self-discrepancy (VSD), avatar identification, and gaming addiction in Massively Multiplayer Online Role-Playing Games (MMORPGs). Two studies were conducted to test the relations between VSDs (i.e., idealized vs utopian avatar), avatar identification, and gaming addiction. In the cross-sectional survey (Study 1; 770 MMORPGs players) we assumed that higher MMORPG addiction was directly predicted by the construction of an idealized avatar (vs. utopian avatar) and by the avatar identification, which also mediated the relationship between the VSDs and gaming addiction. In the 2x2 experimental study (Study 2; 100 participants), manipulating VSD and avatar identification, we assumed that MMORPG addiction risk was higher in the idealized avatar-high identification condition than in the utopian avatar-low identification condition. Results confirmed that the more idealized the avatar was, the more the users increased their avatar identification (Study 1), that in turn was associated with gaming addiction (Study 1 and Study 2), and that only an idealized avatar (vs. utopian avatar) directly affected gaming addiction (Study 1). Furthermore, results showed that MMORPG addiction risk was higher in participants who customized an idealized avatar and identified with it (vs. utopian avatar-low identification) (Study 2).

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Introduction

Massively Multiplayer Online Role-Playing Games (MMORPGs) are virtual worlds in which the players interact with the virtual world and with thousands of other players. The number of MMORPGs players is constantly increasing, and several million players worldwide daily access one or more MMORPGs, sometimes incurring in *Internet Gaming Disorder* (IGD; APA, 2013). MMORPGs are played by means of an avatar that is freely created by a player. Once the player enters the game, the avatar becomes the only medium through which the user can move in the virtual world, interact with other avatars, use objects and live adventures. Therefore, it is not strange that players can customize avatars that look more or less like themselves, as well as it is not strange that they can develop a strong emotional bond with the avatars they built. Both kinds of in-game behaviors – customizing an avatar that is similar or different from the offline self and identifying with it – are identity processes that fulfill some self needs of the players, such as self-esteem and self-efficacy (for a review see Sibilla & Mancini, 2018). In order to get some practical indications on how to prevent gaming addiction, the purpose of this research was to analyze the relation that the discrepancy between the avatar's and the player's personality and the identification with the avatar have with gaming addiction. Two samples of MMORPGs' players participated in a cross-sectional survey (Study 1) and in an experimental study (Study 2).

Virtual Self Discrepancy (VSD) and psychological wellbeing

Several psychological studies have focused on the relationship between the personality traits of the avatar and of the player in the context of MMORPGs drawing on the self-discrepancy theory (SDT; Higgins, 1987; 1989). As it is well known, SDT distinguished

three specific cognitive dimensions of the self: the actual self (the traits one actually possesses), the ideal self (the traits one would ideally like to possess) and the ought self (the traits someone believes one should or ought to possess). Furthermore, SDT postulated two emotional syndromes related to the two specific self-discrepancies: when a person believes that one's actual attributes are far from those he/she would like to possess, emotions such as dejection, sadness, disappointment, and depression will be experienced; whereas, when a person believes that his/her actual attributes are far from those he/she should or ought to possess, agitation-related emotions such as anxiety, nervousness, and guilt will prevail instead. Several studies have supported the STD hypotheses (e.g., Higgins, 1987; 1989) and found that self-discrepancies were correlated with pathology (e.g., Ozgul, Heubeck, Ward, & Wilkinson, 2003) and with other numerous dimensions related to the psychological wellbeing, such as the reduction of personal agency and of purpose in life (Stanley & Burrow, 2015).

SDT has been recently applied to the avatar-based virtual worlds. For example, introducing the *virtual identity discrepancy model*, Jin (2012) has defined the "virtual self-discrepancy" as "the degree to which a user's virtual identity represented in the form of an avatar in the VE (Virtual Environment) deviates from the user's actual identity in the real world" (p. 2161). Most of the studies that have analyzed the distance between the avatar and the offline self having the SDT as theoretical framework (e.g., Bessière, Seay, & Kiesler, 2007; Messinger et al., 2008; Ducheneaut, Wen, Yee, & Wadley, 2009; Van Looy, Courtois, & De Vocht, 2014) identified three self dimensions as co-existing when playing MMORPGs: an actual self, an ideal self and an avatar. Analyzing the relative distances among these self dimensions, these studies obtained consistent results, showing that the avatar was usually perceived and judged by the players as better than their actual self and/or worse than their ideal self, i.e., it generally was an idealized version of the actual personality of the player.

Specifically, exploring how 51 *World of Warcraft* (WoW) players evaluated their actual and ideal self and their avatar in terms of personality traits, Bessière et al. (2007) found that the discrepancy between the players' ideal self and their avatar was significantly smaller than the discrepancy between the players' ideal and actual selves. Specifically, they found that participants rated their avatar as more conscientious, extraverted, and less neurotic than themselves. This trend was stronger for players with lower levels of psychological wellbeing, here measured in terms of depressive affect and self-esteem. Messinger et al. (2008) found similar results. Evaluating the self from both physical and behavioral points of view, the authors found that *Second Life* residents made their avatars similar but somewhat more attractive, outgoing, risk-taking, and superficial than themselves. Similarly, measuring the Big Five Personality traits that users of three virtual worlds (*Maple Story*, *WoW*, and *Second Life*) attributed to their primary avatar and to their actual self, Ducheneaut et al. (2009) showed that users saw their avatar as an idealized version of their offline personality; i.e., they saw their avatar as more conscientious, more extraverted, and less neurotic than themselves. Data of this study also showed that participants with the smallest psychological difference between their avatar and their actual self were more satisfied with their avatar and more attached to it. These results are consistent with the ones obtained in the study by Jin (2012) on *Second Life* residents that showed that a bigger virtual self-discrepancy – i.e., a lower similarity of the avatar with the player's actual self – led to a subsequent decrease in presence, and, in turn, to a lower flow. Additionally, other works found that a lower distance between the avatar and the ideal self correlated with a lower psychological wellbeing. Specifically, it emerged from these studies that avatar idealization correlated positively with depression (Bessière et al., 2007) and negatively with self-esteem (Wang, Yang, & Shen, 2014), while players' self-esteem (You, Kim, & Lee, 2017) and self-efficacy (Snodgrass, Dengah, Lacy, & Fagan, 2013) negatively correlated with problematic gaming.

Bessière et al. (2007), Hefner, Klimmt, and Vorderer (2007), and Van Looy et al. (2014) explained the negative relation between avatar idealization and psychological wellbeing adopting a psycho-dynamic approach. In this perspective, avatar idealization has been considered as a way to alleviate the psychological distress derived from the players' perception of a large discrepancy between their actual and their ideal self. This interpretation is consistent with Higgins' theory (1987; 1989) and with Klimmt, Hefner and Vorderer (2009) assertion, according to which an idealized avatar could help the players in reducing their actual-ideal self-discrepancy, decreasing the distress associated with it.

The effects of VSD on avatar identification and gaming addiction

The psychological literature on MMORPGs explored many dimensions correlated with the player's wellbeing. Among them, two variables emerged as negatively correlated with wellbeing (You et al., 2017): game addiction—that is one of the most studied variables in this literature (Sibilla & Mancini, 2018)—and avatar identification—which emerged as the in-game variable most closely related to gaming addiction (e.g., Courtois, Van Looy, De Vocht, & De Marez, 2011; Leménager et al., 2013; Van Looy, Courtois, De Vocht, & De Marez, 2012; Van Looy et al., 2014).

Avatar identification has been defined as the degree of attachment between the user and their avatar and three subcategories have been identified (Van Looy et al., 2012): perceived similarity, embodied presence, and wishful identification. Avatar identification has been found to be higher in male and younger users (Blinka, 2008; Smahel, Blinka, & Ledabyl, 2008) and in players with more idealized avatars (Courtois et al., 2011; Ducheneaut et al., 2009; Mancini & Sibilla, 2017). In a large number of studies, high avatar identification correlated with avatar idealization and gaming addiction. For example, in You et al. (2017)'s study on middle school students, avatar identification positively correlated with gaming addiction and mediated the relation between depression and gaming addiction. Comparing

World of Warcraft addicted, non-addicted, and naïve participants, Leménager et al. (2013) found that addicted players had lower discrepancies between the 'ideal self' and the avatar on nearly all Giessen test subscales (Beckmann, Brähler, & Richter, 1990). Discussing these results, the authors suggested that the greater avatar idealization in addicted players could be caused by their higher identification with their avatar. Zhong and Yao (2013) found that avatar identification positively associated with the problems and salience as well as with the uncontrollable game-play dimension of game addiction measure. Smahel and colleagues (2008)'s study found that players with a higher tendency towards addiction were more proud and ashamed of their avatar, which they also perceived as being superior and often they wished to be like it in their real lives. The study by Van Looy et al. (2014) obtained similar results: players who strongly identified with their avatar also perceived their avatar as more ideal. Analyzing the relationships among ideal-actual and ideal avatar self-discrepancies, avatar identification and pathological gaming, Van Looy and colleagues showed that the players who had high scores on both avatar identification and pathological gaming tended to idealize their avatar compare to than the players who had low scores on both measurements. Furthermore, players who perceived their avatar as more ideal had a stronger tendency towards pathological gaming. Nevertheless, no interaction effects between avatar identification, pathological gaming, and self-discrepancies emerged from this study, thus not empirically supporting the authors psycho-dynamic hypothesis according to which avatar identification and pathological gaming could be primarily motivated by the desire to alleviate the psychological distress derived from the self-discrepancy as Klimmt et al. (2009) pointed out.

However, it is worth noting that only a few studies have investigated avatar identification and gaming addiction in relation to avatar customization motives other than idealization. Some studies showed that in some cases the avatar looked distant even from the

ideal self of the player, being for example a *utopian* avatar, i.e., an avatar that had traits that the user could not have in real life (Kafai, Fields, & Cook, 2007; Mancini & Sibilla, 2017; Parmentier & Rolland, 2009; see Sibilla & Mancini, 2018 for a review). As the study conducted by Mancini & Sibilla (2017) showed, about half of MMORPGs' players perceived their main avatar as different from (alter-ego) or as an antithesis of (negative hero) their offline personality; these players had a lower avatar identification compared to players who perceived their avatar as either closer to their actual self (actualization) or closer to their ideal self (idealization). Discussing these results, the authors suggested that it is probably when the avatar overcomes the offline self of the player that it can prevent his/her discomfort, because these players seem not to feel the need to use their avatar in order to reduce their actual-ideal self discrepancy and the associated discomfort predicted by SDT.

So at least two kinds of VSD have been documented by the studies. However, the question of how the VSDs linked to the construction of an idealized or an utopian avatar are related to the identification with the avatar and to the gaming addiction still remains largely unexplored, above all with respect to the idealized avatar. This research intends to make a contribution in this direction, also providing empirical evidences that can be useful for the prevention of gaming addiction. In fact, having information on how avatar customization and avatar identification can influence addiction can be used both by game designers and by mental health professionals in order to prevent MMORPGs problematic outcomes.

Overview of the current research: aim and hypotheses

The general aim of this research is to further clarify the relationships among VSDs, avatar identification, and gaming addiction. Even if the majority of the studies (e.g., Bessi re et al., Messinger et al., 2008; Ducheneaut et al. 2009) demonstrated that the avatar is generally similar to the ideal self of the player, i.e., it is an idealized avatar, other studies recently showed that the avatars can also be very different or even independent from the

offline self (Mancini & Sibilla, 2017; Parmentier & Rolland, 2009). What happens in terms of player's wellbeing when the traits that he/she would ideally like to possess are incorporated (i.e., idealized avatar) or are not incorporated (i.e., utopian avatar) into his/her virtual character was the question that this study intended to answer. Specifically, this study considered two different kinds of VSDs—i.e., the “idealized avatar” (the avatar that is similar to the ideal self of the player) and the “utopian avatar” (the avatar that is distant from the ideal self of the player)—and analyzed how they are related to avatar identification and to gaming addiction. Two studies have been conducted. The study 1 was a cross-sectional survey, and the aim was to analyze the relationships among VSDs (idealized vs. utopian avatar), avatar identification, and gaming addiction. Two models were tested in this study in which the identification with the avatar was the mediator of the relationship between the two kinds of VSDs and gaming addiction. The study 2 was a 2X2 experimental study, and the aim was to control the simple and the combined effects of avatar identification (manipulated in high vs. low) and VSDs (manipulated in idealized avatar vs. utopian avatar) on gaming addiction.

Testing the relationships among idealized avatars, avatar identification and gaming addiction. Studies on the relationships among avatar idealization, avatar identification and gaming addiction (e.g., Leménager et al., 2013; Van Looy et al., 2012; Van Looy et al., 2014; Zhong & Yao, 2013) in most cases only analyzed the associations among these variables, while the moderating or mediating effects of some variables on others have not been studied or, when studied, have not been empirically verified yet (Van Looy et al., 2014). Starting from Van Looy and colleague's assumption that gaming addiction could increase when players realize that the deep identification with the avatar does not help them to reduce their actual-ideal self-discrepancy (Klimmt et al., 2009), it is reasonable to assume

that an idealized avatar positively relates to gaming addiction, which also increases when avatar identification increases.

The study 1 and study 2 aimed at finding an empirical base for this assumption focusing on the relational path among avatar idealization, avatar identification, and gaming addiction. Specifically, in study 1 we hypothesized that an “idealized” avatar—i.e., an avatar better than the actual self—will directly increase MMORPG addiction (H1.1), which will also be directly predicted by avatar identification (H1.2), which in turn will partially mediate the relationship between avatar-actual self-discrepancy and gaming addiction (H1.3). Coherently, in study 2 we hypothesized that, among participants instructed to play with an idealized avatar, the MMORPG addiction risk (the intention to continue to play the game) will be higher in those who are invited to identify with the avatar (high avatar identification) than in those who are invited not to identify with it (low avatar identification, H2.1).

Testing the relationships among utopian avatars, avatar identification, and gaming addiction. Some studies have explored the possibility that the avatar may not always be positioned between the actual and the ideal self of the players, e.g., that it could be distant from the offline self of the player (e.g., Mancini & Sibilla, 2017; Parmentier & Rolland, 2009), representing a *utopian* avatar to the extent that it is located “beyond” the offline self of the player. When considering the increase of gaming addiction as a reaction to the player's perception of actual-ideal self-discrepancy (Klimmt et al., 2009), it is reasonable to hypothesize that an utopian avatar does not directly increase gaming addiction, since it is external to the actual-ideal self-discrepancy and to the emotional distress associated to it. Nevertheless, also in this case, gaming addiction could be encouraged by identification with the avatar (e.g., Mancini & Sibilla, 2017).

Studies 1 and 2 aimed at finding an empirical base for these assumptions. Specifically Study 1 focused on the relational path among a utopian avatar, avatar identification, and

gaming addiction, hypothesizing that an avatar better than the ideal self will not directly increase MMORPG addiction (H1.4), which will be directly predicted only by avatar identification (H1.5). In this case, avatar identification will completely mediate the relationship between avatar-ideal self-discrepancy and gaming addiction (H1.6).

Consistently, in Study 2 we hypothesized that, among participants instructed to play with a utopian avatar, the MMORPG addiction risk (the intention to continue to play the game) will be higher in those who are invited to identify with the avatar (high avatar identification) than in those who are invited not to identify with it (low avatar identification, H2.2).

Testing the effects of avatar customization motives and of avatar identification on gaming addiction. In Study 2 we also considered the interaction between VSDs (idealized vs. utopian avatar) and avatar identification (high vs. low). Specifically, in keeping with the studies showing the effects of both a large actual-ideal self-discrepancy (e.g., Klimmt et al., 2009; Leménager et al., 2013) and avatar identification (e.g., Smahel et al., 2008; van Looy et al., 2014; Zhong and Yao) on gaming addiction, we expected that the MMORPG addiction risk (the intention to continue to play the game) will be higher in the participants instructed to play with an idealized avatar and to identify with it, rather than in those instructed to play with a utopian avatar and not identifying with it (H2.3). Due to a presumable compensatory effect related to the presence of two inconsistent conditions, no significant differences in the MMORPG addiction risk (the intention to continue playing) are instead expected between the participants instructed to play with an idealized avatar and not to identify with it and the participants instructed to play with an utopian avatar and to identify with it (H2.4).

Study 1

Methods

Participants. Using *Survey Monkey* (www.surveymonkey.com) platform, an online survey was administered to a sample of MMORPGs' players recruited via advertisements posted on websites, forums, and Facebook pages and groups dedicated to MMORPGs. Data were collected in the period from May to August 2014. To be eligible to participate in the study, participants had to be MMORPG players and to be English language speakers, as the survey was carried out in this language. Complying with the Italian ethical standards, the anonymity of the participants was guaranteed and the participants' completion of the online survey was assumed to represent their implicit consent to participate. To ensure that participants would not have felt harmed or suffered any kind of psychological discomfort when filling in the survey, it was explained that they could have left the survey at any time and that they had the possibility to contact by mail or phone the supervisor of the study if they felt offended or annoyed because of the questions present in the questionnaire. Minors were informed to notify their parents or tutors before filling in the questionnaire.

In total, 1009 participants started the survey, 239 (23.69%) of whom were excluded because completed less than 30% of the questions. In the final sample (N 770), the 92.5% (712) of the participants completed (100%) the questionnaire. Most of the final sample was male (530, 69.30%, 5 missing). Participants' age ranged from 14 to 62 years ($M = 27.48$, $SD = 9.30$). The mean number of hours spent playing MMORPGs in the previous week was 18.16 ($SD = 19.70$, range 0-168). These data are consistent with those obtained by Yee (2006).

Measures. Some demographics data and a few items about MMORPGs usage opened the questionnaire. Then, a mandatory question asked the participants what MMORPG they played. The subsequent questions about the avatar referred to the one the players used most frequently in that MMORPG.

An adjective rating method was used to assess actual self, ideal self and avatar. In line with some previous studies (e.g., Bessi re et al., 2007; Ducheneaut et al., 2009; Van Looy et al., 2014), a short scale based on the Five Factor personality model – i.e., the Big Five Inventory (BFI-10, Rammstedt & John, 2007) – was used. The ten items of the BFI-10 were repeated for each of the three target: the participants were asked to rate to what extent the ten personality traits were false (1 = totally false) or true (5 = very true) when referred to their actual self (“In my real life, I see myself as someone who...”), to their ideal self (“In my real life, if I could choose, I would like to be someone who...”), and to their main avatar, i.e., the avatar they used more frequently (“When I play, my avatar is a character who...”). To reduce order biases, the ten items within each scale, as well as the target to which they referred (actual self, the ideal self, and the main avatar), were randomized. The correlations between the pairs of items measuring extraversion, consciousness, emotional stability, and agreeableness were significant ($p < .05$), while no correlation has been found between the two items measuring openness. For this reason, openness personality factor has not been considered in the following analyses. On the basis of the previous results showing that virtual self-discrepancy profiles did not depend on the personality factors considered (Mancini & Sibilla, 2017), the eight personality items were used to get the actual, the ideal, and the avatar total scores: actual self ($\alpha = 0.64$), ideal self ($\alpha = 0.66$), avatar ($\alpha = 0.59$). Positive scores indicate the extent to which actual self, ideal self and avatar were perceived as extraverted, conscious, emotionally stable, and agreeable. Actual self, ideal self and avatar scores were then standardized and two VSD scores were calculated in order to distinguish idealized and utopian avatars. Specifically, VSD_{A-Ac} score measured the discrepancy between the main avatar (A) and the actual self (Ac). A positive VSD_{A-Ac} score was an indicator of an idealized avatar, being the avatar better than the actual self and therefore positioned between the actual and the ideal self of the player. VSD_{A-I} score measured the discrepancy between the main

avatar (A) and the ideal self (I). A positive VSD_{A-I} score was an indicator of a utopian avatar, being the avatar customized as outside of the dynamic between the actual and the ideal self of the player.

The participants also completed the Avatar Identification subscale by Van Looy et al. (2012). The scale consisted of 17 items measured on a 5-point Likert type scale, ranging from "strongly disagree" to "strongly agree," and measuring perceived similarity (e.g., "I resemble my character"; 6 items, $\alpha = .91$), wishful identification (e.g., "I would like to be more like my character"; 5 items, $\alpha = .87$), and embodied presence (e.g., "When I am playing, it feels as if I am my character"; 6 item, $\alpha = .92$). The alpha score for the total avatar identification scale was very good ($\alpha = .95$).

Finally, the participants completed a Gaming Addiction Scale (Hussain & Griffiths, 2009) composed of 6 items ($\alpha = .64$). Each statement (e.g., "Online gaming is the most important thing in my life", "Conflicts have arisen between me and my family and/or my partner about the amount of online gaming I do") was measured on a five-point Likert type scale (from 1 = "strongly disagree" to 5 = "strongly agree"). The authors of the scale provided a cut-off score of 24 (out of 30) identifying individuals at risk of gaming addiction.

Data analysis. The normality of the distribution was checked and none of the measures had both asymmetry and kurtosis higher than 1 or lower than -1 (Muthén & Kaplan, 1992). Thus, the hypotheses were tested in two steps. First, after multicollinearity was checked (tolerance ranged from 0.92 to 0.98, and variance inflation factors ranged from 1.02 to 1.09), the effects of the two virtual self-discrepancy scores (VSD_{A-Ac} and VSD_{A-I}) and of the avatar identification on game addiction were tested through two multiple regression analyses (MRP; H1.1, H1.2, H1.4, H1.5). Then, simple mediation analyses were conducted (H1.3 and H1.6). Since previous studies (e.g., Durkee et al., 2012; Ko, Yen, Chen, Chen, & Yen, 2005) showed that player's gender and age are associated with gaming addiction, we included them as

control variables (covariates) in both the mediation models. We tested our mediation hypotheses separately on the VSD_{A-Ac} and on VSD_{A-I} scores using the SPSS macro PROCESS (Hayes, 2013). This procedure enables a calculation of the indirect effect ab integrating: (a) a normal theory approach (Sobel, 1982), (b) a bootstrap approach to obtain confidence intervals (CIs) and to avoid power problems introduced by asymmetric and non-normal distribution of an indirect effect (MacKinnon, Lockwood, & Williams, 2004), and (c) the stepwise procedure described by Baron and Kenny (1986). We ran the model 4, with 5000 bootstrap re-samples.

Results

Table 1 shows descriptive statistics and zero-order correlations among variables: with the exception of the correlation between VSD_{A-I} and gaming addiction, all the variables were significantly and positively correlated to each other, even though no correlation was strong enough to threaten the discriminant validity of the measures.

Table 1.

Descriptive statistics and correlations among the investigated variables

	<i>N</i>	<i>M</i>	<i>SD</i>	1	2	3	4
1. VSD_{A-Ac} "Idealized" avatar ^a	730	0.02	1.17	1			
2. VSD_{A-I} ^b "Utopian" avatar	729	0.01	1.11	.47***	1		
3. Avatar identification ^c	770	2.47	1.00	.28***	.14***	1	
4. Gaming addiction ^d	731	16.30	4.68	.21***	.06	.37***	1

^a Range from -4.40 to 3.90; ^b Range from -3.51 to 2.92; ^c Range from 1 to 5; ^d Range from 6 to 30.

*** $p < .001$.

Confirming the hypotheses 1.1 and 1.2, both using an *idealized* avatar (VSD_{A-Ac}) and being identified with it had positive and significant effects on gaming addiction. In particular, avatar identification ($\beta = 0.33, p < .001$) was found to have a stronger effect than the VSD_{A-Ac} ($\beta = 0.12, p < 0.01$), which effect on gaming addiction was weaker but still significant. This regression model was significant ($F(2,713) = 59.67, p < .001$), explaining the 14.1% of variance in MRP (adjusted R^2). As expected by the hypotheses 1.4 and 1.5, using a *utopian* avatar (VSD_{A-I}) did not have a significant effect on gaming addiction ($\beta = 0.01, p > .05$), while identifying with it had a significant and positive effect on addiction ($\beta = 0.37, p < .001$). The regression model was significant ($F(2,715) = 55.23, p < .001$), explaining the 13.1% of variance in MRP (adjusted R^2).

Comparing the regression results and the zero-order correlations (Table 1), it appeared that the effects of both VSD_{A-Ac} and VSD_{A-I} on gaming addiction were lower when controlling for avatar identification, suggesting that, as expected by the hypotheses 1.3 and 1.6, some kind of mediation might have occurred. The mediation analysis, conducted controlling for gender and age, confirmed the hypothesis that avatar identification partially mediates the relationship between avatar idealization—i.e., a positive VSD_{A-Ac} score—and gaming addiction (H1.3). In fact, identification with the avatar was found to have a significant indirect effect on gaming addiction ($ab = .28, SE = .06, Z = 4.88, p < .001$), showing that the construction of an *idealized* avatar affected gaming addiction both directly ($b = .46, SE = .15, t = 3.05, p < .01$) and indirectly, through the mediation of avatar identification. The bootstrap analysis confirmed the Sobel test result, with a bootstrapped 95% CI range from .17 to .41. Figure 1 shows the effects of the model when controlling for gender and age. A positive VSD_{A-Ac} score was found to significantly increase avatar identification especially for female ($b = .20, SE = .08, t = 2.55, p < .05$) and for younger players ($b = -.02, SE = .01, t = -4.95, p < .001$), while only age ($b = -.08, SE = .02, t = -4.61,$

$p < .001$) significantly influenced the total effect of VSD_{A-Ac} and avatar identification on gaming addiction.

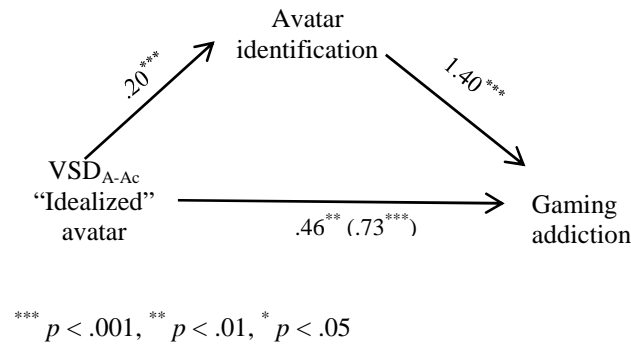
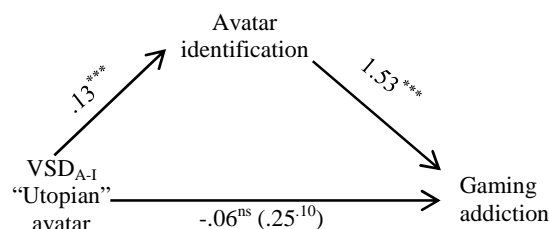


Figure 1.

Mediation effect of avatar identification in the relationship between virtual avatar-actual self-discrepancy (VSD_{A-Ac}) and gaming addiction when controlling for gender and age ($N = 701$). The reported coefficients are unstandardized, Study 1.

Figure 2 shows the mediation analysis conducted considering the use of a *utopian* avatar (VSD_{A-I}) as an independent variable and gender and age as covariates. The results confirmed the hypothesis 1.6 according to which the use of a *utopian* avatar—i.e., a positive VSD_{A-I} score—only indirectly ($ab = .19$, $SE = .05$, $Z = 3.55$, $p < .001$) affects gaming addiction. The bootstrap analysis confirmed this result, with a bootstrapped 95% CI range from .09 to .31. Similarly to the first mediation analysis, a positive VSD_{A-I} was found to significantly increase avatar identification for female ($b = -.32$, $SE = .08$, $t = -4.15$, $p < .001$) and for younger players ($b = -.02$, $SE = .01$, $t = -5.85$, $p < .001$), while only age ($b = -.09$, $SE = .02$, $t = -5.34$, $p < .001$) significantly influenced the total effect of VSD_{A-I} and avatar identification on gaming addiction.



*** $p < .001$; ^{ns} = not significant

Figure 2.

Mediation effect of avatar identification in the relationship between virtual avatar-ideal self-discrepancy (VSD_{A-I}) and gaming addiction when controlling for gender and age (N = 703).

The reported coefficients are unstandardized, Study 1.

Conclusion

The results of study 1 confirmed that the relationships that both an *idealized* avatar—i.e., an avatar better than the actual self of the player—and a *utopian* avatar—i.e., an avatar distant from the ideal self of the player—have with gaming addiction are mediated by the degree of avatar identification. More specifically, the results confirmed all the hypotheses, showing that the more the avatar was *idealized*, the more the player identified with it, and the higher was the risk of excessive online gaming (gaming addiction). Therefore, these results seem to suggest that when players create an idealized avatar, i.e., an avatar that being between their actual and their ideal self could serve to reduce the perceived self-discrepancy (Klimmt et al., 2009), they are also more likely to engage in the game and to become addicted to it. Otherwise, playing with a utopian avatar did not directly affect MMORPG addiction, which in this case increased only through the increase of avatar identification. Therefore, regardless of the type of the avatar used, when avatar identification became stronger gaming addiction increased.

Study 2

A 2 (VSDs: idealized vs. utopian avatar customization) X 2 (avatar identification: high identification vs. low identification) between-subjects laboratory experiment was conducted to test hypotheses 2.1, 2.2, 2.3, and 2.4. The experimental sessions were carried out at the IT laboratory of Psychology of the University of Parma (Italy), involving a

maximum of six participants at a time. The experimental procedure was administered using an online format built with Qualtrics platform (www.qualtrics.com). The electronic format contained: a) the *scales* used to measure the constructs of the study (e.g., intention to continue to play with the same MMORPG), b) the *logics* used to randomly assign the participants to the different experimental conditions, c) the *instructions* required by the experimental protocol, and d) the manipulation *checks* introduced to ensure that the experimental instructions were correctly understood and applied in the experimental gaming session.

Method

Participants. One hundred and nineteen volunteers (73 women, 94 university students) aged from 19 to 35 years ($M=23.71$, $SD=3.86$) took part in the study. The participants were recruited through flyers posted on the university's notice boards or through face-to-face recruitment conducted at the university's reading rooms. Each participant was randomly assigned to one of the four conditions of the 2x2 between-subjects design. Data collected from 19 participants who failed to correctly follow one or both of the two experimental instructions were removed, leaving a sample of 100 participants (69 females, 76 university students), 25 for each of the four experimental conditions.

No differences have been found among the four conditions in terms of gender and of video gaming, MMORPG, and World of Warcraft expertise (11 participants had never played with videogames, 60 played with videogames, 30 played both with videogames and with MMORPGs). Nevertheless, the four conditions differed in age $F(3,96)=3.41$, $p < .05$: Tukey's HSD post-hoc analysis revealed that in the VSD idealised avatar and in the high avatar identification conditions, the average age was significantly lower ($M=21.88$) than in the other three experimental conditions.

Procedure and materials. Once the participants settled in the assigned PC stations, the researcher gave some general information about the procedure and invited them to read

and to sign the informed consent. Complying with the Italian ethical standards, the informed consent explained to the participants the general study's aim, guaranteed the anonymity, and explained them that they could leave the experiment at any time and that they had the possibility to contact the researcher or the supervisor of the study if they felt offended or annoyed because of the procedure or because of the questions posed to them.

The participants then filled in the first part of the electronic format that contained some questions about their personal data (e.g. gender, age) and their expertise with videogames, with MMORPGs, and with World of Warcraft (WoW). They then completed the Italian version of the Ten Item Personality Inventory (Chiorri, Bracco, Piccinno, Modafferi, & Battini, 2015) that was administered to make evident to the participants their ideal self-representation before introducing the VSDs experimental conditions (idealized vs. utopian avatar). Participants had to reply on a seven-point Likert-type scale (ranging from 1 = Strongly disagree to 7 = Strongly agree) to ten adjectives (e.g., extraverted, enthusiastic) in order to describe what, if they could choose, they would like to be.

Once participants finished to fill in this first section of the electronic format, the researcher—also using some projected slides—introduced the MMORPG they had to play (WoW), specifically explaining how to create an avatar and how to play in WoW. Furthermore, a brochure listing the avatar's races and classes available in the game has been given to each participant. The brochure reported the image and the description of each race and class, as provided by the official WoW website (Blizzard Entertainment, 2018a, 2018b). After this game presentation, the participants went back to fill in the second section of the electronic format, replying to some questions about their actual understanding of the game. At the end of this section, a Qualtrics's "logic" randomly assigned each participant to one of the two VSD avatar customization conditions; then specific instructions invited them to build an avatar that was as similar as possible to their ideal self in real life (idealized avatar) or as

different as possible from their ideal self (utopian avatar). At this point, a question in the electronic format checked that participants had customized the avatar correctly inviting them to build a new avatar if the first one did not match the experimental instruction. Fifteen participants were not able to follow the instructions assigned to them and they have been excluded from the data analyses.

After building the avatar required by the experimental instructions, another Qualtrics's logic randomly assigned participants to one of the two avatar identification conditions (high vs. low) manipulated in terms of *Embodied Presence* by Van Looy and colleagues (2012). Specific instructions invited the participants to play the first mission trying to feel as close as possible to the body of the avatar they built (high identification) or trying to feel as distant as possible from it (low identification). Then, a question checked that the participants had correctly understood the experimental instruction assigned to them. Four participants that were not able to follow the instructions were excluded from the data analyses.

Participants had to play the game until they completed 4 missions. At the end of the fourth mission they returned to the electronic format and filled the final survey section consisting of some manipulation checks and of three items used to measure the independent variable: the gaming addiction risk, which was measured through the intention to continue to play to WoW.

Manipulation checks. The electronic format included five manipulation checks, one for the first condition (VSD), and four for the second condition (avatar identification). The *Inclusion of the Avatar in the Self* as adapted by Gabbiadini, Mari, Volpato, and Monaci (2014) was used to check the VSD, i.e. the avatar customization. The participants indicated the degree of overlap (1 = Very far to 8 = Total overlap) between themselves and the avatar they had customized. For the second condition – avatar identification – after each of the first 3

missions was completed, the participants answered to an ad hoc item that measured the degree (1 = not at all to 5 = at all) of identification maintained during the mission They had just accomplished. Then, at the end of the four missions, they completed the *Embodied Presence* subscale of the Player Identification Scale by Van Looy and colleagues (2012). This scale consists of 6 items ($\alpha = .94$) that measure “the degree to which the player felt as if they were their avatar when playing the game on a five-point Likert-type scale” (from 1 = Completely false to 5 = Completely true).

Independent variable. The intention to continue to play with the game was here considered as an indicator of MMORPG addiction. It was measured through three ad hoc items, of which two (“How much would you like to continue playing World of Warcraft?”, “How much the thought of continuing to play World of Warcraft makes you happy?”) measured on a five-point Likert-type scale (from 1 = Not at all to 5 = Extremely), and the other (“In the future, how likely is it that you will continue to play WoW?”) on an eleven-point Likert-type scale (1 = 0% to 11= 100%). The three items had a good internal consistency ($\alpha = .90$). The global score of intention to continue playing ranged from 1 = low intention to 5 = high intention ($M = 2.02$, $SD = 0.86$).

Results

Manipulations checks. Unpaired t-tests were used to assess differences among the experimental conditions. Rating of *Inclusion of Avatar in the Self* indicated that participants in *idealized* avatar condition ($M = 4.15$, $SD = 1.73$) scored significantly higher than participant in *utopian* avatar condition ($M = 2.77$, $SD = 1.83$; $t(93) = 3.78$, $p < .001$). The results of the second experimental manipulation (high avatar identification / low avatar identification) confirmed that at the end of both the first, $t(98) = 5.07$, $p < .001$, and the second, $t(98) = 5.87$, $p < .001$, and the third mission, $t(98) = 6.36$, $p < .001$, the participants in the high avatar identification condition identified with the avatar ($M = 2.70$, $SD = 0.84$; M

= 3.14, , $SD = 0.99$; $M = 3.36$, $SD = 1.08$ in the first, second, and third mission respectively) significantly more than participants in the low avatar identification condition ($M = 1.90$, $SD = 0.73$; $M = 2.06$, $SD = 0.84$; $M = 2.06$, $SD = 0.96$ respectively). The *Embodied presence* subscale confirmed that at the end of the fourth mission the participants in the high avatar identification condition identified with the avatar ($M = 3.04$, $SD = 1.02$) significantly more than participants in the low avatar identification condition ($M = 2.23$, , $SD = 1.10$; $t(98) = 3.83$, $p < .001$).

Testing hypotheses. To test the hypotheses we conducted a 2 (VSD: idealized vs. utopian avatar customization) X 2 (avatar identification: High vs. low) ANOVA, with intention to continue to play as the within variable and age as a covariate. Analysis yielded only an effect at the limit of statistical significance for the avatar identification condition, $F(1,95) = 3.81$, $p = .054$, $\eta^2_p = .04$: in line with the results of the study 1, regardless of the type of avatar used (idealized vs. utopian), participants instructed to identify with their avatar ($M = 2.18$, $SE = .12$) scored higher on intention to continue to play WoW than participants instructed to not identify with the avatar ($M = 1.85$, $SE = .12$). Post-hoc analyses confirmed this trend only for the utopian, $F(1,95) = 5.56$, $p < .05$, $\eta^2_p = .05$, and not for the idealized avatar, with participants in high avatar identification condition scoring significantly higher ($M = 2.25$, $SE = .17$) than participants in low avatar identification condition ($M = 1.68$, $SE = .17$), thus confirming only the hypothesis 2.2 (Figure 3).

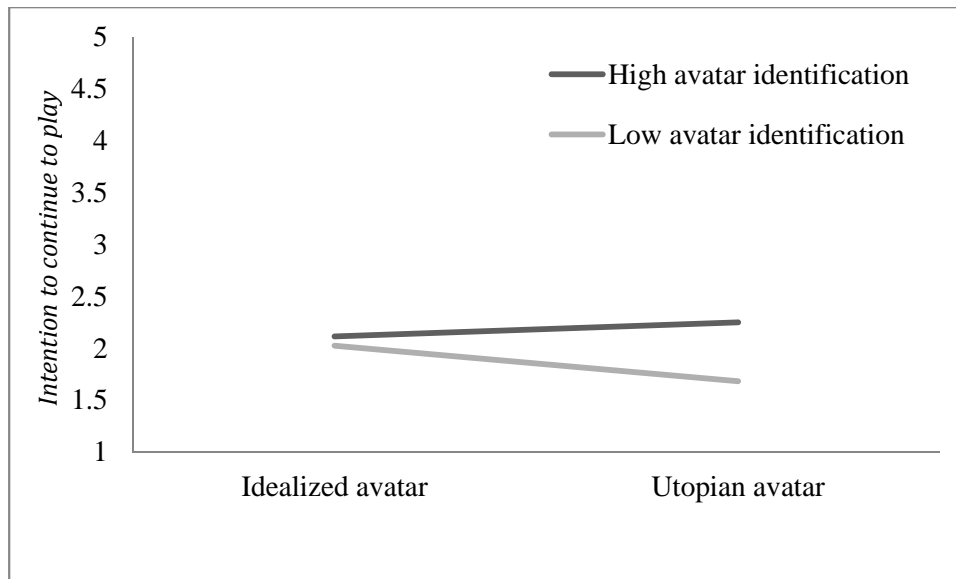


Figure 3.

Intention to continue to play WoW (gaming addiction risk) as a function of avatar customization (idealized vs. utopian) and avatar identification (high vs. low) controlling for age ($N = 100$), Study 2 (Estimated means).

In line with hypothesis 2.3, t -student analyses confirmed that the intention to continue to play the game was higher in the participants that customized an idealized avatar and identified with it ($M = 2.18$, $SD = .91$) than in the participants that customized a utopian avatar and did not identify with it ($M = 1.69$, $SD = .58$), $t(48) = 2.27$, $p < .05$. Nevertheless, in line with hypothesis 2.4, no significant differences in the intention to continue to play were found between participants that played with an idealized avatar and did not identify with it ($M = 2.01$, $SD = .78$) and participants that played with a utopian avatar and identified with it ($M = 2.20$, $SD = 1.04$).

Conclusion

The results of this experimental study seem to overall strengthen the data obtained in the cross-sectional study (study 1). Specifically, the results provide an empirical evidence that the risk of an excessive online gaming is enhanced by the identification with the avatar

more than by the customization of an avatar as similar or as different from the ideal self of the player. Specifically, the results of this study clarified that keeping the identification with the avatar under control, the two kinds of VSDs – idealized vs. utopian avatar – did not affect the intention to continue to play the videogames. Vice versa, keeping the avatar customization under control, the two levels of avatar identification – high vs. low – slightly affected the intention to continue to play the videogame. Therefore, these results confirm the data of some cross-sectional studies (Mancini & Sibilla, 2017; Smahel et al., 2008; Zhong & Yao, 2013) that showed the positive effect of avatar identification on the risk of an excessive online gaming. Indeed, when the two kinds of VSDs were taken into account, no significant difference in the intention to continue to play WoW has been found between participants with high or low idealized avatar identification. That is, for participants who were instructed to customize an avatar that was as similar as possible to their ideal self (idealized avatar) the level of identification with this avatar (high vs. low) did not affect the intention to continue to play, as assumed from the hypothesis 2.1. Instead, confirming our hypothesis 2.2, a high identification with the avatar predicted a greater intention to continue to play the game when the avatar was built as different as possible from the player's ideal self, i.e., when the participants had to customize a utopian avatar. Therefore, confirming the results of study 1, the experimental data established that when a *utopian* avatar was used, MMORPG addiction risk can be avoided by keeping the identification with the avatar low, while when an idealized avatar was used, the risk of gaming addiction remains constant regardless of the level of avatar identification. This probably occurred because players spontaneously tended to identify more with an avatar that were similar to themselves, as the correlational analyses of the study 1 showed, and as the interaction effects of this study highlighted. In fact, according to our hypothesis 2.4, no significant difference in the intention to continue to play WoW emerged between the conditions that were to some extent inconsistent: i.e., between

participants that had not to identify with the avatar they customized as an idealized version of themselves and participants that had to identify with the avatar they customized as utopian. Instead, confirming hypothesis 2.3, a significant even if modest effect emerged between the two consistent conditions: i.e., between participants that had to identify with the avatar they customized as an idealized version of themselves and participants that had not to identify with the avatar they customized as utopian. In conclusion, as the results of study 1 showed, when MMORPGs' players try to create an avatar that resembles their desired self, they are also more likely to identify with it and to engage and become addicted to the game. Nevertheless, MMORPGs' players can also reach a deeper identification with their *utopian* avatar and it is this identification that encourages their intention to continue to play.

General discussion

Does the character of an avatar and/or the emotional bond that is created between the avatar and the player increase gaming addiction risk in MMORPGs' players? Extending the results obtained in some previous studies (Bessière et al., 2007; Ducheneaut et al., 2009; Leménager et al., 2013; Messinger et al., 2008; Van Looy et al., 2012; Van Looy et al., 2014; Zhong & Yao, 2013), this research tried to answer the question, analyzing whether it was more the similarity (vs. the difference) between the avatar's and the player's personality (e.g., Mancini & Sibilla, 2017), or the emotional bond between the player and the main avatar he/she played with (e.g., van Looy et al., 2014), that better accounted for the variations found in gaming addiction. Therefore, the aim of this research was to clarify the path of relationships among avatar customization motives connected with player's identity needs, avatar identification, and gaming addiction, considering that these relationships have not been adequately analyzed and understood in the previous literature. In order to reach this aim, a research project has been implemented and two studies have been conducted. Both studies applied the *virtual self discrepancy model* elaborated by Jin (2012) and measured avatar

identification and gaming addiction risk. Through the virtual self discrepancy model, derived from the SDT of Higgins (1987), the article analyzed the players perception of the virtual self-discrepancy in terms of distance both between the avatar and the actual self (Study 1), and between the avatar and the ideal self (Study 1 and 2). Questioning the results obtained by some studies (Bessi re et al., 2007; Ducheneaut et al., 2009; Messinger et al., 2008; Van Looy et al., 2014) and confirming those achieved by other studies (Kafai et al., 2007; Mancini & Sibilla, 2017; Parmentier & Rolland, 2009), it emerged that some other motives beyond the one to create an *idealized* avatar can drive the customization of an avatar in MMORPGs. Specifically, data confirmed that one of these motives consisted in the construction of a *utopian* avatar, i.e., an avatar better than the ideal self and therefore theoretically unconnected with the attempt to reduce the discrepancy perceived between the actual and the ideal self of the player (Higgins, 1987) through an avatar close to players's desired self. However, the construction and the use of an *idealized* avatar—i.e., an avatar better than the actual self of the player— or of a *utopian* avatar—i.e., an avatar distant from the ideal self of the player—did not seem to be so relevant for gaming addiction, since the results of the two studies confirmed that it was instead the emotional bond created with the avatar, i.e., the avatar identification, to significantly increase MMORPG addiction risk. The results also confirmed, however, that the identification with the avatar was to some extent simpler, almost natural (Study 2), and therefore higher (Study 1) when this avatar was an externalization or an extension of the user's self (e.g., Yee, Bailenson, & Ducheneaut, 2009), compared to when the character was simply an artifact, a product or a tool (e.g., Cui, Aghajan, Lacroix, Halteren, & Aghajan, 2009). In line with other studies, we can assume that a higher identification occurred because an idealized avatar appears more attractive (e.g., Van Looy et al., 2012) or more socially desirable (e.g., Mancini & Sibilla, 2017) to the players

than an utopian avatar does. Thus, players who create an avatar that resembles their offline self are also more likely to engage and become addicted to the game.

Klimmt et al. (2009) and van Looy et al. (2014) assumed that gaming addiction increases when players realize that the deep identification with the avatar does not help them to reduce their actual-ideal self-discrepancy. Even if the present research has not included measures of the players' level of distress derived from the perception of a large actual-ideal self-discrepancy or measures of their desire to alleviate it through the avatar, the obtained results seem to be in line with Higgins (1987; 1989) self-discrepancy theory and with the assertion of Klimmt et al. (2009). Results are in fact consistent with the hypothesis that if a deep identification with the avatar lets the player experience a temporary reduction of the perceived self-discrepancy, it is probably not enough to alleviate the psychological distress derived from it. If so, we do not explain why the players who identified more with their avatar also considered themselves as more addicted to the game. It seems, therefore, that an excessive and compulsive use of computer games such as MMORPGs can be considered as an attempt to satisfy the desire to reduce the perception of a self-discrepancy, and thus probably to alleviate the psychological distress associated with it. That is to say that gaming addiction would aim at satisfying a player's identity need, even if it really does not satisfy it. Avatar customization is connected to the attempts to satisfy this player's identity need, since it is precisely the attempt to build an avatar that was better than the actual self of the player—i.e., an *idealized* avatar—that was found to be associated with a higher level of gaming addiction risk, while an avatar that was better than the ideal self—i.e., a *utopian*—was not. Therefore, the latter type of customization appears to protect from addiction more than how the construction of an *idealized* avatar does, even if it only occurs when the player is able to maintain a certain emotional distance from the avatar. However, other studies (Jin, 2012)

clearly showed, that the emotional distance from the avatar reduces the in-game presence and the satisfaction that the player derive from playing.

This research has some limitations. First of all, the conclusions about the process that starting from virtual self-discrepancy leads to gaming addiction through avatar identification needs to be strengthened by longitudinal studies too. Moreover, this research considered the creation of only one avatar, although other studies (e.g. Mancini, Caricati, Balestrieri, & Sibilla, 2018) showed that having multiple avatars can improve positive in-game behaviors. Furthermore, the psychodynamic hypotheses about the relationships among avatar customization, avatar identification, and gaming addiction, here only inferred, need to be corroborated by a direct measurement of the players' level of distress derived from the perception of a large actual-ideal self-discrepancy. Additionally, other measurements are needed to better explore the motives that guide the players to build avatars similar to or distant from their offline selves, to identify with them, or to get excessively immersed in the game. Further studies should also explore how other self-needs, rather than the one of reducing self-discrepancy (e.g., self-esteem or specific self-efficacy; for a review see Sibilla & Mancini, 2018), are related to avatar identification and gaming addiction. Moreover, future studies should point out other negative outcomes of MMORPG usage rather than gaming addiction, e.g., the risks related to the general use of new technologies such as being affected by computer viruses (Mariani & Zappalà, 2014).

Despite its limitations, this research has the merit to shed light on the possible psychological relationships between the players and their avatars, and on the effects of these relationships on gaming addiction. Future research can start from the results obtained in the present studies not only in order to deepen the knowledge on the relationships among VSDs, avatar identification, and gaming addiction, but also to develop ways to manage the risk of gaming addiction. In this sense, it would be also advisable to investigate the effects of other

kinds of avatar customization beyond the idealized and the utopian ones, and to understand how to contrast the way in which some kinds of avatars favor addiction through avatar identification. Therefore, the obtained results offer insights both for clinical practice and for gaming designers, suggesting the need for training programs and marketing policies encouraging the players to create and customize avatars that are simply tools for playing and not means for satisfy self needs that are not satisfied in the offline life. Indeed, encourage the players to disconnect from their avatars is probably not a viable solution for reducing gaming addiction. As some studies showed (e.g., Jin, 2012), to disconnect the players from their avatars – i.e., discouraging the avatar identification – also means to disconnect them from the game itself, eliminating the reasons why they play MMORPGs in the first place. Probably, another type of identification with the avatar can be encouraged without negative consequences: an identification where the emotional bond with the avatar is exclusively connected with the character created and not with the idea that the player has of himself. Thus, sponsors of video games, as well as educators, psychologists and parents of younger players should encourage users to customize avatars that are not referred to their offline personality, but whose function is mainly to entertain the players and to give there the opportunity to experiment worlds and roles that are not possible in the real life. Therefore, it becomes compelling to further promote media literacy, for example increasing the spread of media education programs that could educate people to make good use of the online games and therefore prevent negative outcomes, as well as of programs for the identification of the cases of risk and the intervention on them.

References

American Psychiatric Association (APA) (2013). *Diagnostic and Statistical Manual of Mental Disorders (5th ed.)*. Washington, DC.

- Baron, R.M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173-1182. <https://doi.org/10.1037/0022-3514.51.6.1173>.
- Beckmann, D., Brähler, E., & Richter, H.E. (1990). Der Giessen-Test (GT). Bern: Huber.
- Bessière, K., Seay, F., & Kiesler, S. (2007). The ideal elf: identity exploration in World of Warcraft. *Cyberpsychology and Behaviour*, 10(4), 530–535. <https://doi.org/10.1089/cpb.2007.9994>.
- Blinka, L. (2008). The relationship of players to their avatars in MMORPGs: Differences between adolescents, emerging adults and adults. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 2(1), article 5. Retrieved from <https://cyberpsychology.eu/article/view/4211/3252>.
- Chiorri, C., Bracco, F., Piccinno, T., Modafferi C., & Battini, V. (2015). Psychometric properties of a revised version of the Ten Item Personality Inventory. *European Journal of Psychological Assessment*, 31, 109-119. <https://doi.org/10.1027/1015-5759/a000215>.
- Courtois, C., Van Looy, J., De Vocht, M., & De Marez, L. (2011, July). *Self-discrepancy and MMORPGs. Testing the moderating effects of avatar identification and pathological gaming in World of Warcraft*. Paper presented at the International Conference on the Social Aspects of Digital Gaming, Stuttgart, Germany.
- Cui, J., Aghajan, Y., Lacroix, J., Halteren, A. V., & Aghajan, H. (2009) Exercising at home: Real-time interaction and experience sharing using avatars. *Entertainment Computing*, 1(2), 63–73. <https://doi.org/10.1016/j.entcom.2009.09.003>.
- Ducheneaut, N., Wen, M. H., Yee, N., & Wadley, G. (2009, April). *Body and mind: A study of avatar personalization in three virtual worlds*. Paper presented at the 27th Annual

- CHI Conference on Human Factors in Computing Systems, Boston, MA.
<https://dl.acm.org/citation.cfm?doid=1518701.1518877>.
- Durkee, T., Kaess, M., Carli, V., Parzer, P., Wasserman, C., Floderus, B., ... Wasserman, D. (2012). Prevalence of pathological internet use among adolescents in Europe: demographic and social factors. *Addiction*, 107(12), 2210-2222.
<https://doi.org/10.1111/j.1360-0443.2012.03946.x>.
- Gabbiadini, A., Mari, S., Volpato, C., & Monaci, M. G. (2014). Identification processes in online groups: Identity motives in the virtual realm of MMORPGs. *Journal of Media Psychology*, 26(3), 141–152. <https://doi.org/10.1027/1864-1105/a000119>.
- Hayes, AF. (2013) *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.
- Hefner D, Klimmt C, Vorderer P. (2007, September). *Identification with the player character as determinant of video game enjoyment*. Paper presented at the 6th International Conference on Entertainment Computing, Shangai.
https://link.springer.com/chapter/10.1007%2F978-3-540-74873-1_6.
- Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review*, 94(3), 319–340. <https://doi.org/10.1037//0033-295X.94.3.319>.
- Higgins, E. T. (1989). Self-discrepancy theory: What patterns of self-beliefs cause people to suffer? In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 22, pp. 93–136). New York, NY: Academic Press.
- Hussain, Z., & Griffiths, M. D. (2009). Excessive use of Massively Multi-Player Online Role-Playing Games: A pilot study. *International Journal of Mental Health and Addiction*, 7(4), 563–571. <https://doi.org/10.1007/s11469-009-9202-8>.
- Jin, S. A. (2012). The virtual malleable self and the virtual identity discrepancy model: Investigative frameworks for virtual possible selves and others in avatar-based identity

- construction and social interaction. *Computers in Human Behavior*, 28(6), 2160–2168.
<https://doi.org/10.1016/j.chb.2012.06.022>.
- Kafai, Y. B., Fields, D. A., & Cook, M. S. (2010). Your second selves: Player-designed avatars. *Games and Culture*, 5(1), 23-42. <https://doi.org/10.1177/1555412009351260>.
- Klimmt, C., Hefner, D., & Vorderer, P. (2009). The video game experience as “true” identification: a theory of enjoyable alterations of players’ self-perception. *Communication Theory*, 19(4), 351–373. <https://doi.org/10.1111/j.1468-2885.2009.01347.x>.
- Ko, C. H., Yen, J. Y., Chen, C. C., Chen, S. H., & Yen, C. F. (2005). Gender differences and related factors affecting online gaming addiction among Taiwanese adolescents. *The Journal of Nervous and Mental Disease*, 4(193), 273-277.
<https://doi.org/10.1097/01.nmd.0000158373.85150.57>.
- Leménager, T., Gwodz, A., Richter, A., Reinhard, I., Kämmerer, N., Sell, M., & Mann, K. (2013). Self-concept deficits in massively multiplayer online role-playing games addiction. *European Addiction Research*, 19(5), 227-234.
<https://doi.org/10.1159/000345458>.
- MacKinnon, D.P., Lockwood, C.M., & Williams, J. (2004). Confidence limits for the indirect effect: distribution of the produce and resampling methods. *Multivariate Behavioral Research*, 39(1), 99-128. https://doi.org/10.1207/s15327906mbr3901_4.
- Mancini, T., & Sibilla, F. (2017). Offline personality and avatar customisation. Discrepancy profiles and avatar identification in a sample of MMORPG players. *Computer in Human Behavior*, 69, 275-283. <https://doi.org/10.1016/j.chb.2016.12.031>.
- Mancini, T., Caricati, L., Balestrieri, M., & Sibilla, F. (2018). How to reduce intergroup hostility in virtual contexts: The role of alts in decreasing intergroup bias in World of

Warcraft, *Computer in Human Behavior*, 83, 8-15.

<https://doi.org/10.1016/j.chb.2018.01.021>.

Mariani, M. G., & Zappalà, S. (2014). Pc virus attacks in small firms: Effects of risk perceptions and information technology competence on preventive behaviors. *TPM - Testing, Psychometrics, Methodology in Applied Psychology*, 21(1), 51-65.
<https://doi.org/10.4473/TPM21.1.4>.

Messinger, P. R., Ge, X., Stroulia, E., Lyons, K., Smirnov, K., & Bone, M. (2008). On the relationship between my avatar and myself. *Journal of Virtual Worlds Research*, 1(2), 1–17. <https://doi.org/10.4101/jvwr.v1i2.352>.

Muthén, B., & Kaplan, D. (1992). A comparison of some methodologies for the factor analysis of non-normal Likert variables: a note on the size of the model. *British Journal of Mathematical and Statistical Psychology*, 45(1), 19-30.
<https://doi.org/10.1111/j.2044-8317.1992.tb00975.x>.

Ozgul, S., Heubeck, B., Ward, J., & Wilkinson, R. (2003). Self-discrepancies: Measurement and relation to various negative affective states. *Australian Journal of Psychology*, 55(1), 56–62. <https://doi.org/10.1080/00049530412331312884>.

Parmentier, G., & Rolland, S. (2009). Consumers in virtual worlds: Identity building and consuming experience in Second Life. *Recherche et Applications en Marketing* (English Edition), 24(3), 43-55. <https://doi.org/10.1177/205157070902400302>.

Rammstedt, B., & John, O. P. (2007). Measuring personality in one minute or less: a 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality*, 41(1), 203–212. <https://doi.org/10.1016/j.jrp.2006.02.001>.

Sibilla, F., & Mancini, T. (2018). I am (not) my avatar: A review of the user-avatar relationships in Massively Multiplayer Online Worlds. *Cyberpsychology.eu*. In revision.

- Smahel, D., Blinka, L., & Ledabyl, O. (2008). Playing MMORPGs: Connections between addiction and identifying with a character. *Cyberpsychology, Behavior, and Social Networking*, 11(6), 715-718. <https://doi.org/10.1089/cpb.2007.0210>.
- Snodgrass, J. G., Dengah, H. J. F., Lacy, M. G., & Fagan, J. (2013). A formal anthropological view of motivation models of problematic MMO play: Achievement, social, and immersion factors in the context of culture. *Transcultural Psychiatry*, 50(2), 235-262. <https://doi.org/10.1177/1363461513487666>.
- Sobel, M.E. (1982). Asymptotic intervals for indirect effects in structural equations models. In: Leinhardt S, ed. *Sociological methodology*. San Francisco, C.A.: Jossey-Bass, pp. 290-312.
- Stanley, M., & Burrow, A.L. (2015). The distance between selves: The influence of self-discrepancy on purpose in life. *Self and Identity*, 14(4), 441-452. <https://doi.org/10.1080/15298868.2015.1008564>.
- Van Looy, J., Courtois, C., & De Vocht, M. (2014). Self-discrepancy and MMORPGs. Testing the moderating effects of avatar identification and pathological gaming in World of Warcraft. In S. Kröger, & T. Quandt (Eds.), *Multi-Player: The Social Aspects of Digital Gaming* (pp. 234-242). London, England: Routledge.
- Van Looy, J., Courtois, C., De Vocht, M., & De Marez, L. (2012). Player identification in online games: Validation of a scale for measuring identification in MMOGs. *Media Psychology*, 15(2), 197-221. <https://doi.org/10.1080/15213269.2012.674917>.
- Wang, C. C., Yang, Y. Y. H., & Shen I (2014, June). *Self-present by avatars in multiplayer online role-playing games: the influence of self-esteem, online disinhibition, and self-discrepancy*. Paper presented at the Pacific Asia Conference on Information Systems, Chengdu.

- Yee, N. (2006). The demographics, motivations and derived experiences of users of massively-multiuser online graphical environments. *PRESENCE: Teleoperators and Virtual Environments*, 15(3), 309-329. <https://doi.org/10.1162/pres.15.3.309>.
- Yee, N., Bailenson, J. N., & Ducheneaut, N. (2009). The Proteus Effect: Implications of transformed digital self-representation on online and offline behavior. *Communication Research*, 36(2), 285–312. <https://doi.org/10.1177/0093650208330254>.
- You, S., Kim, E., & Lee, D. (2017). Virtually real: Exploring avatar identification in game addiction among Massively Multiplayer Online Role-Playing Games (MMORPG) players. *Games and Culture*, 12(1), 56-71. <https://doi.org/10.1177/1555412015581087>.
- Zhong, Z.J., & Yao, M.Z. (2013). Gaming motivations, avatar-self identification and symptoms of online game addiction. *Asian Journal of Communication*, 23(5), 555-573. <https://doi.org/10.1080/01292986.2012.748814>.
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Highlights

- Avatar identification increases addiction risk more than avatar customization
- Creating an idealized avatar increases identification with it
- Using an idealized avatar is riskier than using a utopian avatar
- The risk of addiction can be avoided by keeping a low identification with the avatar