MUNI FSS

JOURNAL OF PSYCHOSOCIAL RESEARCH ON CYBERSPACE
CYBERPSYCHOLOGY

Guegan, J., Nelson, J., Lamy, L., & Buisine, S. (2020). Actions speak louder than looks: The effects of avatar appearance and in-game actions on subsequent prosocial behavior. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 14*(4), Article 1. https://doi.org/10.5817/CP2020-4-1

Actions Speak Louder Than Looks: The Effects of Avatar Appearance and In-Game Actions on Subsequent Prosocial Behavior

Jérôme Guegan[1], Julien Nelson[1], Lubomir Lamy[1], & Stéphanie Buisine[2]

[1] Université de Paris, Paris, France
[2] CESI, Nanterre, France

Abstract

Several experimental studies in recent years have shown an effect of the appearance of embodied avatars in a digital environment on subsequent behaviors in unrelated context. However, such studies often focus exclusively on the appearance of avatars, and do not consider the nature of the behavior carried out in-game. This article presents an experiment exploring the combined effects of avatar appearance and in-game behavior on subsequent prosocial behavior in an unrelated task. 120 undergraduate students from a medical and health sciences course traversed a digital environment in a roleplaying game, battling opponents ("mobs") along the way. Using a factorial design, participants embodied either a heroic or a villainous avatar, and battled good or evil mobs. Results show that mob appearance, but not avatar appearance, affected prosocial behavior in a subsequent unrelated task. Participants having battled negative-looking mobs tended to exhibit more prosocial behavior than those having battled positive-looking mobs. These results, highlighting the potential of avatar's behavior to influence user's subsequent behavior, are discussed in terms of self-perception, theoretical insight and research on the Proteus effect.

Keywords: Avatar appearance; prosocial behavior; in-game behavior; Proteus effect; video games

Introduction

Effects of Video Games on Pro- and Antisocial Behavior

Video games often allow players to encounter situations in-game that they would be unlikely to ever encounter in everyday life. The storyline of a game might require a player to make choices and perform actions in-game that one would never be exposed to in one's lifetime. Looting a dragon's cave in a mediaeval role playing game (RPG) or fighting off a gang of street thugs to defend a helpless passer-by in more modern settings are two examples of fairly common situations one might encounter that have some moral component.

In this context, several studies have focused on identifying whether exposure to violent content in video games may influence players to subsequently exhibit aggressive behaviors (Anderson & Bushman, 2001; Anderson et al., 2010). The General Aggression Model (GAM; Bushman & Anderson, 2002) argues that exposure to such content may lead to a short term increase in aggression by priming aggressive concepts (aggressive scripts and perceptual schemata), increasing arousal, and creating an aggressive affective state. Furthermore, it is argued that exposure to violent content may lead to a short-term desensitization to the pain and suffering of others, reducing subsequent helping behavior towards others (Bushman & Anderson, 2009; Carnagey et al., 2007). It is thought that repeated exposure to violent content in video games may have a cumulative effect in making hostility-related knowledge structures, such as trait concepts and stereotypes, more accessible, leading to more frequent hostility-related thoughts and, potentially, aggressive behavior (Hasan et al., 2013).

Increasingly, however – perhaps in an effort to cultivate a more balanced debate on the effects of video games – studies have sought to examine the other side of the problem, i.e., whether video games with prosocial contents might lead players to exhibit more prosocial behavior subsequently to playing. This was reflected by an extension of the GAM into the General Learning Model (GLM; Buckley & Anderson, 2006). According to the GLM, the kind of associations promoted by a video game (i.e., pro- or antisocial) depends on the content of that game. As these authors note, "playing a prosocial game can increase many forms of nonviolent outcome variables, such as the accessibility of prosocial thoughts" (p. 371). For example, Greitemeyer and Osswald (2010) asked participants to play either a prosocial game (*Lemmings*, a popular game where the goal is to save vulnerable creatures from certain doom), an antisocial game (*Lamers*, an aggressive version of *Lemmings*, where the goal is precisely to kill these creatures) or a neutral game (*Tetris*), for a few minutes. The authors found that participants who had played the prosocial game were more likely to help the experimenter after a mishap than those who had played either the neutral or the antisocial game. The same pattern of results was found in a follow-up experiment in which the prosocial behavior entailed a risk of more severe consequences for the helper: participants who had played a prosocially-oriented video game were more likely to intervene to help a woman being harassed outside of the game – at the risk of being confronted themselves by the harasser – than participants who had played a neutral-themed game. In a later study, Greitemeyer and Osswald (2011) examined the effects of playing a prosocial game on the outcome of a lexical decision task. Their results showed that participants who had played the prosocial game prior to the task exhibited a greater cognitive accessibility of prosocial concepts than those who had played the neutral game. In a recent meta-analysis, Greitemeyer and Mügge (2014) showed that playing games with prosocial content is associated with increased prosocial and decreased antisocial outcomes.

Effects of Avatar Appearance on Subsequent Pro- or Antisocial Behavior

Within the context of a game, all characters are seen as social beings, for whom social norms and concepts of morality therefore apply (Weaver & Lewis, 2012; Yee et al., 2007). Committing antisocial acts within a game might be appealing for several reasons, for example for the construction of one's identity, because of the aesthetic appeal of destructive actions, or because this is part of in-game challenges demonstrating player skills (Klimmt et al., 2006a). This is particularly true when there are no adverse consequences to the victims, or to the player as perpetrators (Klimmt et al., 2006b). However, committing immoral actions in a game can sometimes elicit guilt and make players *more* sensitive to moral violations, especially when they perceive violence to be unjustified (e.g., gratuitous violence against civilians), and when they exhibit high trait empathy (Hartmann et al., 2010). Committing immoral unjustified actions in-game could increase moral intuitions, concern for others' suffering, reciprocity and justice (Grizzard et al., 2014; Tamborini, 2011).

Video games feature protagonists with a moral orientation: some characters behave in consistently good ways (e.g., Superman or Mario), others behave in consistently evil ways (e.g., Freddy Krueger or Ganon), and others can be morally ambiguous, when they commit reprehensible actions in the service of a noble cause (e.g., an antihero, such as Dexter Morgan or Kratos; Krakowiak & Oliver, 2012; Shafer & Raney, 2012). Players embody these characters through a visual representation termed an *avatar*, i.e., a digital self-representation which serves as a primary identity cue (Yee & Bailenson, 2007). At a theoretical level, explanations of the Proteus effect are primarily rooted in *self-perception theory* and *deindividuation effects*. Self-perception theory argues "individuals come to "know" their own attitudes, emotions and other internal states partially by inferring them from observations of their own overt behavior" (Bem, 1972, p. 2). Deindividuation, in turn, refers to situations in which people experience a loss of self-awareness in situations where people are not identifiable as individuals (e.g., in large groups), potentially fostering antisocial behavior (Festinger et al., 1952; Zimbardo, 1969), although other authors have shown it may also lead to more prosocial behavior as well (Gergen et al., 1973). In sum, deindividuation is not, in itself, conducive to anti- or prosocial behavior, but moderates the impact of contextual cues on individual behavior (Spivey & Prentice-Dunn, 1990; Yee et al., 2009). Avatars constitute "our entire self-representation", emphasizing reliance on cues related to the visual appearance of one's avatar (Yee & Bailenson, 2007, p. 274). Hence, the *Proteus effect* refers to a behavioral modulation related to the appearance of the avatar, whereby users exhibit behaviors and rationalize them so as to remain consistent with the avatar's identity (Yee & Bailenson, 2007). Instances of the Proteus effect have been found in various avatar-based systems, influencing a diverse range of decisions and behaviors including aggressiveness in negotiation (Yee & Bailenson, 2007; Yee et al., 2009), creative behavior (Buisine & Guegan, 2020; Guegan et al., 2016), etc. (for a recent review, see Ratan et al., 2020).

Another line of reasoning argues that the Proteus effect may also be explained through priming (Bargh et al., 1996; Peña et al., 2009). According to Bargh et al. (1996), priming refers to "the incidental activation of knowledge structures, such as trait concepts and stereotypes, by the current situational context" (p. 230). Avatars could then be seen as a priming support leading to behavioral assimilation, i.e., an increase in the likelihood of behaviors congruent with the primed concept. For instance, embodying an avatar whose appearance is likely to activate antisocial concepts (e.g., violence, aggression, racism) could lead to behave in a more negative way.

It was shown that avatar appearance in video games impact subsequent aggressive cognition. For example participants displayed more aggressive attitudes and intentions towards other players when their avatar wore a black cloak – a color associated with death and evil (Adams & Osgood, 1973) – than when they wore a white coat (Peña et al., 2009, Study 1). Eastin et al. (2009) found that White players displayed more postgame hostile thoughts after having embodied a Black avatar than a White avatar. Ash (2016) showed that players embodying a Black avatar in a boxing game exhibited greater aggressive in-game behavior than those embodying a White avatar. However, this effect was only present for players experiencing high levels of embodiment.

Moral orientation of the embodied character – heroic *vs*. villainous – also impacts post-game behavior. Happ et al. (2013) showed that participants who had embodied Superman exhibited greater prosocial behavior and less hostile perception bias than those who had embodied a stereotypically evil character – the Joker. Rosenberg et al. (2013) showed that embodying an avatar possessing superheroes powers (flying) volunteered more to help the experimenter pick up pens he had dropped than those who had flown as passengers of a virtual helicopter. Finally, Yoon and Vargas (2014) asked participants to play a game, embodying Superman or a villainous avatar (Voldemort), and then to take part in a blind test of food – taste a dish and add an unspecified amount of chocolate (prosocial action) or chili sauce (antisocial action) for consumption by a future participant. Participants who had embodied Superman behaved in a more prosocial way than those who had embodied Voldemort.

Effects of Prosocial Context

Studies on the effects of video games on pro- or antisocial behavior are thus in agreement that such effects are influenced by the contents of the game. These contents are typically classified in a binary manner: in all of the studies mentioned above, the characters are described as being either clearly heroic or clearly villainous. However, in order to understand the effects of in-game actions on subsequent behavior, one needs to account for the morality of these behaviors, which some authors have called the prosocial context (Gitter et al., 2013, Study 1). These authors invited participants to play a video game for a short time before taking part in a Competitive Reaction Time task, a task often used in studies of media effects on aggression (Anderson & Dill, 2000). In this task, participants were told they were competing against a (fictitious) opponent and had to respond as quickly as possible to a cue with a mouse click. The "loser" of each trial heard an unpleasant blast of white noise through headphones, the intensity and duration of which was set by the "winner". The intensity value of the blast is then operationalized as a measure of aggressive behavior. The nature of the video game was experimentally manipulated. In two conditions, the video game was a violent game in which the player uses a shotgun and chainsaw to kill hordes of attacking zombies. In the *explicitly prosocial* condition, the goal of the game was presented as protecting another character. In the *ambiguously prosocial* condition, the goal was to kill as many zombies as possible. In the third condition, a *nonviolent game* (a *Tetris* clone) was used. The results show that participants in the explicitly prosocial condition were significantly less aggressive than those in the morally ambiguous or in the nonviolent game condition.

Research Question

These theoretical elements lead us to the following question. If performing prosocial in-game behavior while looking like a "good guy" leads to subsequent prosocial behavior, is this due to the visual appearance of the embodied character, or to the nature of the in-game behavior itself? Following this line of reasoning, what can we expect when a "bad guy" performs prosocial in-game behavior – or conversely, when a player embodying a "good guy" character performs antisocial in-game behavior? Answering these questions requires investigating how in-game behavior may moderate the effects of avatar appearance on subsequent behavior. For instance, in the aforementioned studies by Yoon and Vargas (2014), these two factors were confounded, since the enemies had been selected to correspond to natural antagonists of the embodied character. Participants embodying Superman fought villains, and those embodying Voldemort fought heroes. Likewise, in the study by Happ et al. (2013), participants embodying the Superman avatar always battled the Joker, and *vice versa*. Such designs do not allow assessing the comparative strength of these two influences. It is quite possible, for example, that players in the study by Yoon and Vargas (2014) would be more inclined to add chili sauce because they had previously fought heroes (with an in-game antisocial behavior possibly encouraging later antisocial behavior), rather than because they looked like a villain.

The present study aims to disentangle the effects of these two factors on subsequent manifestations of prosocial behavior. We argue that the recent emphasis on the effects of avatar appearance has perhaps led to overlooking the fact that in usual gaming practice, players use these digital characters, first and foremost, to *act within the game*. It therefore seems important, to further the existing research, to take into account both the effects of avatar appearance and the nature of in-game behaviors carried out as the avatar.

Hypotheses

Existing studies inspired by seminal works on the Proteus effect have shown that the appearance of avatars embodied in a video game may affect subsequent prosocial behavior (Peña et al., 2009; Yoon & Vargas, 2014). These works show that avatars can be made to resemble a morally positive character (i.e., a hero) or a morally negative one (i.e., a villain). In accordance to this literature:

H1. Prosocial outcomes (prosocial orientation and intention to help, number of pens picked up and time to help) should be greater for participants embodying the positive avatar than those embodying the negative avatar.

In addition, our review of the literature (e.g., Happ et al., 2013; Shafer & Raney, 2012) suggests that similar in-game actions – fighting mobs – can be viewed as pro- or antisocial, depending on whether their target is morally acceptable (e.g., a bandit) or not (e.g., an innocent bystander). For brevity, we have termed these targets *negative mobs* and *positive mobs*, respectively. Hence:

H2. Prosocial outcomes should be greater for participants fighting negative mobs than those fighting the positive mobs.

Following self-perception theory, one of the theoretical foundations of the Proteus effect, avatar appearance and in-game behavior should therefore jointly affect prosocial behavior.

H3. Participants embodying positive avatars should exhibit even more prosocial outcomes after having fought negative mobs. Conversely, participants embodying negative avatars should exhibit even less prosocial outcomes after having fought positive mobs. In sum, the effects of avatar appearance on prosocial outcomes should be moderated by the nature of behavior.

Method

Power Analysis

Ratan et al.'s meta-analysis (2020) on the behavioral and attitudinal main effects of avatars on users showed a small-but-approaching-medium effect size (d = 0.52 based on 37 studies, N = 3101). G*Power analysis indicate that to reach 80% at .05 alpha level, 119 participants are needed to detect this small-but-approaching-medium effect size.

Participants

Participants were 120 undergraduate students from a medical and health sciences course (76 M, 44 F) aged 18 to 31 years (M = 20.53, SD = 2.38). Because of this background, none of the participants had undergone courses in experimental psychology, and none were aware of its methods (e.g., the use of cover stories or covert measures). None of them received any course credit or financial compensation for their participation.

Procedure

Participants were invited under the pretense of taking part in a study aiming to assess the user experience associated with a fantasy-themed video game. They were invited to sit in front of a computer, displaying the goal of the game: to reach the end of a path and fight any characters (termed "mobs" in gaming parlance) encountered on the way. The time to complete this task was approximately 5 minutes. The appearance of the avatars representing the player and of the mobs was manipulated experimentally using a two-factor between-subjects design (Avatar appearance: Positive or Negative; Mob type: Positive or Negative). Participants were randomly assigned to four groups derived from crossing these two factors. Age and gender distribution for each of the groups are indicated in Table 1 below. The four groups did not differ with regard to either age ($F(3, 116) = 0.11$, $p = .96$, $\eta_p^2 = .003$) or gender distribution ($\chi^2(3) = 1.44$, $p = .697$). The experimenter was unaware of the condition which each participant was exposed to while running the experiment. However, upon completion of the level, the avatar and final mob remained visible, making it possible to identify the experimental condition after the participant's departure at the end of a session.

Table 1. *Age Ranges and Gender Distribution for Each of the Four Experimental Groups.*

Group	N	Age range	Age	Gender distribution
Negative Avatar, Negative Mobs	30	18-25	M = 20.27, SD = 2.21	9 F, 21 M
Negative Avatar, Positive Mobs	30	18-26	M = 20.40, SD = 2.55	10 F, 20 M
Positive Avatar, Negative Mobs	30	18-28	M = 20.48, SD = 1.88	13 F, 17 M
Positive Avatar, Positive Mobs	30	18-31	M = 20.60, SD = 2.71	12 F, 18 M

Participants encountered the same number of mobs and travelled the same map across all experimental conditions. The strength of avatars and mobs was also standardized. Manipulating mob type allowed us to control the tone of these encounters in terms of prosocial orientation: a more antisocial behavior when fighting more attractive and prosocial-looking characters (positive mobs) than less attractive and prosocial-looking ones (negative mobs).

Following this, the experimenter interrupted a task on his computer to hand out a questionnaire related to the cover story of assessing the user experience related to the game. This questionnaire was comprised of items from the Core Elements of Gaming Questionnaire (Calvillo-Gámez et al., 2010), but will be described no further as participants' responses were not used in the study. While doing so, the experimenter "accidentally" and ostensibly knocked over a cup containing 15 pens (Rosenberg et al., 2013). The experimenter then waited five seconds before attempting to pick up the pens, giving the participant time to help. If the participant did not get up to help within those five seconds, the experimenter picked up the pens one at a time at a rate of about one pen per second, still giving the participant the opportunity to help. This pen task lasted 20 seconds. After the pen task was completed, the experimenter handed in a second questionnaire, assessing prosocial orientation and intention to help. The entire procedure lasted about 30 minutes and was videotaped covertly for further analysis. At the end of the procedure, participants were debriefed as to its purpose and hypotheses, and gave their consent for the recording to be used. They were informed as to the goal of the study and to how the videos were to be used for further analysis. All participants gave their consent for their data to be used anonymously in the study.

Materials

The gaming environment used in the experiment was built for the purpose of the study (using RPG Maker). Participants were represented by an avatar and had to traverse a map, engaging in combat with mobs along the way. Each character was represented using two views: a top-down view for movement within the map and a sideview for battle sequences (Figure 1). These sequences – traversing the map and battling mobs – occurred successively. Thus, participants were exposed only to top-down views or to sideviews at any one time.

Figure 1. *Screen Capture of an Exploration Sequence (Left) and of a Battle Sequence (Right)*.

Pilot Test: Evaluation of the Experimental Materials

With regard to the procedure presented above, it was essential to pretest and identify relevant avatars and mobs. A pilot test was therefore carried out to identify the avatars (positive and negative) and mobs (positive and negative) that will be used in the experiment. 91 undergraduate students (64 F, 27 M) aged between 18 and 27 years (*M* = 21.8, *SD* = 1.9), took part in the evaluation of the experimental materials. None of them were included in the 120 participants taking part in the experiment. They were asked to assess screen captures of 24 character sets, each comprising a top-down view and a side view.

44 students were asked to assess the top-down views, and 49 were asked to assess the side views. For both types of views, images were presented one by one. Each judge was exposed to 20 character sets. Assessment relied on five items, associated with 7-point Likert scales. Two items measured attractiveness ("This character looks [not at all/very attractive], [not at all/very beautiful]"), and three measured prosocial appearance ("This character looks [nasty/nice], [heroic/villainous], [attractive: not at all/very much], [beautiful: not at all/very much], [likely to help someone in need: not at all/very much]"). Internal consistency was satisfactory for both attractiveness ($r = .68$ for top-down views, $r = .58$ for side views, $p < .001$) and prosocial appearance ($\alpha = .88$ for top-down views, $\alpha = .89$ for side views), and aggregate measures were used for both.

Character sets were selected so as to rank high (positive avatar and mob conditions) or low (negative avatar and mob conditions) on aggregate measures for both attractiveness and prosocial appearance.

Evaluation of Avatars

Table 2 shows the two characters selected to represent the player avatar in the positive and negative avatar conditions, respectively. Paired samples t tests showed that in top-down view, the positive avatar was perceived as more attractive ($t(43) = 13.51$, $p < .001$, Cohen's $d = 4.12$) and more prosocial ($t(43) = 2.59$, $p = .013$, $d = 0.79$) than the negative avatar. Similarly, in sideview, the positive avatar was perceived as more attractive ($t(46) = 14.58$, $p < .001$, $d = 4.30$) and more prosocial ($t(46) = 3.72$, $p = .001$, $d = 1.10$).

Table 2. *Appearance of the Positive and the Negative Avatar.*

	Positive avatar		Negative avatar	
	Side view	Top-down view	Side view	Top-down view
				
Attr.	*M* = 4.30	*M* = 4.59	*M* = 2.83	*M* = 3.70
	SD = 1.72	*SD* = 1.49	*SD* = 1.64	*SD* = 1.86
Prosoc	*M* = 5.92	*M* = 5.57	*M* = 2.14	*M* = 2.16
	SD = 1.00	*SD* = 1.15	*SD* = 1.08	*SD* = 1.30

Evaluation of Mobs

To test the mob sets for inclusion in the experiment, we compared ratings of prosociality and attractiveness for two mob sets, corresponding to the positive and negative mob conditions, respectively. To avoid repetitiveness when encountering enemies, six mob characters were selected, three for the positive mob conditions and three for the negative mob conditions (Table 3).

Independent-samples t-tests showed that the positive mobs were perceived as more attractive ($t(42) = 5.37$, $p < .001$, $d = 1.66$) and more prosocial ($t(42) = 11.38$, $p < .001$, $d = 3.51$) than the negative mobs in top-down view. Similarly, in sideview, positive mobs were perceived as more attractive ($t(45) = 8.14$, $p < .001$, $d = 2.43$) and prosocial ($t(45) = 13.47$, $p < .001$, $d = 4.02$) than negative mobs.

Table 3. *Appearance of the Positive and the Negative Mobs.*

	Positive mobs		Negative mobs	
	Side view	Top-down view	Side view	Top down view
				
Attr.	*M* = 5.62	*M* = 5.38	*M* = 3.71	*M* = 3.77
	SD = 1.23	*SD* = 1.64	*SD* = 1.84	*SD* = 1.82
Prosoc	*M* = 5.77	*M* = 6.04	*M* = 2.13	*M* = 2.37
	SD = 1.30	*SD* = 0.90	*SD* = 0.89	*SD* = 1.30

				
Attr.	*M* = 4.65	*M* = 4.61	*M* = 2.78	*M* = 2.35
	SD = 1.24	*SD* = 1.33	*SD* = 1.34	*SD* = 1.46
Prosoc	*M* = 5.63	*M* = 5.33	*M* = 3.43	*M* = 2.15
	SD = 0.92	*SD* = 0.94	*SD* = 1.24	*SD* = 1.19
				
Attr.	*M* = 5.09	*M* = 5.18	*M* = 2.95	*M* = 3.09
	SD = 1.34	*SD* = 1.50	*SD* = 1.80	*SD* = 1.56
Prosoc	*M* = 5.54	*M* = 5.58	*M* = 2.94	*M* = 3.20
	SD = 1.01	*SD* = 1.17	*SD* = 1.50	*SD* = 1.55
	All positive		All negative	
Attr.	*M* = 5.23	*M* = 5.14	*M* = 3.15	*M* = 3.07
	SD = 1.31	*SD* = 1.54	*SD* = 1.72	*SD* = 1.71
Prosoc.	*M* = 5.65	*M* = 5.72	*M* = 2.83	*M* = 2.57
	SD = 1.12	*SD* = 1.05	*SD* = 1.34	*SD* = 1.42

Measures

Prosocial Orientation and Intention to Help

We used 17 items from the Prosocial Orientation Questionnaire (POQ). The original version of the POQ was constructed to measure Trait prosocial behavioral tendency in adolescents in 40 items (Cheung et al., 1998). The version we used just after the game session comprised 17 items, and has been used successfully in previous studies of the effects of video game use on prosocial behavior (Gentile et al., 2009; Rosenberg et al., 2013), e.g., “I would spend time and money to help those in need”; “I would volunteer to help charity if they need my help”, or “If a stranger left something behind, I would tell him or her”. Internal consistency of this subscale was acceptable (α = .70). In addition, following Nelson and Norton (2005), we also asked participants how many hours per week they would be willing to volunteer for a local charity organization.

Behavioral Measures

Following previous studies (Greitemeyer & Osswald, 2010; Peña & Chen, 2017; Rosenberg et al., 2013), we used three variables: the presence of a helping behavior, the time to help and the number of pens picked up.

Presence of a Helping Behavior. Such behavior was coded as present when participants had picked up at least one pen during the pen task, and absent otherwise.

Time to Help. Two independent coders were asked to note the exact point in the video where participants stood up from their chair to help. In order to include all participants in the data, and considering the duration of the pen task, time to help for participants who did not pick up any pens equaled the duration of the task, i.e., 20 seconds. The correlation between the two judges' estimates was high ($r = .99$, $p < .001$), and the average estimate of time taken to help was considered for analysis.

Number of Pens Picked Up. The two coders also counted how many of the pens the participants picked up before the experimenter finished picking up the pens.

Results

Prosocial Orientation and Intention to Help

A two-way ANOVA was carried out on an aggregate measure of prosocial orientation, using Avatar appearance (Positive vs. Negative) and Mob type (Positive vs. Negative) as between-subjects factors. Neither avatar appearance ($F(1, 116) = 0.16$, $p = .69$, $\eta_p^2 = .001$) nor mob type ($F(1, 116) = 0.16$, $p = .69$, $\eta_p^2 = .001$) yielded any significant effect. The interaction effect was nonsignificant ($F(1, 116) = 1.20$, $p = .28$, $\eta_p^2 = .010$).

Likewise, two-way ANOVA was carried out on the number of hours participants were willing to volunteer per week. As before, neither the appearance of the avatar ($F(1, 116) = 0.97$, $p = .33$, $\eta_p^2 = .008$) nor the type of mob ($F(1, 116) = 0.06$, $p = .81$, $\eta_p^2 = .005$) yielded any significant effects. The interaction effect was nonsignificant ($F(1, 116) = 3.25$, $p = .07$, $\eta_p^2 = .027$). Therefore, the results do not support hypotheses H1, H2 and H3.

Presence of Helping Behavior

There was no effect of avatar type on whether or not participants would pick up any pens (Fisher's exact test, $p = .25$). However, there was a significant effect of mob type on the presence of such behavior (Fisher's exact test, $p < .01$). Participants tended to help more often after having fought negative mobs (76.7%) than positive mobs (51.7%). Therefore, results support hypothesis H2, but not H1.

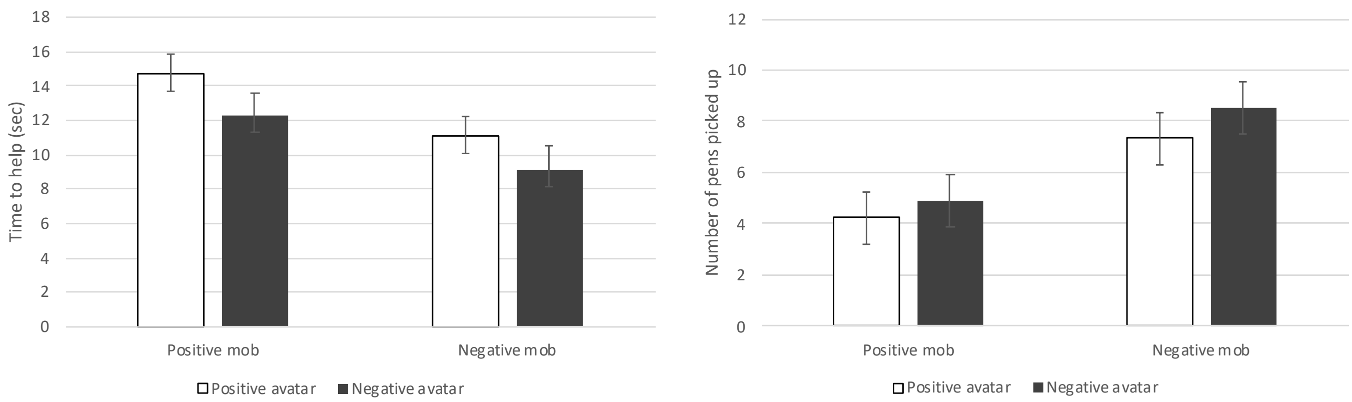
Time to Help

The effect of avatar type on time to help was not significant ($F(1, 116) = 3.02$, $p = .08$, $\eta_p^2 = .025$). Participants embodying the positive avatar took a similar amount of time to help ($M = 12.88$, $SD = 6.62$) than those embodying the negative avatar ($M = 10.70$, $SD = 7.41$). However, there was a significant effect of mob type on time to help ($F(1, 116) = 7.11$, $p < .01$, $\eta_p^2 = .058$, see Figure 2, left panel). Participants took significantly longer to help in the pen task after having fought the positive mobs ($M = 13.47$, $SD = 6.94$) than the negative mobs ($M = 10.12$, SD = 6.88). The interaction effect was nonsignificant ($F(1, 116) = 0.03$, $p = .86$, $\eta_p^2 < .001$). Hypothesis H2 is supported, but not hypotheses H1 or H3.

Number of Pens Picked Up

A two-way ANOVA revealed the effect of avatar appearance was not significant ($F(1, 116) = 0.85$, $p = .36$, $\eta_p^2 = .007$). Participants picked up similar numbers of pens whether they had previously embodied the positive avatar ($M = 5.8$, $SD = 5.7$) or the negative avatar ($M = 6.7$, $SD = 5.8$). However, there was a significant effect of mob type on the number of pens picked up ($F(1, 116) = 11.05$, $p = .001$, $\eta_p^2 = .087$, see Figure 2 right panel). Participants who had battled the unattractive, non prosocial-looking mobs picked up significantly more pens ($M = 7.9$, $SD = 5.6$) than those who had battled the attractive, prosocial-looking mobs ($M = 4.57$, $SD = 5.43$). The interaction effect between avatar appearance and mob type was nonsignificant ($F(1, 116) = 0.07$, $p = .79$, $\eta_p^2 = .001$). These results support hypothesis H2. However, hypotheses H1 and H3 are not supported.

Figure 2. *Left: Time to Help as a Function of Mob Type and Avatar Appearance; Right: Number of Pens Picked Up as a Function of Mob Type and Avatar Appearance*.



Discussion

The goal of the present study was to examine the influence of avatar appearance and in-game behavior on subsequent player behaviors. The influence of avatar appearance on users' subsequent behavior is a well-established phenomenon in the literature on the Proteus effect (Ratan et al., 2020; Yee & Bailenson, 2007), and examined more particularly in the context of gaming and prosocial behavior by the more recent studies (Rosenberg et al., 2013; Yoon & Vargas, 2014). Our own results suggested, first, that avatar appearance did not significantly affect either intention to help or subsequent prosocial behavior.

Regarding the absence of Proteus effect on intention to help, this result is consistent with those of Rosenberg et al. (2013), who did not find an effect of endowing participants with superheroic flight ability on intention to help. However, it is worth noting that intention to help, both in their study and in ours, was measured through prosocial orientation, which is a stable trait and would likely not be affected by a single exposure to a video game. Retrospectively, it is not so surprising that this part of Hypothesis 1 was not validated. The observation of spontaneous reaction when there is an opportunity to provide an affordable helping behavior may remain the most efficient way to measure instant intention to help.

In contrast, the absence of Proteus effect on prosocial *behavior* is quite puzzling as it contradicts consistent results of previous research obtained in a variety of contexts (Ratan et al., 2020). However, to the best of our knowledge, there was no prior examination of the combined effects of avatars' appearance and behavior. Our results suggest that avatar's behavior was a more powerful cue to player self-perception than avatar's appearance. In our view, this finding may be explained by going back to the theoretical foundations of self-perception theory (Bem, 1972). Indeed, appearance is one of the first cues on which we may form an impression on someone's personality or moral orientation, in the absence of more relevant cues to assess such traits. However, as soon as we have the opportunity to observe his/her behavior, it makes sense that such information overrides mere appearance. In the present study, avatar appearance would have served as a basis to infer the character's tendency to act in a prosocial way in the absence of behavior or in the presence of neutral behavior. However, witnessing prosocial or antisocial behavior exhibited by the avatar probably made appearance irrelevant to make a judgement on his/her moral orientation. Moreover, in the videogame context, the perception of avatars' behavior served as a cue for the players to infer their own internal states and dispositions, which influenced their subsequent offline behavior. In other words, "looking like" a good guy or a bad guy would have less impact on self-inferences compared to the factual nature of the behavior performed. In this respect, our results highlight a known phenomenon (avatar's influence on user behavior) triggered by a new kind of cue (avatar's behavior instead of avatar's appearance).

Given their theoretical and practical importance, the combined influence of avatars' appearance and behavior should be further tested in several contexts to improve our understanding of these phenomena and choose the best combination of cues for each target effect: in some contexts, appearance may be a central cue (e.g., avatar's body size for the promotion of physical activity, like in Peña et al., 2016), while in other contexts, behavior may be more relevant.

In addition, the visual design and mode of interaction with the game would likely affect the presence and/or size of the effect of avatar appearance. In Rosenberg et al.'s (2013) study, for example, participants were immersed in the game using a Head-Mounted Device, whereas in the present study, exposure to the game was non-immersive. Moreover, accounting for the lack of a behavioral effect of avatar's appearance requires taking into account the fact that in the context of a game, players are invited to identify with their character, i.e., undergo "a temporal shift in [their own] self-perception" (Klimmt et al., 2009, p. 351). This identification is thought to relate to several constructs (Van Looy et al., 2012): *similarity*, i.e., the fact that the player vicariously participates in the character's experiences, wishful identification, i.e., the desire for the player to be more like the character, and embodied presence, i.e., the emotion of being embodied in the character. Hence, the fact that we did not observe this effect could be explained, for example, by the fact that we did not use an immersive system in the present study. Future studies should control for the level of player identification to the avatar using existing scales (Hefner et al., 2007; Van Looy et al., 2012) and provide clear indications as to the technology used to immerse the player in the game.

Manipulating mob appearance served as a means to manipulate the prosocial context of in-game actions (Gitter et al., 2013). Thus, attacking a negative mob (e.g., an ogre) could clearly be seen, in context, as a more prosocial action than attacking a positive one (e.g., a villager). The results of the present study did demonstrate an effect of mob type on behavioral outcomes: participants having battled negative mobs exhibited more prosocial behavior towards the experimenter than participants who had battled positive mobs. As seen above, this phenomenon is compatible with self-perception principles, which can be extended to video game contexts: the observation of his/her own behavior (even if it is carried out in the game) leads the player to make self-inferences likely to influence subsequent behaviors. Following this self-perception perspective, the present study therefore suggests that the perception of behavior (i.e., what we do in the game) may also exert a powerful influence as the perception of the appearance of the avatar does (i.e., what we look like in the game). Such a phenomenon may shed new light on the results of existing studies. For instance, as noted above, the results of Yoon and Vargas' first study (2014) might also be explained by the orientation of behavior carried out in-game, rather than by the nature of the embodied avatar. In further support of this claim, Yoon and Vargas (2014, Study 2) showed that participants carried out more antisocial behavior when having played as a villain, but not after merely having observed the behavior of a villain in a demonstration of the same game. Their interpretation is that playing the game implies *embodying* a heroic or villainous avatar, whereas observing the same game does not. Another explanation, in line with our results, might be that playing the game implies *behaving* in heroic or villainous ways, whereas an observer, by definition, will produce no in-game behavior whatsoever.

Limitations and Future Prospects

The present research holds several limitations which open avenues for future research. The first limitation concerns our experimental population, which was composed of a homogeneous group of students from the same academic curriculum. It would then be highly desirable to replicate the experiment with other categories of populations: on the one side, a more diverse range of participants (e.g. teenagers, older adults) may enable us to check whether the processes involved can be generalized. On the other side, a more specific population of gamers may enable one to study whether prior gaming experience and frequency of game play impact self-perception through avatars and subsequent behavior. In this respect, the level of embodiment experienced by the player should be controlled.

A few methodological details should also be refined in future experiments on the topic. For example, in the present study, the characteristics of the samples used for the pilot test and for the main experiment were not exactly the same (e.g., gender ratio). Beyond a proper validation of the experimental material, it may therefore be safer to introduce in the experiment a manipulation check with regard to participants' actual perception of their own avatar and of the mobs as more or less attractive and more or less prosocial.

In the present study, the appearance of opponents is a key element in conveying a context within which a player may interpret the consequences of his/her own in-game actions. However, it is only one possible element of this context. Other types of information, related to the overall goal of the game (Gitter et al., 2013) or to the background and motivations of the character (Happ et al., 2013; Sauer et al., 2015) may moderate the effects of avatar appearance on subsequent behavior.

In line with Ewell et al. (2018), we argue that it is also necessary, when attempting to understand such effects, to take into account the manner in which the player's actions are connected to the outcome of aggressive behavior. In the present study, the action of attacking a mob was carried out by selecting an option from a menu and the outcome was conveyed with animations (e.g., flashes), changes in numeric values (i.e., a decline in "health points") and text feedback (informing the player that the opponent had been vanquished). Although both of these are common mechanics in top-down role-playing games, it is likely that examining the effects of more or less graphical depictions of violence might shed some light on the impact of video game play on subsequent pro- and antisocial behavior. For example, it is possible that antisocial behavior depicted in the game in a realistic and detailed way could have a stronger influence on the player. This would also contribute to the generalizability of our findings, as graphical displays of violence are a common feature in many of today's most popular games.

A full understanding of the effects of in-game behavior on subsequent (post-game) player behavior will no doubt require extending this line of inquiry. The results of our study suggest a need to examine the known effects of avatar appearance while also considering the effects of in-game behaviors that the player carries out *through the avatar*, which may potentially override avatar's appearance in a variety of contexts.

References

Adams, F. M., & Osgood, C. E. (1973). A Cross-cultural study of the affective meanings of color. *Journal of Cross-Cultural Psychology*, *4*(2), 135–156. https://doi.org/10.1177/002202217300400201

Anderson, C. A., & Bushman, B. J. (2001). Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. *Psychological Science*, *12*(5), 353–359. https://doi.org/10.1111/1467-9280.00366

Anderson, C. A., & Dill, K. E. (2000). Video games and aggressive thoughts, feelings, and behavior in the laboratory and in life. *Journal of Personality and Social Psychology*, *78*(4), 772–790. https://doi.org/10.1037/0022-3514.78.4.772

Anderson, C. A., Shibuya, A., Ihori, N., Swing, E. L., Bushman, B. J., Sakamoto, A., Rothstein, H. R., & Saleem, M. (2010). Violent video game effects on aggression, empathy, and prosocial behavior in Eastern and Western countries: A meta-analytic review. *Psychological Bulletin*, *136*(2), 151–173. https://doi.org/10.1037/a0018251

Ash, E. (2016). Priming or Proteus effect? Examining the effects of avatar race on in-game behavior and post-play aggressive cognition and affect in video games. *Games and Culture*, *11*(4), 422–440. https://doi.org/10.1177/1555412014568870

Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype-activation on action. *Journal of Personality and Social Psychology*, *71*(2), 230–244. https://doi.org/10.1037/0022-3514.71.2.230

Bem, D. J. (1972). Self-perception theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 6, pp. 1–62). Academic Press.

Buckley, K. E., & Anderson, C. A. (2006). A theoretical model of the effects and consequences of playing video games. In P. Vorderer & J. Bryant (Eds.), *Playing video games: Motives, responses and consequences* (pp. 363–378). Lawrence Erlbaum Associates.

Buisine, S., & Guegan, J. (2020). Proteus vs. social identity effects on virtual brainstorming. *Behaviour & Information Technology*, *39*(5), 594–606. https://doi.org/10.1080/0144929X.2019.1605408

Bushman, B. J., & Anderson, C. A. (2002). Violent video games and hostile expectations: A test of the General Aggression Model. *Personality and Social Psychology Bulletin*, *28*(12), 1679–1686. https://doi.org/10.1177/014616702237649

Bushman, B. J., & Anderson, C. A. (2009). Comfortably numb: Desensitizing effects of violent media on helping others. *Psychological Science*, *20*(3), 273–277. https://doi.org/10.1111/j.1467-9280.2009.02287.x

Calvillo-Gámez, E. H., Cairns, P., & Cox, A. L. (2010). Assessing the core elements of the gaming experience. In R. Bernhaupt (Ed.), *Evaluating the user experience in games: Concepts and methods* (pp. 47–71). Springer.

Carnagey, N. L., Anderson, C. A., & Bushman, B. J. (2007). The effect of video game violence on physiological desensitization to real-life violence. *Journal of Experimental Social Psychology*, *43*(3), 489–496. https://doi.org/10.1016/j.jesp.2006.05.003

Cheung, P. C., Ma, H. K., & Shek, D. T. L. (1998). Conceptions of success: Their correlates with prosocial orientation and behaviour in Chinese adolescents. *Journal of Adolescence*, *21*(1), 31–42. https://doi.org/10.1006/jado.1997.0127

Eastin, M. S., Appiah, O., & Cicchirllo, V. (2009). Identification and the influence of cultural stereotyping on postvideogame play hostility. *Human Communication Research*, *35*(3), 337–356. https://doi.org/10.1111/j.1468-2958.2009.01354.x

Ewell, P. J., Hamilton, J. C., & Guadagno, R. E. (2018). How do videogame players identify their actions? Integrating Action Identification Theory and videogame play via the Behavior Identification Form - Gamer. *Computers in Human Behavior*, *81*, 189–197. https://doi.org/10.1016/j.chb.2017.12.019

Festinger, L., Pepitone, A., & Newcomb, T. (1952). Some consequences of de-individuation in a group. *The Journal of Abnormal and Social Psychology*, *47*(Suppl. 2), 382–389. https://doi.org/10.1037/h0057906

Gentile, D. A., Anderson, C. A., Yukawa, S., Ihori, N., Saleem, M., Ming, L. K., Shibuya, A., Liau, A. K., Khoo, A., Bushman, B. J., Huesmann, L. R., & Sakamoto, A. (2009). The effects of prosocial video games on prosocial behaviors: International evidence from correlational, longitudinal, and experimental studies. *Personality and Social Psychology Bulletin*, *35*(6), 752–763. https://doi.org/10.1177/0146167209333045

Gergen, K. J., Gergen, M. M., & Barton, W. H. (1973). Deviance in dark. *Psychology Today*, *7*(5), 129–131.

Gitter, S. A., Ewell, P. J., Guadagno, R. E., Stillman, T. F., & Baumeister, R. F. (2013). Virtually justifiable homicide: The effects of prosocial contexts on the link between violent video games, aggression, and prosocial and hostile cognition. *Aggressive Behavior*, *39*(5), 346–354. https://doi.org/10.1002/ab.21487

Greitemeyer, T., & Mügge, D. O. (2014). Video games do affect social outcomes: A meta-analytic review of the effects of violent and prosocial video game play. *Personality and Social Psychology Bulletin*, *40*(5), 578–589. https://doi.org/10.1177/0146167213520459

Greitemeyer, T., & Osswald, S. (2010). Effects of prosocial video games on prosocial behavior. *Journal of Personality and Social Psychology*, *98*(2), 211–221. https://doi.org/10.1037/a0016997

Greitemeyer, T., & Osswald, S. (2011). Playing prosocial video games increases the accessibility of prosocial thoughts. *The Journal of Social Psychology*, *151*(2), 121–128. https://doi.org/10.1080/00224540903365588

Grizzard, M., Tamborini, R., Lewis, R. J., Wang, L., & Prabhu, S. (2014). Being bad in a video game can make us morally sensitive. *Cyberpsychology, Behavior, and Social Networking*, *17*(8), 499–504. https://doi.org/10.1089/cyber.2013.0658

Guegan, J., Buisine, S., Mantelet, F., Maranzana, N., & Segonds, F. (2016). Avatar-mediated creativity: When embodying inventors makes engineers more creative. *Computers in Human Behavior*, *61*, 165–175. https://doi.org/10.1016/j.chb.2016.03.024

Happ, C., Melzer, A., & Steffgen, G. (2013). Superman vs. BAD man? The effects of empathy and game character in violent video games. *Cyberpsychology, Behavior, and Social Networking*, *16*(10), 774–778. https://doi.org/10.1089/cyber.2012.0695

Hartmann, T., Toz, E., & Brandon, M. (2010). Just a game? Unjustified virtual violence produces guilt in empathetic players. *Media Psychology*, *13*(4), 339–363. https://doi.org/10.1080/15213269.2010.524912

Hasan, Y., Bègue, L., Scharkow, M., & Bushman, B. J. (2013). The more you play, the more aggressive you become: A long-term experimental study of cumulative violent video game effects on hostile expectations and aggressive behavior. *Journal of Experimental Social Psychology*, *49*(2), 224–227. https://doi.org/10.1016/j.jesp.2012.10.016

Hefner, D., Klimmt, C., & Vorderer, P. (2007). Identification with the player character as determinant of video game enjoyment. In L. Ma, M. Rauterberg, & R. Nakatsu (Eds.), *Entertainment Computing – ICEC 2007* (pp. 39–48). Springer. https://doi.org/10.1007/978-3-540-74873-1_6

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

Klimmt, C., Schmid, H., Nosper, A., Hartmann, T., & Vorderer, P. (2006a). ‘Moral management’: Dealing with moral concerns to maintain enjoyment of violent video games. In A. Jahn-Sudmann & R. Stockmann (Eds.), *Computer games as a sociocultural phenomenon: Games without frontiers, war without tears* (pp. 108–118). Palgrave Macmillan.

Klimmt, C., Schmid, H., Nosper, A., Hartmann, T., & Vorderer, P. (2006b). How players manage moral concerns to make video game violence enjoyable. *Communications*, *31*(3), 309–326. https://doi.org/10.1515/COMMUN.2006.020

Krakowiak, K. M., & Oliver, M. B. (2012). When good characters do bad things: Examining the effect of moral ambiguity on enjoyment. *Journal of Communication*, *62*(1), 117–135. https://doi.org/10.1111/j.1460-2466.2011.01618.x

Nelson, L. D., & Norton, M. I. (2005). From student to superhero: Situational primes shape future helping. *Journal of Experimental Social Psychology*, *41*(4), 423–430. https://doi.org/10.1016/j.jesp.2004.08.003

Peña, J., & Chen, M. (2017). With great power comes great responsibility: Superhero primes and expansive poses influence prosocial behavior after a motion-controlled game task. *Computers in Human Behavior*, *76*, 378–385. https://doi.org/10.1016/j.chb.2017.07.039

Peña, J., Hancock, J. T., & Merola, N. A. (2009). The priming effects of avatars in virtual settings. *Communication Research*, *36*(6), 838–856. https://doi.org/10.1177/0093650209346802

Peña, J., Khan, S., & Alexopoulos, C. (2016). I am what I see: How avatar and opponent agent body size affects physical activity among men playing exergames. *Journal of Computer-Mediated Communication, 21*(3), 195-209. https://doi.org/10.1111/jcc4.12151

Ratan, R., Beyea, D., Li, B. J., & Graciano, L. (2020). Avatar characteristics induce users’ behavioral conformity with small-to-medium effect sizes: A meta-analysis of the Proteus effect. *Media Psychology*, *23*(5), 651–675. https://doi.org/10.1080/15213269.2019.1623698

Rosenberg, R. S., Baughman, S. L., & Bailenson, J. N. (2013). Virtual superheroes: Using superpowers in virtual reality to encourage prosocial behavior. *PLoS ONE*, *8*(1), Article e55003. https://doi.org/10.1371/journal.pone.0055003

Sauer, J. D., Drummond, A., & Nova, N. (2015). Violent video games: The effects of narrative context and reward structure on in-game and postgame aggression. *Journal of Experimental Psychology: Applied*, *21*(3), 205–214. https://doi.org/10.1037/xap0000050

Shafer, D. M., & Raney, A. A. (2012). Exploring how we enjoy antihero narratives. *Journal of Communication*, *62*(6), 1028–1046. https://doi.org/10.1111/j.1460-2466.2012.01682.x

Spivey, C. B., & Prentice-Dunn, S. (1990). Assessing the directionality of deindividuated behavior: Effects of deindividuation, modeling, and private self-consciousness on aggressive and prosocial responses. *Basic and Applied Social Psychology*, *11*(4), 387–403. https://doi.org/10.1207/s15324834basp1104_3

Tamborini, R. (2011). Moral intuition and media entertainment. *Journal of Media Psychology*, *23*(1), 39–45. https://doi.org/10.1027/1864-1105/a000031

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

Weaver, A. J., & Lewis, N. (2012). Mirrored morality: An exploration of moral choice in video games. *Cyberpsychology, Behavior, and Social Networking*, *15*(11), 610–614. https://doi.org/10.1089/cyber.2012.0235

Yee, N., & Bailenson, J. (2007). The Proteus effect: The effect of transformed self-representation on behavior. *Human Communication Research*, *33*(3), 271–290. https://doi.org/10.1111/j.1468-2958.2007.00299.x

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

Yee, N., Bailenson, J. N., Urbanek, M., Chang, F., & Merget, D. (2007). The unbearable likeness of being digital: The persistence of nonverbal social norms in online virtual environments. *CyberPsychology & Behavior*, *10*(1), 115–121. https://doi.org/10.1089/cpb.2006.9984

Yoon, G., & Vargas, P. T. (2014). Know thy avatar: The unintended effect of virtual-self representation on behavior. *Psychological Science*, *25*(4), 1043–1045. https://doi.org/10.1177/0956797613519271

Zimbardo, P. G. (1969). The human choice: Individuation, reason, and order vs. deindividuation, impulse and chaos. In W. J. Arnold & D. Levine (Eds.), *Nebraska symposium on motivation* (Vol. 17, pp. 237–307). University of Nebraska Press.

Correspondence to:
Jérôme Guegan
Department of Psychology, LaPEA
71 avenue Edouard Vaillant
F-92100 Boulogne Billancourt
France
Email: jerome.guegan(at)u-paris.fr

Editorial record: First submission received on July 23, 2019. Revisions received on May 10, 2020 and September 28, 2020. Accepted for publication on October 3, 2020.
Editor in charge: Lenka Dedkova

About Authors

Jérôme Guegan is Associate Professor in social psychology at Université de Paris, France. His research focuses on creativity and group processes in computer-mediated communication. He studied in particular the influence of avatars and virtual environments on creativity and sociocognitive processes.

Julien Nelson is Associate Professor in Human Computer Interaction and Ergonomics at Université de Paris, France. His research focuses on creativity, prospective ergonomics and technology. He is also interested in the influence of virtual environments on creativity.

Lubomir Lamy, PhD, is a Professor of social psychology at Université de Paris, France. His research interests focus on the emotions-cognitions interface, and on socio-cognitive influences on prosocial behavior.

Stéphanie Buisine is a Professor in CESI Graduate School of Engineering in Nanterre, France. With a background in Psychology and Ergonomics, her research topics include innovation and creativity processes. She has been conducting research in the field of creativity-supporting technologies, and contributed to several researches on the Proteus effect in the context of avatar-mediated creativity.