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Research paper

Escaping reality through videogames is linked to an implicit preference for virtual over real-life stimuli

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ABSTRACT

Background: From the theory of compensatory Internet use, escapism through videogames may constitute a coping strategy that is sometimes helpful but, in some cases, maladaptive. To date, however, evidence supporting this view has been gathered only through the use of explicit self-reported questionnaires, which are known to be biased. Accordingly, the aim of the current study was to test whether the escapism motive is related to a preference for the virtual environment.

Method: A laboratory task that allowed the measurement of implicit attitudes, namely, the Affect Misattribution Procedure, was created with stimuli from real world and videogames. The task was administered online with a series of questionnaire and completed by 273 online gamers from the community.

Results: Participants had more positive attitudes toward pictures depicting virtual environments than toward those depicting real environments. Furthermore, participants who frequently used videogames to escape real life and were highly engaged in video gaming had a more pronounced positive implicit attitude toward virtual environments.

Discussion: This study contributes to a better understanding of the psychological processes underlying escapism in videogames and calls for a refinement of the escapism construct, which can be related to both problematic (i.e., potential coping strategy) and nonproblematic patterns of videogame use. Among the limitations, it should be noted that the selection of stimuli related to videogames is restricted to one genre of game, and that the participants' environment could not be controlled due to the online design.

1. Introduction

With the exponential success of online videogames such as *World of Warcraft, League of Legends*, or, more recently, *Fortnite* and its 125 million gamers counted for June 2018 (Statista, 2018), playing videogames has become one of the most popular leisure activities worldwide. Although videogaming can be a stimulating and nonproblematic leisure pursuit in many respects, a growing number of studies have documented that overinvolvement in videogames can be associated with functional impairment and psychopathological symptoms (Billieux et al., 2017). In 2013, Internet gaming disorder was included in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* as a tentative psychiatric condition warranting further study (American Psychiatric Association, 2013). Similarly, gaming disorder was included in the eleventh revision of the *International Classification of Diseases* (World Health Organization, 2018).

Henceforth, it is imperative to understand the circumstances under which problematic gaming patterns eventually lead to functional

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impairment. Kardefelt-Winther (2014a, 2014b) has highlighted that many studies conducted on problematic gaming patterns have so far mainly focused on isolating individual predictors for problematic behaviors, but have not integrated them in a holistic and more comprehensive model of problematic gaming that also accounts for the wider social context and life environment of the individual. The downside of focusing on isolated predictors is twofold: it supports overestimation of the impact of an isolated predictor, while simultaneously failing to account for other aspects of an individual's life that may causally explain the problematic behavior. Kardefelt-Winther (2014a, 2014b) also emphasized that, while much of the existing literature clearly mentions that videogames may be used as a way to cope with life difficulties (e.g., Kuss et al., 2012; Schimmenti and Caretti, 2010; Widyanto and Griffiths, 2006), few studies have empirically tested this proposal. Crucially, the few studies that did so entirely relied on self-reported measures. The proposition of using videogames as a means to cope with life difficulties should be complemented by additional evidence from experimental studies.

Kardefelt-Winther (2014a, 2014b) proposed the theory of compensatory Internet use, derived from Young's assumption (1998), that online activities, such as videogaming, may fulfill individual needs unachieved in real life. According to this theory, spending time online can help to alleviate a problematic situation and fulfill certain needs, but at the cost of potential negative outcomes. From this perspective, the various motivations underlying online behaviors and their relations to psychosocial well-being are key to understanding when gaming constitutes a nonproblematic leisure activity or a potentially problematic behavior (Billieux et al., 2015; Shen and Williams, 2011).

The wealth of possible options for players in some videogames, especially for the massively multiplayer online role-playing game (MMORPG) genre, led researchers to identify the various motives driving players in those games (Yee, 2006). Different taxonomies exist (e.g., Demetrovics et al., 2011; Park et al., 2011), but the most influential to date is the one proposed by Yee (2006). After having interviewed 3,000 MMORPG players, Yee identified three main motivations divided into ten different subcomponents. These three main motivations are related to achievement (e.g., succeeding in quests, gaining in power), immersion (e.g., discovering the game, knowing its secrets, being immersed), or social interactions (e.g., making new friends, talking with other players). Ensuing studies have examined motivations that could also predict problematic use. Among Yee's motivations, and in line with the theory of compensatory Internet use (Kardefelt-Winther, 2014a, 2014b), the immersion-related motivation of escapism, defined as the use of online virtual worlds as a way to escape real-life problems, stood out as being a strong predictor of problematic use and negative impacts on gamers' lives (e.g., Billieux et al., 2011, 2013; Caplan et al., 2009; Hellström et al., 2012; Kardefelt-Winther, 2014b; Yee, 2006; Zanetta Dauriat et al., 2011). To some gamers, videogames may thus provide the empowerment that they are either lacking or rarely find in the real world (King and Delfabbro, 2009). Notably, although escapism was the most important motivation predicting problematic online gaming, other motivations have also been found significant, in particular achievement-related motivations (e.g., Billieux et al., 2011, 2013; Caplan et al., 2009; Hellström et al., 2012; Kardefelt-Winther, 2014b; Zanetta Dauriat et al., 2011). Player motivations may even have a crucial role in explaining some consistent relationships found between psychopathological symptoms and problematic gaming patterns. For example, Kardefelt-Winther (2014b) emphasized that including escapism and achievement motives as predictors of problematic gaming weakens or even eliminates the associations between some psychopathological variables thought to be directly associated with problematic gaming (stress, social anxiety, or loneliness). Furthermore, several studies have shown that escapism motivation moderates the relationship between psychopathological symptoms and problematic technology use (for an example in relation to schizotypal traits, see Schimmenti et al., 2017). Kardefelt-Winther (2014c) found that escapism was positively associated with problematic gaming among individuals experiencing more negative outcomes related to gaming and have higher rates of psychopathological symptoms. In addition, escapism was also shown to mediate the relationship between psychiatric distress and problematic online gaming (Ballabio et al., 2017; Király et al., 2015).

From the theory of compensatory Internet use and the results of these recent studies, it seems plausible that escapism through videogames may constitute a coping strategy to face adversity, which may sometimes be helpful but in some cases maladaptive. Escapism could be seen as an experiential avoidance from the individual. This process is involved in a wide range of psychological problems, consisting of taking measures to influence or avoid negative experiences (e.g., involving emotions, thoughts, bodily sensations) as much as possible to regulate emotions (Chawla and Ostafin, 2007; Hayes et al., 1996). If videogame involvement can function as experiential avoidance, this may partly explain the association between escapism and problematic patterns. In contrast, online escapism could result from a nonproblematic preference (or more positive attitude) toward online environments as opposed to the real world (e.g., virtual worlds are more fun and enjoyable, or they allow one to relax easily). Crucially, in the latter case, escapism through videogames could be adaptive (e.g., a useful way to cope with stress or to relax). A notable experimental study by Yen et al. (2011) found that gamers who showed addictive-like patterns of playing were characterized by positive implicit attitudes toward videogames-related stimuli (screenshots of games). However, since they did not test both hypotheses, an experiment that directly measures gamers' preferences for real versus virtual worlds is required.

Therefore, the aim of the current study was to test, in the context of videogaming, whether escapism motive is related to a preference for virtual environments. An innovative element of this study is that a task was used to assess players' implicit attitudes toward the real versus virtual worlds. Indeed, most available studies on videogames used explicit self-reported questionnaires. In contrast, the Affect Misattribution Procedure (AMP; Payne et al., 2005) used here measures implicit attitudes regarding virtual versus real world-related stimuli. Attitudes are defined as relatively stable cognitive representations associated with positive or negative valence stored in long-term memory (Cunningham et al., 2007). Implicit measurements focus on automatic processes that require less voluntary cognitive control (De Houwer et al., 2009), and, thus, are presumed to predict attitudes more accurately than explicit measures do (Payne et al., 2008; Rudman, 2004). The AMP is even thought to be more effective in studying the relation between implicit attitudes and addictive behaviors when compared with other implicit measures, such as the Implicit Association Task (Greenwald et al., 1998; Payne et al., 2008). In the AMP, the participant indicates whether a neutral stimulus is pleasant or unpleasant, following the brief presentation of a cue. The task has been successfully used in previous studies and is considered a valid measurement of implicit attitudes (e.g., Cameron et al., 2012; Payne and Lundberg, 2014; Teige-Mocigemba et al., 2017). The current study tested whether escapism would predict positive attitudes for virtual worlds over the real world. The first hypothesis postulated that pictures clearly recognizable as depicting scenes from videogames would activate more positive attitudes among gamers than would real-world pictures. The second hypothesis postulated that escapism would be the strongest motive to predict the preference for virtual worlds. It is noteworthy that the use of the word "preference" for virtual worlds does not necessarily imply a rejection or depreciation of the real world. Accordingly, and in line with the distinction proposed by Charlton and Danforth (2007, 2010), it was also postulated that a preference for the online environment can be related both to an elevated but nonproblematic involvement in videogames and/or a harmful involvement in videogames.

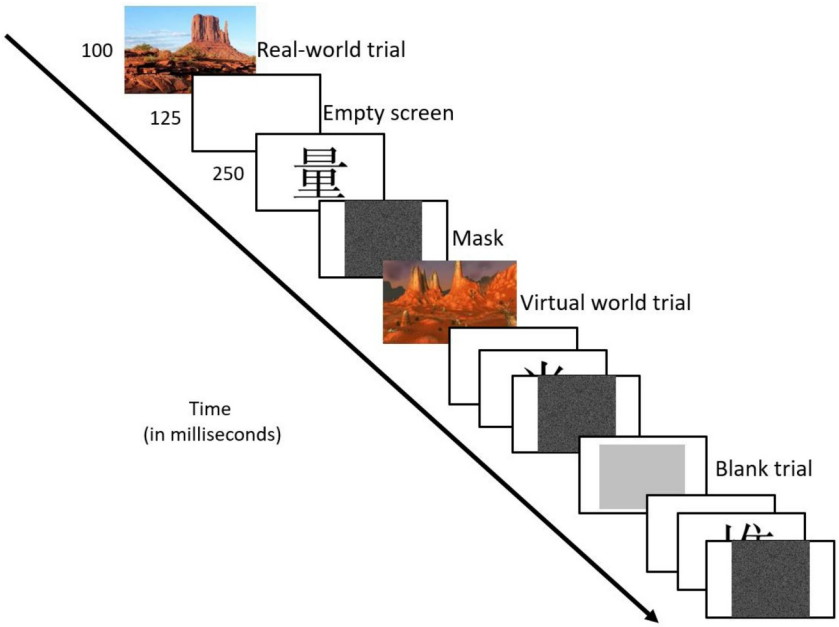

Fig. 1. Example of trials in the AMP.

2. Method

2.1. Participants and procedure

Participants recruitment followed a two-step procedure. First, a short online survey was sent to all students at the Université catholique de Louvain (Louvain-la-Neuve, Belgium) to identify a large sample of online videogamers. No incentive or compensation was provided for participating in this initial step. This questionnaire asked the participants about their frequency of use and the types of videogames they currently play (e.g., specific game genre, offline or online). Inclusion criteria were a minimum age of 18, being either a native or a fluent French speaker, playing online videogames at least once per week, and not being able to understand Chinese, as it would interfere with the material used in the AMP. In total, 1637 volunteers completed this initial questionnaire. Based on these inclusion criteria, 645 of them were eligible for the second step. Among them, a total of 291 participants agreed to take part in the study. Eighteen participants were further excluded because of incomplete data or unrealistic self-reported number of hours of game play per week. The final sample consisted of 273 participants (222 males) aged between 18 and 34 years (M = 21.54, SD = 3.02), who indicated playing between 1 and 40 h per week (M = 15.86, SD = 9.16). Participants were informed that their full contribution to the second step of the study would allow them to participate in a lottery in which five participants would receive 20 euros each. The volunteers were e-mailed the necessary links to take part in the experiment with their own personal anonymous ID randomly assigned. Since the entire experiment was conducted online without direct control over the participants, written instructions were provided before the AMP started and questionnaires were presented. Participants were instructed to do the experiment in a quiet room and to stay focused and alert during the whole task.

Each participant first completed several questions using Qualtrics online platform (Provo, UT, 2016) that addressed socio-demographic variables (i.e., age, gender, native language, educational level, and current occupation), gaming habits (i.e., two open questions measuring their estimated hours played per week of their favorite game and of videogames in general). All game genres were considered relevant for the study, as any genre can be related to escapism (Kahn et al., 2015). Participants then completed a version of the AMP (Payne et al., 2005) designed to assess implicit attitudes toward real versus virtual environments. Next, participants completed questionnaires measuring their gaming motives (Motivation to Play in Online Games Questionnaire [MPOGQ]; Yee, 2006) and the degrees to which they use their favorite online videogame in a functional or dysfunctional way (i.e., addiction; with the Addiction-Engagement Questionnaire; Charlton and Danforth, 2007). Developed by Payne et al. (2005), the AMP was programmed with the online platform Testable (Rezlescu, 2017) which constitutes a reliable online platform for creating and launching laboratory tasks.

The ethical committee of the Psychological Science Research Institute (Université catholique de Louvain) approved the study protocol. Only the experimenter in charge of the study had access to the file linking e-mail addresses to IDs, which was deleted directly after the study to ensure complete anonymity. Part of the self-reported data collected in the current dataset were used in the framework of a study unrelated to the hypotheses and aims of the current report (see Deleuze et al., 2018). The stimuli and the questionnaires used in the current study are available in the following Open Science Framework link: https://osf.io/7suwv/ (Deleuze et al., 2017).

2.2. Instruments

2.2.1. The Affect Misattribution Procedure (AMP)

To create the AMP, a set of 22 pictures was selected: 11 photos depicting real-world environments and 11 screenshots from virtual worlds. Each real-world picture was carefully selected to match the corresponding virtual world picture in terms of colors, shapes, and details, thereby forming a total of 11 pairs of matching stimuli (e.g., real and virtual desert landscapes, forests, ruins, or castles). External research assistants (some of them active gamers) judged the pictures (e.g., in terms of videogame representativeness, distinctiveness between virtual and real stimuli) and validated the stimuli.

In the AMP, each trial started with the presentation of a prime for 100 ms, followed by 125 ms of blank screen, and then a neutral target for 250 ms before being replaced by a gray mask in place of the target until the participant answered (see Fig. 1). Similar to previous AMP-based studies (e.g., Moussally et al., 2015), different Chinese pictograms were randomly selected from a set and presented as targets. Stimuli were presumed emotionally neutral for the vast majority of European

participants. The gray mask was intended to maximize the ambiguity of perceptual processing between priming cue and target to prevent afterimages on the retina, which would affect perceptual processing of the stimuli (Payne et al., 2007). Participants were asked to judge the target as either pleasant or unpleasant by clicking on the corresponding button at the bottom of the screen. Screenshots from videogames and real-world pictures served as prime stimuli to determine implicit attitudes (i.e., to influence the judgment made on neutral targets). Following classic AMP guidelines (Payne et al., 2005; Payne and Lundberg, 2014), participants were instructed to focus on the target (i.e., the Chinese pictograms) and not on the preceding stimuli.

The task began with a five-trial training session with neutral picture primes that were not related to the study hypotheses (e.g., a tap, a bucket). The actual AMP consisted of three different types of trials: 44 videogame-related trials, 44 real world-related trials, and 44 with no prime (i.e., a blank screen). We decided to include these latter blank trials to control for potential individual differences in positive and negative response biases among participants. Scores obtained with the AMP are binary (i.e., positive or negative), the dependent variable being the proportion of positive answers (PP) for each trial type (i.e., frequency of pleasant responses for the targets following real-world pictures, virtual-world pictures, and blanks).

Each picture used was presented four times. To prevent paired learning of pictorial stimuli and specific characters, Chinese pictograms were randomly assigned to trials (i.e., 137 Chinese pictograms were used, 5 for the training trials and 132 for the relevant trials). Trials were separated by a fixed inter-trial duration of 1000 ms. The different types of trials were presented in random order.

The AMP version used in the current study was slightly adapted from the original. While previous studies used simple stimuli (e.g., a bottle of alcohol, or cigarettes), we used visual scenes that required complex perceptual processing. Although the time of appearance on the screen had to remain brief, participant had to be able to fully perceive the stimulus. From a series of pre-tests, post-task questions revealed that most participants were unable to distinguish between real and virtual stimuli with the original AMP duration time of 75 ms. We thus decided to increase the presentation time for cues and targets to 100 ms and 250 ms, respectively (instead of 75 ms and 125 ms in the original AMP; Payne et al., 2008). Similarly, the presentation time of the target stimuli (i.e., Chinese pictograms) was also increased on the basis of the results from pre-tests (250 ms instead of 100 ms). According to Payne and Lundberg's review (2014), such types of adjustments are acceptable or sometimes even necessary. Of more importance, these adjustments do not alter the constructs measured. Meta-analyses confirmed the high validity and reliability of the task (Cameron et al., 2012; Payne and Lundberg, 2014).

2.2.2. The Motivation to Play in Online Games Questionnaire (MPOGQ)

The MPOGQ (Yee, 2006, French version by Billieux et al., 2013) is a 39-item questionnaire that measures ten motives to play online, ranging from 0 (*not important/interested at all* or *never*, depending on the items) to 4 (*extremely important/interested* or *always*, depending on the items). The various motives measured included (1) Achievement-related motives, including Advancement (i.e., progressing in the game; Cronbach's $\alpha = 0.78$), Mechanics (i.e., knowing how the game system works; $\alpha = 0.79$), and Competition (i.e., challenging other players; $\alpha = 0.74$); (2) Social-related motives, including Socializing (i.e., helping and chatting with others; $\alpha = 0.81$), Relationship (i.e., forming long-term relationships with other players; $\alpha = 0.78$), and Teamwork (i.e., being part of the group effort; $\alpha = 0.77$); and (3) Immersion-related motives, including Discovery (i.e., finding and knowing as many things as possible within the game; $\alpha = 0.85$), Role-playing (i.e., creating a background to the played avatar, interacting with others as if you were the character; $\alpha = 0.83$), Customization (i.e., liking to customize the appearance of the avatar; $\alpha = 0.82$), and Escapism (i.e., escaping from real-life problems through the virtual environment; $\alpha = 0.66$).

2.2.3. The Addiction-Engagement Questionnaire

The Addiction-Engagement Questionnaire is a 24-item scale created by Charlton and Danforth (2007, 2010; French version by Deleuze et al., 2018) with scores ranging from 1 (*completely disagree*) to 7 (*completely agree*). Participants are first asked to indicate the game they play most so that the items can be adapted accordingly. This questionnaire is composed of the Engagement subscale ($\alpha = 0.76$), which measures elevated but nonproblematic engagement in online videogames (i.e., a passion), and the Addiction subscale ($\alpha = 0.80$), which measures excessive and pathological use of videogames.

2.3. Data analysis

The PPs for each type of trial (PP virtual, PP real, and PP blank) were extracted. From these percentages, the dependent variable for the study consisted of the composite score of the AMP (cAMP), which is traditionally used in AMP-based studies (e.g., Moussally et al., 2015; Payne et al., 2008). This score was computed by subtracting PP real from PP virtual (PP virtual–PP real). Therefore, a positive score indicates a preference for virtual environments.

To ensure the priming impact of the type of cues, we performed repeated measures analyses of variance (ANOVAs) on the entire sample with the Greenhouse–Geisser correction applied when necessary. Two-tailed Pearson's correlations were then calculated to evaluate the associations between cAMP and the other variables. Our main hypothesis was tested using a multiple regression analysis with cAMP as the dependent variable. Independent predictors entered in the regression analysis were the Addiction and the Engagement subscales of the Addiction-Engagement Questionnaire and the ten motivations to play of the MPOGQ, along with control variables, namely, PP blank to control for positivity or negativity biases, demographics (age and gender), and the mean hours spent playing per week.

3. Results

3.1. Implicit attitudes

For the repeated measures ANOVAs, Mauchly's test of sphericity being not assumed ($p < .01$), there was a significant effect of prime type, $F_{(1.45,394.14)} = 8.31$, $p < .01$, $\eta^2 = 0.03$ (which corresponds to a small effect size). Three Bonferroni post hoc comparisons were computed. Confirming the first hypothesis, participants rated targets following virtual environments ($M_{PP\ virtual} = 56.11$, $SD = 17.70$) more positively than targets following real-world pictures ($M_{PP\ real} = 53.11$, $SD = 19.43$) at $p < .01$. Targets following real-world pictures were rated as being significantly less pleasant than those following blank screens ($M_{blank} = 59.10$, $SD = 20.23$) at $p = .002$. There was no significant difference in pleasantness ratings between trials with virtual environments and blank screens ($p = .19$).

3.2. Multiple regression analysis

Table 1 shows the zero-order correlations between cAMP and the other variables. Only Engagement, Escapism, and PP blank were significantly and positively correlated with cAMP.

Table 2 shows the coefficients of each variable used in the multiple regression to predict cAMP. Inspection of residuals and multicollinearity effects showed that the conditions of application for regression analyses were respected. A significant regression equation was found, $F_{(16,256)} = 2.36$, $p < .01$, which accounted for 12.8% of the total cAMP variance. For the effect size, the calculated Cohen's f^2 was 0.14, close to a medium effect size (i.e., between 0.15 and 0.34). The regression analysis confirmed that Escapism was the only motive that significantly and positively predicted cAMP, thereby indicating a higher preference for virtual environments in comparison to real environments. Regarding problematic gaming, the regression analysis also

Table 1
Correlations between the composite scores on the Affective Misattribution Procedure (cAMP) and the other study variables.

	cAMP
Age	.10
Gender	−.11
Hours/week	.05
Addiction	.09
Engagement	.26**
MPOGQ-Advancement	.10
MPOGQ-Mechanics	.08
MPOGQ-Competition	.07
MPOGQ-Socializing	−.03
MPOGQ-Relationship	.02
MPOGQ-Teamwork	−.05
MPOGQ-Discovery	< −.01
MPOGQ-Role play	−.03
MPOGQ-Customization	< −.01
MPOGQ-Escapism	.17**
PP blank	.13*

Note. Gender = males coded as 1, females as 0; hours/week = mean hours spent playing video games per week; Addiction = subscale of the Addiction-Engagement Questionnaire; Engagement = subscale of the Addiction-Engagement Questionnaire; MPOGQ = Motivation to Play in Online Games Questionnaire; PP blank = proportions of positive answers in the "blank" condition.
* $p < .05$; ** $p < .005$.

Table 2
Multiple regression analysis with composite scores on the Affective Misattribution Procedure as the dependent variable.

Model	B	Standard error	β	t
Age	.27	.31	.05	.87
Gender	−5.14	2.51	−.13	−2.05*
Hours/week	−.04	.11	−.02	−.37
Addiction	−.01	.08	−.01	−.16
Engagement	.36	.11	.24	3.43**
MPOGQ-Advancement	.18	.25	.05	.70
MPOGQ-Mechanics	.04	.29	.01	.13
MPOGQ-Competition	.05	.31	.01	.17
MPOGQ-Socializing	.04	.35	.01	.12
MPOGQ-Relationship	−.15	.42	−.03	−.36
MPOGQ-Teamwork	−.07	.33	−.02	−.22
MPOGQ-Discovery	−.01	.26	< −.01	−.03
MPOGQ-Role play	−.46	.28	−.12	−1.66
MPOGQ-Customization	−.29	.35	−.06	−.82
MPOGQ-Escapism	.88	.43	.14	2.05*
PP blank	.08	.05	.11	1.82

Note. Gender = males coded as 1, females as 0; hours/week = mean hours spent playing video games per week; Addiction = subscale of the Addiction-Engagement Questionnaire; Engagement = subscale of the Addiction-Engagement Questionnaire; MPOGQ = Motivation to Play in Online Games Questionnaire; PP blank = proportions of positive answers in the "blank" condition.
β = Standardized Coefficients
* $p < .05$; ** $p < .005$.

revealed that Engagement, but not Addiction, predicted preference toward videogame environments. Finally, gender emerged as another significant predictor, indicating that being female was associated with a higher cAMP score. PP blank, although being correlated with cAMP, was not a significant predictor in the regression analysis. No other variable appeared as a significant predictor in the computed model.

Table 3 shows the correlations between all variables tested in the model.

4. Discussion

This study aimed at testing whether gamers have a preference for virtual versus real environment and whether the escapism motive and in-game engagement (problematic and nonproblematic) is related to this preference. Escapism is a common feature to passions and hobbies, involving being immersed in an activity that can take a high amount of time. However, Escapism is also known to be an important predictor of problematic use of online videogames (e.g., Billieux et al., 2015; Kaczmarek and Drążkowski, 2014). Our design was innovative in that it incorporated the measurement of attitudes for pictures showing virtual and real worlds by using an implicit task, the AMP (Payne et al., 2005).

Although the effect size was only close to a medium effect, the first hypothesis was confirmed, as game-related pictures that displayed typical scenes from virtual environments were implicitly processed more positively than were real-world pictures. Given that the sample was composed exclusively of gamers, this result supports the idea that they had a greater implicit preference for virtual over real environments. Moreover, this finding also corroborates that the stimuli used in the present study belonged to distinct categories (i.e., virtual and real stimuli). The second hypothesis was also supported, as escapism was found to be the only motive predicting the cAMP score in the multiple regression model. Regarding our final hypothesis, results also showed that Engagement, i.e., the high but nonproblematic involvement in videogames, predicted a preference for virtual environments in our sample of regular gamers.

In view of Kardefelt-Winther's (2014a) theory of compensatory Internet use, distinguishing the player's type of engagement could help unravel whether gaming is functional or dysfunctional. Crucially, the current results support the view that having a preference for virtual worlds is not necessarily related to dysfunctional or addictive-like use of videogames. However, it is important to underline here that only volunteer gamers from the community participated, rather than gamers selected on the basis of problematic playing patterns. It is likely that for our participants, playing games serves as an adaptive coping strategy, and that "relaxing" is perhaps a better label than "escapism" to describe this gaming motive. Therefore, the sample as a whole cannot be considered as using the game as a form of experiential avoidance, or that engaging in videogames reflects a dysfunctional coping strategy. Rather, it is likely that for the majority of participants in our study, gaming had the positive function of helping them to relax while engaging in an enjoyable activity, leading to a condition "where the search for emotional relief under distressful conditions can be accomplished through a *momentary* escape into states of self-absorption" (Schimmenti and Caretti, 2010, p. 118, original italics), which may serve to restore energy and creativity. However, it is possible that in other people who show more problematic videogaming patterns, the escapism motive could represent a dysfunctional coping strategy linked to an intense need to avoid or even dissociate painful mental states concerning current or past difficulties (Schimmenti et al., 2012). Longitudinal research is required to ascertain whether momentary escapism (e.g., when someone faces temporary stressful life period) or pervasive escapism (e.g., when someone systemically cope with negative affects through videogaming) are differentially linked to pathological videogaming.

In conclusion, we believe that these findings, although obtained in a single study, call for a better understanding of the escapism concept and its relation to problematic gaming. According to Yee's model on which this study was based, escapism is defined as "*using the online environment to avoid thinking about real life problems*" (Yee, 2006, p. 774). This definition has been used in many studies that highlight the role of escapism in problematic videogame playing. Regarding the different models of motivations to play online, however, it appears that the definitions of escapism vary substantially. Demetrovics et al. (2011) identified an "escape" factor defined as the will to escape from real-life problems (e.g., "*I play online games to forget about unpleasant things or*

Table 3
Pearson correlations between all variables.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.Age	–														
2.Gender	−.09	–													
3.Hours/week	.06	.16**	–												
4.Addiction	−.04	.07	.18**	–											
5.Engagement	.13*	.05	.30**	.29**	–										
6.MPOGQ-Advancement	−.09	.09	.25**	.32**	.34**	–									
7.MPOGQ-Mechanics	.07	.18**	.27**	.19**	.36**	.48**	–								
8.MPOGQ-Competition	−.09	.26**	.14*	.29**	.24**	.31**	.18**	–							
9.MPOGQ-Socializing	−.03	.05	.15*	−.05	.08	.23**	.15*	−.09	–						
10.MPOGQ-Relationship	.02	.05	.24**	.14*	.22**	.32**	.18**	.11	.57**	–					
11.MPOGQ-Teamwork	−.07	.16**	.12	−.04	−.03	−.04	−.11	−.02	.37**	.28**	–				
12.MPOGQ-Discovery	.02	−.05	.07	−.01	.15*	.27**	.17**	−.04	.27**	.08	−.20**	–			
13.MPOGQ-Role play	.02	−.10	.13*	.05	.22**	.22**	.25**	−.07	.29**	.20**	−.12*	.48**	–		
14.MPOGQ-Customization	.02	−.07	.11	.10	.17**	.34**	.32**	−.01	.24**	.13*	−.09	.52**	.44**	–	
15.MPOGQ-Escapism	−.03	−.06	.24**	.33**	.30**	.33**	.27**	.16**	.09	.13*	−.08	.24**	.32**	.35**	–
16.PP blank	.14*	.02	.01	−.05	.06	−.11	−.01	.02	−.04	.01	−.03	−.07	−.06	−.05	−.03

Note. Gender = males coded as 1, females as 0; hours/week = mean hours spent playing video games per week; Addiction = subscale of the Addiction-Engagement Questionnaire; Engagement = subscale of the Addiction-Engagement Questionnaire; MPOGQ = Motivation to Play in Online Games Questionnaire; PP blank = proportions of positive answers in the "blank" condition.

* $p < .05$; ** $p < .005$.

offenses"), a "recreation" factor defined as playing to relax and have fun (e.g., "*I play online games because it is entertaining*"), and a "coping" factor referring to coping with dysphoric moods (e.g., "*I play online games because gaming helps me get into a better mood*"). In another example, Kahn et al. (2015) identified players who qualified as "escapists," which refers to a sense of immersion and practicing (e.g., "*I like to do things in games which I cannot do in real life*"). Eventually, escapism has been included as a diagnostic criteria to define Internet gaming disorder in the DSM-5 (Criteria 8: "use of Internet games to escape or relieve a negative mood"; American Psychiatric Association, 2013, p. 795). Our results, and the various gaming motives identified in previous research (Demetrovics et al., 2011; Yee, 2006), thus call for further studies disentangling the probably multifaceted construct of Escapism in the framework of videogame playing. Indeed, current accounts seem to indicate conceptual overlaps regarding its definition, which might best be understood as a continuum that ranges from healthy positive relaxation to dysfunctional coping, or even to dissociative phenomena (Schimmenti and Caretti, 2010). Along the same line, it might also be that the (not necessarily problematic) escapism measured in the current study partially overlaps with "distraction", conceptualized as an adaptive emotion regulation strategy. Indeed, past research has shown that momentary distraction (e.g., temporarily redirecting one's attention to something more pleasant) is more adaptive and predictive of well-being than experiential avoidance (e.g., using strategies to avoid or delay the confrontation with adverse emotions) (Wolgast et al., 2013; Wolgast and Lundh, 2017). As stated by Kardefelt-Winther (2014a), knowing "why" someone is playing will help avoid pathologizing gaming behavior with speculations or misinterpretations.

Finally, the regression analysis also revealed that females had higher cAMP score. Previous evidences showed that females are more attracted by social motivations and exploration, while males are more competition-oriented (Billieux et al., 2013; Yee, 2006). However, more recent research has extended such findings. For example, Billieux et al. (2015) identified a group of problematic MMORPG gamers who displayed increased emotion dysregulation and escapism, the majority of whom were women. Similarly, Kiràly et al. (2015) found that female gamers showed higher escapism scores associated with more problematic gaming". Further work is necessary to determine whether women are more prone than men to experience negative feelings that motivate them to play games for coping reasons (Nolen-Hoeksema, 2001; Nolen-Hoeksema and Girgus, 1994).

Some limitations of our study must be reported. Although it is among the few studies using a laboratory task through online dissemination, which allows for collecting a larger amount of data simultaneously and faster than in traditional laboratory conditions, the participants' environment could not be controlled. Another limitation concerns the pictures used in the AMP. All virtual world-related pictures were taken from the game *World of Warcraft*. Further studies should thus be conducted with a more representative set of stimuli (e.g., by integrating different games to see whether they evoke the implicit attitudes regarding gaming, regardless of whether the image represents a known game or a preferred genre). It would also be interesting to test these stimuli with non-players to see whether an effect due to the novelty or "fun aspect" of it would be enough to activate positive implicit attitudes among them. Hence, future studies should include a control group of non-gamers. A final limitation concerns our decision to add PP blank trials in the AMP. The results obtained when comparing the three conditions (i.e., the proportion of positive answers for blank trials) were, indeed, puzzling. Although it is possible to speculate on how virtual and real trials might have contaminated responses provided to blank trials, additional research is warranted to better understand how blank trials may be affected by salient trials in the AMP. In addition, applying such a design among individuals with dysfunctional gaming (e.g., treatment-seeking gamers or gamers reporting negative consequences) might lead to different results. Such gamers could have a larger gap between the two worlds, possibly with the rejection of the real one, or the addiction score may predict the cAMP score better than the engagement score. There was already some indication that gamers tend to prefer virtual-world pictures in the present study. In contrast to the other conditions, seeing these pictures led participants to find Chinese pictograms the least pleasant, thereby reflecting a tendency in gamers to find virtual worlds more attractive, perhaps because they perfectly match their motive of escapism. Therefore, future research is warranted to expand the understanding of the escapism concept and to improve its use in research and clinical practice.

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Contributors

Jory Deleuze and Joël Billieux designed the study. Jory Deleuze elaborated the online survey and collected the data. Jory Deleuze did the statistical analyses with the help of Filip Nuyens, André Melzer, and Joël Billieux. Jory Deleuze and Joël Billieux interpreted the results and wrote the article. Jory Deleuze, Pierre Maurage, Adriano Schimmenti, Filip Nuyens, André Melzer, and Joël Billieux reviewed the manuscript. All authors approved the final version of the manuscript.

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Conflict of Interest

All authors have no conflicts of interests to declare.

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