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IMPULSIVITY AND ALEXITHYMIA IN VIRTUAL WORLDS: A STUDY ON PLAYERS OF WORLD OF WARCRAFT

Noemi Rosa Maganuco, Antonino Costanzo, Laura Rosa Midolo, Gianluca Santoro, Adriano Schimmenti

Abstract

Objective: Symptoms of problematic Internet use (PIU) may be increased in people who display an excessive involvement in Massively Multiplayer Online Role-Playing Games (MMORPGs). Notably, impulsivity and alexithymia have not been investigated together in the literature addressing the predictors of PIU among gamers, despite evidence that these personality traits may play a pivotal role in the development of problematic gaming patterns. The purpose of this research was to explore the relationship between facets of alexithymia and impulsivity and PIU scores among MMORPG players.

Method: In the current study, 364 World of Warcraft (WoW) players (272 males, 74.7%) aged 18 to 48 years old provided socio-demographic information and completed questionnaires on PIU, time spent online playing WoW, alexithymia, and impulsivity.

Results: PIU scores were negatively associated with age and positively associated with alexithymia scores, impulsivity scores, and time spent online playing WoW. A linear regression analysis showed that PIU scores were predicted by time spent online playing WoW, the alexithymic features concerning difficulties identifying and describing feelings, and attentional impulsivity.

Conclusions: Our findings suggest that MMORPG players with difficulties concerning affect awareness and a tendency to be distracted by novel stimuli may spend an excessive amount of time playing video games and may also show prominent symptoms of PIU.

Key words: problematic gaming, problematic Internet use, impulsivity, alexithymia, World of Warcraft, gaming disorder, Internet gaming disorder

Declaration of interest: none

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1. Introduction

Massively Multiplayer Online Role-Playing Games (MMORPGs) are computer games that are played on the Internet and that allow many gamers to play simultaneously in a virtual world. Players from all over the world can explore, communicate, cooperate and fight to achieve in-game goals, to develop the plot of the game and to improve the characteristics of their virtual representation (i.e., the avatar). In an MMORPG, the world continues to exist when the user is not logged in, and both events and interactions continue to occur when the user is not connected.

One of the most played MMORPGs is World of Warcraft (WoW). WoW is an MMORPG set in the fantasy world of Azeroth, which offers a wide selection of contents and quests. The quest is a task assigned to a player character, which generates a reward when completed, such as experience points (XP), objects and gold (gold is the in-game currency of WoW).

Players begin their adventure in WoW, like in any other MMORPG, by creating a character. This character is largely customizable in terms of appearance and roles played in game dynamics. There are two in-game factions that the player can choose: Horde and

Alliance. Also, WoW includes twelve playable classes (e.g. Death Knight, Monks, Druids) and thirteen races (e.g. Dwarfs, Gnomes, Humans). WoW entails different game modes, such as Player versus Environment (PvE) and Player versus Player (PvP). In addition, its universe is constantly expanding, and new contents and in-game activities are frequently provided to the player. These attractive characteristics of WoW might explain its huge success among its players.

However, research on WoW and other MMORPGs suggests that there is a dark side of the coin: in fact, it is reported that a minority of MMORPG players develop symptoms of problematic gaming (Hahn et al., 2014; Leménager et al., 2014; Stavropoulos, Kuss, Griffiths, Wilson, & Motti-Stefanidi, 2017). Psychological features associated with problematic use of MMORPGs, and especially WoW, have been extensively examined in research (Billieux et al., 2013, 2015; Deleuze et al., 2019; Fuster, Chamarro, Carbonell, & Vallerand, 2014; Kuss, Louws, & Wiers, 2012; Ryan, Rigby, & Przybylski, 2006; Yee, 2006). Research shows that motivational factors such as a desire for competition, advancement and escapism may lead the player to spend excessive time in the virtual world and may foster an excessive and problematic use of the game (Billieux et

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al., 2011, 2013, 2015; Dauriat et al., 2011; Hellström, Nilsson, Leppert, & Åslund, 2012; Király et al., 2015; Kirby, Jones, & Copello, 2014; Schimmenti, Infanti, Badoud, Laloyaux, & Billieux, 2017a; Yee, 2006).

It is noteworthy that people who spend many hours playing MMORPG do not necessarily display a problematic use associated with negative outcomes. In fact, it has been observed that a great amount of time spent by individuals in virtual worlds can represent the result of a healthy passion, rather than a problematic behavior (Billieux et al., 2013; Burnay, Billieux, Blairy, & Larøi, 2015; Charlton & Danforth, 2007); nonetheless, it has also been observed that an excessive time spent in virtual worlds, combined with other symptoms related to excessive and dysregulated game use, may generate problematic gaming patterns. Notably, the conflicting interpretations of the psychological and behavioral correlates of an excessive involvement in online games fostered an intense scientific debate, especially concerning the adequacy of classifying problematic gaming patterns as a specific psychiatric disorder. The American Psychiatric Association (APA, 2013) proposed the diagnosis of Internet gaming disorder (IGD) as a condition for further study, in order to identify a putative form of behavioral addiction characterized by loss of control and a persistent and recurrent use of Internet games that lead to significant impairments in psychological and psychosocial functioning. More recently, WHO experts recommended to include Gaming Disorder (GD) in the section of disorders due to addictive behaviors in the ICD-11 (World Health Organization [WHO], 2018). WHO experts described GD as a disorder characterized by symptoms such as impairment control over gaming, a priority given to gaming compared to other interests and daily activities, and continuation or escalation of gaming despite its negative consequences. Just to provide an example of the intense debate concerning the diagnostic classification of problematic gaming, Dullur and Starcevic (2018) recently highlighted that there is no clear consensus to establish that a problematic use of online games can be classified as a mental disorder. King and colleagues (2018) replied that there are sufficient reasons, especially from a public health perspective, to include the diagnosis of gaming disorder in the diagnostic manuals. Then, Schimmenti and Starcevic (2019) identified some prominent logical fallacies (that is, logical errors in the scientific discourse) that have been used by King and colleagues to promote the inclusion of IGD and GD among mental disorders.

From a psychological perspective, Kardefelt-Winther (2014a, 2014b) has proposed to consider some Internet activities, such as an excessive use of online games, as a compensatory strategy to satisfy needs and to cope with psychosocial problems. In this context, problematic Internet use (PIU) has been conceptualized as a coping strategy to escape from real life problems and difficulties, through a temporary retreat in Internet activities (Deleuze et al., 2019; Di Blasi et al., 2019; Kardefelt-Winther, 2014c; Maroney, Williams, Thomas, Skues, & Moulding, 2018; Reinecke, 2009; Schimmenti, & Caretti 2010, 2017; Schimmenti et al., 2019a; Snodgrass et al., 2018).

PIU can be defined as an excessive, dysregulated, and potentially addictive use of Internet services and applications (Schimmenti & Caretti, 2017). However, following a compensatory approach, a great amount of time spent in video games can be conceived either as a problematic or non-problematic activity, depending on the psychological factors that lead an individual to “escape” in the virtual worlds.

Research has shown that males, especially adolescents and young adults, are more likely to develop PIU (Anderson, Steen, & Stavropoulos, 2018), including excessive use of online games (Borgonovi, 2016; Durkee et al., 2012; Ha & Hwang, 2014; Laconi, Pires, & Chabrol, 2017; Li, Yu, Zhang, & Jin, 2015). Men tend to spend more time than women on video games (Elliott, Ream, McGinsky, & Dunlap, 2012; Laconi et al., 2017; Puerta-Cortés, Panova, Carbonell, & Chamarro, 2017; Rehbein, Staudt, Hanslmaier, & Kliem, 2016), even though recent data suggest that the use of video games among women is increasing (Entertainment Software Association, 2018). Studies suggest that men prefer MMORPG and sports games, while women prefer simulation games and casual games (Laconi et al., 2017; Puerta-Cortés et al., 2017; Rehbein et al., 2016).

Importantly, research has already highlighted the role of personality features in the development of problematic gaming patterns, beyond the effects of gender preferences and time spent online (Gervasi et al., 2017a). Among the personality factors that may affect the development of problematic gaming, alexithymia and impulsivity may represent two relevant constructs that deserve further investigation in their relationship with excessive gaming patterns and PIU.

The term alexithymia (a composed Greek term which means “no word for emotions”) describes a personality trait characterized by difficulty identifying and describing one’s own feelings, together with a limited capacity to fantasize and to use one’s emotions to guide actions (Bagby, Parker, & Taylor, 1994a). Impulsivity is a personality trait that includes a difficulty focusing on tasks and a tendency to act without self-control, on the spur of the moment (Patton, Stanford, & Barratt, 1995).

Alexithymia and impulsivity are closely linked with difficulties in emotion regulation. Emotion regulation is the psychological process that allows the individuals to recognize, differentiate, and modulate their emotions in response to internal, environmental, and relational stimuli (David, 2016; Fonagy, Gergely, Jurist, & Target, 2002; Gross & Thompson, 2007). The emotional difficulties related to alexithymic traits and impulsivity have been theoretically conceptualized as specific components of an emotion dysregulation process, with research findings supporting this conceptualization (Di Blasi et al., 2019; D’Agostino, Covanti, Monti, & Starcevic, 2017; Schimmenti, Santoro, La Marca, Costanzo, & Gervasi, 2019b).

Literature findings show that emotion dysregulation is a potential risk factor for PIU (Estévez Gutiérrez, Herrero Fernández, Sarabia Gonzalvo, & Jáuregui Bilbao, 2014; Estévez, Jáuregui, Sánchez-Marcos, Lopez-González, & Griffiths, 2017; Hollett & Harris, 2019). In particular, alexithymia and impulsivity are positively associated with PIU (Casale, Caplan, & Fioravanti, 2016; Dalbudak et al., 2013; Hormes, Kearns, & Timko, 2014; Kandri, Bonotis, Floros, & Zafropoulou, 2014; Meerkerk, van den Eijnden, Franken, & Garretsen, 2010; Mottram & Fleming, 2009; Schimmenti et al., 2017b; Scimeca et al., 2014; Yates, Gregor, & Haviland, 2012; Yildiz, 2017), and especially with problematic gaming (Bonnaire & Baptista, 2018; Gentile et al., 2011; Gervasi et al., 2017a). For example, Bonnaire and Baptista (2018) found that people who displayed problematic MMORPG use were more alexithymic than non-problematic players. Also, research has shown that regular gamers display higher levels of alexithymia and are less emotionally reactive than irregular gamers (Gaetan, Bréjard, & Bonnet,

2016). Accordingly, it has been proposed that video games can be used to aid emotion regulation in people who display alexithymic traits and emotion dysregulation (Di Blasi et al., 2019; Gaetan et al., 2016; Hemenover & Bowman 2018; Hussain & Griffiths, 2009; Villani et al., 2018).

Furthermore, a longitudinal study conducted on a large sample of adolescents identified impulsivity as a risk factor for the development of problematic use of videogames (Gentile et al., 2011). A recent systematic review on the relationship between problematic gaming patterns and personality traits (Gervasi et al., 2017a) also showed that impulsivity is moderately to strongly associated with problematic gaming. However, it was also suggested that features such as impulsivity, sensation seeking, diminished inhibitory control and poor self-control might qualify both problematic and non-problematic gamers (Billieux et al., 2011, 2015; Billieux & Van der Linden, 2012; Choi et al., 2014; Collins, Freeman, & Chamarro-Premuzic, 2012; Metcalf & Pammer, 2014; Zhou, Zhu, Li, & Wang, 2014), and some studies suggested that MMORPG players may display different impulsivity profiles with respect to other videogame players (Collins et al., 2012, Puerta-Cortés et al., 2017), such as players of action games (Metcalf & Pammer, 2014).

In sum, research suggests that alexithymic features and impulsivity may contribute to the development of PIU, including problematic gaming, but it has to be understood which domains of alexithymia and impulsivity are associated with problematic gaming in MMORPG players. Therefore, the purpose of this study was to explore if specific features of alexithymia and impulsivity predicted PIU in a sample of MMORPG players, controlling for gender, age, household arrangement, and time spent in WoW.

2. Method

2.1. Participants

The study sample included 364 WoW players (272 males, 74.7%) aged 18 to 48 years old ($M = 25.39$; $SD = 7.03$). All participants were recruited via an online survey. An advertisement was shared on different platforms, such as official WoW forums, general video game forums, and Facebook groups and pages dedicated to World of Warcraft. Before taking the survey, participants were informed about the nature of the study. The anonymity of the data was guaranteed: no information that could reveal the identity of the players, such as real names or Internet protocol address, was collected.

2.2. Measures

Internet Addiction Test (IAT; Young, 1998)

The IAT is a self-report measure that assesses the presence and the extent of PIU. It includes items addressing the incapability to control Internet use, the degree of preoccupation with the Internet, the extent of hiding or lying about online use, and its continued use despite negative effects. The IAT comprises 20 items rated on a five-point scale ranging from 1 (*never*) to 5 (*always*). IAT scores can range from 20 to 100, with higher scores indicating higher levels of PIU. The IAT includes questions such as "How often do you block out disturbing thoughts about your life with soothing thoughts

of the Internet?" The IAT has demonstrated adequate validity and reliability in Italy (Ferraro, Caci, D'Amico, & Di Blasi, 2007) and worldwide (Ha & Hwang, 2006; Widyanto & McMurran, 2004), and it is one of the most widely used scales in research on PIU. The Cronbach's alpha coefficient of the IAT in the current study was .89.

Twenty-Items Toronto Alexithymia Scale (TAS-20; Bagby et al., 1994a; Bagby, Taylor, & Parker, 1994b)

The TAS-20 is a self-report measure used to assess alexithymia. It consists of 20 items that address three factors of alexithymia: difficulty identifying feelings (DIF, 7 items), difficulty describing feelings (DDF, 5 items) and externally oriented thinking (EOT, 8 items). Participants indicate how much they agree with each statement on a five-point scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). The TAS-20 total score can range from 20 to 100, with higher scores indicating higher levels of alexithymic traits. The TAS-20 includes statements such as: "I have feelings that I can't quite identify" (related to the DIF factor); "It is difficult for me to find the right words for my feelings" (related to the DDF factor); and "I prefer talking to people about their daily activities rather than their feelings" (related to the EOT factor). The TAS-20 has demonstrated good psychometric properties in many studies (Parker, Keefer, Taylor, & Bagby, 2008; Taylor & Bagby, 2013), including Italy (Bressi et al., 1996). In the current study, the Cronbach's alpha coefficient was .83 for TAS-20 total score (alpha value of factor scores: .84 for DIF, .79 for DDF, and .63 for EOT).

The Barratt Impulsiveness Scale-11 (BIS-11; Patton et al., 1995)

The BIS-11 is a widely used self-report measure for the assessment of impulsivity. It comprises 30 items presented as first-person statement rated on a 4-point scale (*Rarely/Never*, *Occasionally*, *Often*, *Almost Always/Always*). In addition to a total score ranged from 30 to 120, the BIS-11 provides three subscale scores addressing different domains of impulsivity: attentional impulsiveness (8 items; e.g., "I don't 'pay attention'"), motor impulsiveness (11 items; e.g., "I act on impulse"), and non-planning impulsiveness (11 items; e.g., "I get easily bored when solving through problems"). Higher scores indicate higher levels of impulsivity. The psychometric properties of the BIS-11 have been tested with positive results in many countries, including Italy (Fossati, Di Ceglie, Acquarini, & Barratt, 2001). In the current study, the Cronbach's alpha coefficient was .83 for BIS-11 total score, .60 for attentional impulsiveness, .69 for motor impulsiveness and .70 for non-planning impulsiveness.

Socio-demographic data and average numbers of hours spent each day playing WoW were collected by means of an ad hoc-questionnaire.

2.3. Statistical analyses

Descriptive statistics were computed for all study variables. Group differences were examined through *t*-test. Pearson's *r* correlation coefficients were calculated to examine the associations between time spent in WoW, IAT scores, TAS-20 scores, and BIS-11 scores. A multiple linear regression analysis was conducted to analyze the effects of gender, age, household arrangement, time spent online playing WoW, alexithymia factors (DIF, DDF and EOT) and impulsivity domains (attentional impulsiveness, motor impulsiveness and non-planning

impulsiveness) on IAT scores.

3. Results

Descriptive statistics are reported in **Table 1**, for the full sample and differentiated by gender. Most of the participants (92%) lived with other people in the household, such as family members and colleagues, whereas the others lived alone. Male players were younger than females, and they reported higher scores on TAS-20 and its DDF and EOT factors.

Subsequently, the correlations between the

investigated variables were examined (see **Table 2**). A pattern of significant and positive associations emerged among time spent online playing WoW and scores on IAT, TAS-20, and BIS-11. All these variables were significantly and negatively associated with age.

A multiple linear regression analysis was performed to examine the role of gender, age, household arrangement, time spent online playing WoW, TAS-20 factors and BIS-11 factors in predicting IAT scores in the sample. The time spent online playing WoW, the TAS-20 factors concerning difficulty identifying feelings and difficulty describing feelings, and the BIS-11 domain of attentional impulsiveness were significant and positive

Table 1. Descriptive statistics and gender differences

	Full sample (N= 364)			Males (n= 272)		Females (n= 92)		<i>t</i> ₍₃₆₂₎	<i>p</i>
	M	(SD)	Range	M	(SD)	M	(SD)		
Age	25.39	(7.03)	18-48	24.52	(6.45)	27.97	(8.03)	4.15	<.01
Hours spent online playing World of Warcraft	3.22	(1.43)	.5-5	3.18	(1.45)	3.34	(1.37)	-.97	.33
Internet Addiction Test	52.03	(14.18)	23-100	52.32	(13.85)	51.20	(15.17)	.66	.51
TAS-20 (total score)	44.54	(12.71)	21-83	45.56	(12.17)	41.53	(13.84)	2.65	.01
Difficulty Identifying Feelings	13.82	(6.30)	7-34	13.68	(6.20)	14.24	(6.59)	-.74	.46
Difficulty Describing Feelings	12.74	(5.22)	5-25	13.15	(5.11)	11.53	(5.38)	2.59	.01
Externally Oriented Thinking	17.98	(5.24)	8-36	18.73	(5.36)	15.76	(4.15)	4.84	<.01
BIS-11 (total score)	61.26	(11.18)	36-105	61.54	(11.48)	60.40	(10.25)	.85	.40
Attentional Impulsiveness	16.12	(3.64)	10-30	16.27	(3.66)	15.66	(3.57)	1.39	.17
Motor Impulsiveness	20.80	(4.58)	12-42	20.72	(4.69)	21.03	(4.23)	-.57	.57
Non-planning Impulsiveness	24.34	(5.30)	12-41	24.56	(5.36)	23.71	(5.11)	1.33	.19

Note. TAS-20: Twenty-Items Toronto Alexithymia Scale; BIS-11: The Barratt Impulsiveness Scale-11.

Table 2. Pearson's *r* correlations between the investigated variables

	2	3	4	5	6	7	8	9	10	11
1. Age	.12*	.22**	.31**	-.24**	.29**	.19**	.14**	.24**	.04	.17**
2. Time spent online playing World of Warcraft	-	.38**	.20**	.16**	.09	.21**	.25**	.13*	.25**	.22**
3. Internet Addiction Test		-	.51**	.51**	.40**	.24**	.47**	.48**	.40**	.31**
4. TAS-20 (total score)			-	.82**	.82**	.63**	.52**	.52**	.38**	.42**
5. Difficulty Identifying Feelings				-	.58**	.21**	.48**	.50**	.40**	.32**
6. Difficulty Describing Feelings					-	.29**	.30**	.38**	.18**	.23**
7. Externally Oriented Thinking						-	.40**	.29**	.26**	.42**
8. BIS- 11 total (score)							-	.78**	.84**	.84**
9. Attentional Impulsiveness								-	.57**	.47**
10. Motor Impulsiveness									-	.52**
11. Non-planning Impulsiveness										-

Note. TAS-20: Twenty-Items Toronto Alexithymia Scale; BIS-11: The Barratt Impulsiveness Scale-11; **p* < .05, ***p* < .01

Table 3. Linear regression model predicting problematic Internet use scores

	B	SE	Partial <i>r</i>	<i>t</i>	<i>p</i>
Gender	-.60	1.41	-.02	-.43	.67
Age	-.10	.09	-.06	-1.03	.30
Living with family or peers	-1.55	2.17	-.04	-.72	.48
Hours spent online playing World of Warcraft	2.71	.43	.32	6.38	<.01
Difficulty Identifying Feelings	.57	.13	.24	4.57	<.01
Difficulty Describing Feelings	.31	.14	.12	2.17	.03
Externally Oriented Thinking	.00	.13	.00	-.01	.99
Attentional Impulsiveness	.86	.22	.21	3.94	<.01
Motor Impulsiveness	.29	.18	.09	1.62	.11
Non-planning Impulsiveness	-.04	.14	-.02	-.31	.76

Model: $F(10,353) = 26.33, p < .001; R^2 = .43$

predictors of IAT scores in the sample (see **Table 3**). The regression model was significant ($F_{(10,353)} = 26.33$; $p < .001$) and it explained 43% of variance in IAT scores. An additional exploration of the interactions between alexithymia factor scores and impulsivity factor scores displayed no significant interaction effects, indicating that difficulty identifying feelings, difficulty describing feelings, and attentional impulsiveness independently predicted PIU in our sample of WoW players.

4. Discussion

The present study examined the role of alexithymia and impulsivity facets in PIU scores reported by players of WoW. Three out of four participants in our study were males. This is in line with research showing that men prefer MMORPGs, sport games, and competitive online videogames (Elliott et al., 2012; Laconi et al., 2017; Puerta-Cortés et al., 2017; Rehbein et al., 2016), whereas women tend to play casual games for entertainment (Ko, Yen, Chen, Chen, & Yen, 2005) and they prefer videogames involving simulation, strategy games and mini-games (Laconi et al., 2017; Puerta-Cortés et al., 2017; Rehbein et al., 2016). Our results also showed that males were younger than females in our sample. According to Yee (2006), male players may have earlier access to MMORPGs than females, and females are frequently introduced to MMORPGs in later time by friends or partners.

Many participants in our study reported IAT scores indicating the presence of difficulties controlling their Internet use and an excessive involvement with Internet activities (Young, 1998). This finding supports the view that some WoW players may display PIU because of their excessive involvement with the game and their consequent problematic gaming patterns. In contrast with the majority of studies (e.g., Dong et al., 2018; Durkee et al., 2012; Greenberg, Lewis, & Dodd, 1999; Kormas, Critselis, Janikian, Kafetzis, & Tsitsika, 2011; Tsitsika, Critselis, Janikian, Kormas, & Kafetzis, 2011), men and women in our sample did not differ in their PIU scores, nor they displayed significant differences in the time spent online playing WoW. However, in line with other studies, in our sample younger age was associated with higher levels of PIU (Gervasi et al., 2017b; Schimmenti, Passanisi, Gervasi, Manzella, & Fama, 2014; Schimmenti et al., 2019a; Scimeca et al., 2014) and increased time spent in WoW (Englund, Egeland, Oliva, & Collins, 2008). Moreover, younger participants showed increased levels of alexithymic features and impulsivity traits. Probably, emotion regulation abilities were not entirely developed in some of the youngest people in our sample, and this might have led some of them to use WoW to increase their positive emotions or to facilitate affect modulation and regulation (Di Blasi et al., 2019). This would be in line with theory (Schimmenti & Caretti, 2010, 2017) suggesting that vulnerable people may use the Internet as a “psychic retreat” to protect themselves from distressing experiences.

Finally, a linear regression analysis showed that time spent online playing WoW, difficulty identifying feelings, difficulty describing feelings, and attentional impulsivity predicted the scores on PIU in our sample. This suggests that video games may represent a facilitating environment to cope with negative feelings for some individuals, and that gaming might also help some players to reduce their difficulties identifying, describing and processing their feelings (Gaetan et al., 2016). In fact, research suggests that playing

online can be used to access emotions and to reduce alexithymic dynamics (Di Blasi et al., 2019; Gaetan et al., 2016; Hemenover & Bowman, 2018; Villani et al., 2018). However, playing MMORPGs may also trigger an excessive emotional involvement and a need to excessively and continuously play the game in some vulnerable people (Gentile et al., 2011), thus increasing the risk of problematic and dysregulated gaming patterns. In fact, immediate gratification due to in-game reinforcements and an increasing level of challenges can lead some vulnerable and emotionally dysregulated MMORPG players to a compulsive and impulsive use of the game (Choi & Kim, 2004; Hull, Williams, & Griffiths, 2013; Wan & Chiou, 2006). In this context, the tendency to seek novel and attractive stimuli may foster the absorption in the video game and, consequently, its excessive use, starting a maladaptive pathway that may result in the development of PIU.

In sum, these considerations are in line with research suggesting that PIU is linked to an interference with processing emotional stimuli (Schimmenti, Starcevic, Gervasi, Deleuze, & Billieux, 2018) and support the view that video games may represent a particularly attractive environment for some vulnerable individuals. In MMORPGs, these individuals may find a way to cope with emotion difficulties and, at the same time, to fulfill their needs for stimulation and novelty (Deleuze et al., 2019; Demetrovics et al., 2011). Especially, people who have difficulties identifying and communicating their feelings may be prone to use video games as a way to escape from negative feelings and boredom (Billieux & Van der Linden, 2012; Billieux et al., 2015; Di Blasi et al., 2019; Hussain & Griffiths, 2009; Kardefelt-Winther 2014a, 2014c; Kuo, Lutz, & Hiler, 2016; Maroney et al., 2018). Therefore, a potential interpretation of our findings is that the tendency to be distracted by different and novel stimuli and the continuous search for stimulation are linked, in a vicious circle, to increased difficulties identifying and describing feelings. This, in turn, may foster an excessive use of the video game, and may ultimately generate PIU.

Some limitations of the current study must be reported. First, we used the IAT to examine PIU, but the questions included in this measure did not allow us to disentangle the effects of problematic gaming patterns from other features of an excessive and dysregulated involvement with the Internet, thus we relied on participants' self-reported time playing WoW to speculate on the role of excessive gaming in PIU. Future research might use specific measures of IGD or GD symptoms together with measures of PIU. Second, our study relied on self-reported measures, which can result in bias effects. Third, the self-selected nature of the sample limited the possibility to generalize our findings to other video game players; additionally, our results refer only to WoW players. Fourth, direct causation cannot be inferred due to the cross-sectional nature of the study. Finally, our sample was recruited in the community, so our results cannot be immediately extended to individuals who seek treatment for problematic gaming.

5. Conclusions

Its limitations notwithstanding, our study can shed new lights on how time spent online, alexithymic features and impulsivity traits can contribute to the development of PIU in WoW players. Our findings suggest that difficulties in understanding and communicating feelings, together with the tendency

to be distracted by novel and attractive stimuli, can contribute to the development of problematic gaming patterns. Moreover, our study suggests that investigating the domains of emotion dysregulation in people who display an excessive use of video games can be useful to identify their specific psychological vulnerabilities.

All these considerations are in line with a theoretical framework that conceptualizes problematic gaming as a compensatory strategy to deal with psychological and psychosocial problems (Di Blasi et al., 2019; Kardefelt-Winther, 2014b; Schimmenti & Caretti, 2010; Snodgrass et al., 2018). On the clinical level, some implications can be derived when such framework is applied to our findings. These clinical implications particularly concern the opportunity to treat the reduced affect awareness and the tendency to become easily distracted by external stimuli of some video game players. In fact, for some people who display an excessive use of video games associated with alexithymic features and impulsivity, treatment interventions should aim to promote emotion understanding and affect regulation (Schimmenti & Caretti, 2010). In fact these interventions might serve to help this type of dysregulated gamers to balance their interest about in-game attractive stimuli with an interest about those mental states and psychological motives that brought them to excessively use the game.

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