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Reference:

Vandenbosch Laura, Driesmans Karolien, Trekels Jolien, Eggermont Steven.- Sexualized video game avatars and self-objectification in adolescents : the role of gender congruency and activation frequency
Media psychology - ISSN 1532-785X - (2016), p. 1-33

Please cite as “Vandenbosch, L., Driemans, K., Trekels, J., & Eggermont, S. (in press). Sexualized Video Game Avatars and Self-Objectification in Adolescents: The Role of Gender Congruency and Activation Frequency. *Media Psychology*”

Sexualized Video Game Avatars and Self-Objectification in Adolescents: The Role of
Gender Congruency and Activation Frequency

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Abstract

Little is known about the effects of playing sexualizing video games on adolescent boys' and girls' self-objectified body image. Early and middle adolescents ($N = 115$; $M_{\text{age}} = 12.63$, $SD = 0.85$) participated in a between-subjects experiment testing the effect of playing with a sexualized male or female avatar as compared to a control condition. We revealed that playing a video game with a sexualized avatar increased self-objectification among adolescents. This effect occurred regardless of the gender of the adolescent and thus did not support the gender congruency hypothesis. In contrast to the activation frequency hypothesis and video game literature on sexualization, the effect of playing with a female sexualized avatar was not moderated by game frequency. Given the adverse consequences of self-objectification in adolescence, the current study results highlight the need for research on how these effects may be countered.

Keywords: sexualization, adolescents, video games, self-objectification

Sexualized Video Game Avatars and Self-Objectification in Adolescents: The Role of Gender
Congruency and Activation Frequency

With an average of 10.52 hours of play time per week, video gaming is one of the most preferred leisure activities during late childhood and adolescence (Exelmans, Custers, & Van den Bulck, 2014). In the same phase of life, the body assumes a greater prominence in the awareness of young people due to a set of important biological, cognitive, and social changes (Tiggemann, 2010). These body-related developments relatively frequently lead to undesirable consequences. Research among developing adolescents has shown an increased risk of body image disturbances and related depression (Angold, Costello, & Worthman, 1998; Smolak, 2004).

A central factor in the occurrence of these maladaptive outcomes is self-objectification or the tendency to observe one's own body from the perspective of an observer (Fredrickson & Roberts, 1997). Self-objectification is triggered by sexualization, i.e., the cultural practice of treating individuals as sexual bodies while ignoring their personalities (APA, 2007; Fredrickson & Roberts, 1997; Moradi & Huang, 2008). The practice of sexualization can be encountered in social interactions, such as individuals who gaze at someone's body in an inspecting way, but also in mediated interactions (APA, 2007; Fredrickson & Roberts, 1997). One medium in which sexualization is likely to occur is video games (Dill & Thill, 2007; Downs & Smith, 2009; Martins, Williams, Harrison, & Ratan, 2009). Content analyses have reported on the prevalence of sexualization in video games, for instance, through featuring avatars who comply to narrowly defined appearance ideals and place a strong emphasis on their physical appearance (Dill & Thill, 2007; Downs & Smith, 2009). This paper aims to examine the influence of sexualizing video games on adolescents' self-objectification using the data of an experimental study that tested how playing with a sexualized avatar affects self-objectification in boys and girls.

It expands prior research on this topic in four ways. First, while objectification studies have particularly examined traditional mass media, such as television and magazines (e.g., Aubrey, 2006), literature has highlighted that the relationship between interactive media use, such as video games, and self-objectification is understudied (APA, 2007; Fox, Bailenson, & Tricase, 2013). Second, although adolescence is a critical period of identity formation, making even a slight increase in self-objectification potentially harmful, this type of research has rarely been conducted among adolescents (Tiggemann, 2010). Third, in contrast to the scholarly focus on the sexualization of women in media and on female media users (e.g., Vandenberg & Eggermont, 2012), the current research explores how both boys and girls are affected by sexualized avatars. Moreover, the moderating influence of gender congruency between avatars and players on the effect of sexualizing video games is examined. Fourth, the study proposes an empirical test of the activation frequency hypothesis (Bargh, Chaiken, Raymond, & Hymes, 1996; Bargh, Lee-chai, Barndollar, Gollwitzer, & Trötschel, 2001) by exploring if frequent playing moderates the effect of video games on self-objectification.

Sexualization in Video Games and Self-Objectification

The APA Task Force on the Sexualization of Girls (2007, p. 1) defines sexualization as evaluating individuals based on their sexual appeal or sexual behavior, equating standards of appearance with being sexually attractive, sexually objectifying a person and/or inappropriately imposing sexuality on individuals. Various content analyses have demonstrated that several of these elements occur frequently in video games. In particular, avatars have been shown to exemplify the sexual attractiveness ideals of thinness and muscularity (Dill & Thill, 2007). They are often presented in sexually suggestive poses while wearing revealing attire (Dill & Thill, 2007; Downs & Smith, 2009; Martins et al. , 2009). These findings particularly apply to female

avatars, who are much more likely to be sexualized than male avatars. For instance, the study of Dill and Thill (2007) demonstrated that 60% of the female video game characters are sexualized compared to only 1% of their male counterparts. Downs and Smith (2009) found that female game characters were eight times more likely to wear revealing clothing than male characters.

Objectification theory (Fredrickson & Roberts, 1997) and research based on this theory suggest that exposure to such sexualization induces self-objectification, implying that one gradually develops a self-perception that relies heavily on his or her physical appearance rather than on personality or competence-related characteristics. For instance, Aubrey, Henson, Hopper, and Smith (2009) tested the tenets of this theory in an experimental study. They exposed female college students to images of either high-objectified women (i.e., barely dressed), images of low-objectified women (i.e., with clothes to cover up their body) or body-neutral images. Results showed that high-objectified images induced higher levels of (state) self-objectification among women as compared to control images. Moreover, cross-sectional research among female and male adolescents has shown that exposure to sexualizing music television (Grabe & Hyde, 2009) and sexually explicit websites (Vandenbosch & Eggermont, 2013) increases self-objectification.

There are reasons to believe that a similar effect may occur after playing sexualizing video games. Sexualized avatars frequently occur in video games (Downs & Smith, 2009). Moreover, the reductionist focus on appearance and sexuality often does not really fit into a narrative (as in movies or television shows) but is stressed as a “decorative element” (Downs & Smith, 2009). This may contribute to an instrumental perspective on the body.

Two studies have, so far, supported the effect of video games on self-objectification. A recent experimental study of Fox and colleagues (2013) demonstrated that playing video games through sexualized avatars increases self-objectification among female college students. In

another study, Fox, Ralston, Cooper, and Jones (2014) showed that women who had been exposed to sexualized avatars in the online game “Second Life” experienced higher levels of self-objectification than those who had been exposed to non-sexualized avatars.

The objectives of the current study are to expand this evidence to adolescents of both genders and to improve the external validity of the study. The first experiment of Fox and colleagues (2013) created a fully immersive virtual environment in which college women could fully embody the sexualized avatar through a head-mounted display. However, many video game players do not use such a device to play games (Magerkurth, Cheok, Nilsen, Mandryk, & Nilsen, 2005), partly because of the rather high costs of this device (Dörner, Lok, & Broll, 2011). The hypothesis that “everyday” video game play with sexualized avatars may trigger self-objectification has thus so far only been supported in one study among female college students (Fox et al., 2014). Moreover, the prediction that such everyday video game play affects the body image of early adolescent boys and girls remains unexplored. However, video game play is especially popular among adolescents (e.g., Kirsch, 2003; Willoughby, 2008), while its popularity generally decreases with age (e.g., Gentile, 2009; Roberts, Foehr, Rideout, & Brodie, 1999). Therefore, the first hypothesis of this study reads:

H1: After playing a video game with a sexualized avatar, adolescents demonstrate higher levels of self-objectification than adolescents who played with a non-sexualized avatar.

In line with prior experimental research studying the effects of media content on objectification outcomes (e.g., Aubrey, Hopper, & Mbure, 2011; Aubrey et al., 2009; Vandebosch, Frison, & Eggermont, 2012), the instant impact of playing with a sexualized avatar on self-objectification may further be explained by priming theory. Priming theory presents the human memory as an associative network. When individuals (gamers) are exposed

to a stimulus (a sexualized avatar), nodes related to the stimulus (the importance of attractiveness) are likely to become activated (Collins & Loftus, 1975). The activated nodes may, in turn, serve as an interpretative frame for subsequent judgments (Hansen & Hansen, 1988) such as evaluating the importance of one's own physical appearance. In such a process, gender congruency may be a relevant factor. Based on gender schema theory (Bem, 1981a), it has been hypothesized and demonstrated that children especially tend to adopt cognitions and behaviors from models of the congruent gender (Bussey & Bandura, 1984; Luecke-Aleksa, Anderson, Collins, & Schmitt, 1995; Slaby & Frey, 1975). When observing female or male models, girls and boys who are in the middle of developing a gendered identity may thus prefer to store information modeled by respectively female and male models, because they expect such information to be more valuable for them as it informs them on typical feminine or masculine behavior (Bem, 1981a; Mia & Woolley, 2013).

Bem (1983) further explains that gender socialization is a "learned process." The effect of gender congruency is therefore dependent on the extent to which the child has internalized a gendered identity and thus has endorsed a masculine or feminine identity. For instance, girls scoring high on femininity may especially be expected to encode information of a female role model. However, the gender of the model would be less important for the encoding of information when girls score low on femininity. This predisposition in the processing of information occurs because individuals differ in anticipating on the importance of learning about typical feminine or masculine behavior. Applying this reasoning to the current study, we can expect that the message implied by a sexualized avatar may especially affect adolescents who perceive the gender of the avatar as congruent with their own gender.

Moreover, there are indications in the literature that the interaction effect of gender congruency and playing with a sexualized avatar on self-objectification may be particularly strong among girls. Objectification literature (Fredrickson & Roberts, 1997; Slater & Tiggemann, 2010) explains that girls and women in general encounter sexualization more often in everyday interactions, which makes the practice of sexualization more salient for girls than for boys and may manifest itself in a greater propensity for self-objectification. Based on gender schema theory and gender literature, the second hypothesis of this study reads:

H2a: Adolescents who played the game with a gender congruent sexualized avatar demonstrate higher levels of self-objectification than adolescents who played the game with a gender incongruent sexualized avatar.

H2b: The gender congruency effect results in the greatest level of self-objectification among girls who played with a female sexualized avatar as compared to adolescents who played with a sexualized male avatar and a non-sexualized avatar.

Priming theory further suggests that activation frequency may be a relevant factor to consider (Hansen & Hansen, 1988). Activation frequency refers to the frequency with which a relevant node in the memory is activated by exposure to a particular stimulus (Bargh et al., 2001; Bargh et al., 1996). This frequency is of importance; a node in the memory that is frequently activated (for example, a node related to sexual attractiveness often activated by playing with a sexualized avatar) tends to trigger other nodes in the memory associated therewith (for example, the tendency to observe one's own body from the perspective of an observer). The notion of activation frequency thus suggests an enhanced accessibility of self-objectification among frequent players of video games.

However, this effect of repeated activation may particularly, or almost exclusively, occur when playing with female avatars, since female avatars have been shown to be frequently sexualized, while male avatars are hardly sexualized (Dill & Thill, 2007; Downs & Smith, 2009; Martins et al., 2009). As particularly female avatars may activate nodes related to appearance among frequent gamers, the instant effect of playing with a sexualized avatar may be especially intense when playing with a female avatar. Based on the activation frequency hypothesis (Bargh et al., 1996) and literature on gender differences in the sexualization of video game characters (e.g., Dill & Thill, 2007), the third hypothesis of this study reads:

H3a: After playing a video game with a female sexualized avatar, adolescents who frequently play video games demonstrate higher levels of self-objectification than adolescents who rarely play video games.

H3b: The game play frequency effect results in the greatest level of self-objectification among adolescents who played with a female sexualized avatar as compared to adolescents who played with a sexualized male avatar and a non-sexualized avatar.

Method

An experiment was conducted to test the influence of sexualizing video games on self-objectification¹. Adolescents were asked to play the game RuneScape. Ethical approval was received and informed consent was obtained in accordance with customary guidelines in Belgium.

Participants and Procedure

One hundred twenty-two adolescents aged 11 to 14 years ($M = 12.63$, $SD = 0.85$) participated in our between-subjects experiment. Seven participants were omitted from the analyses due to missing data and outliers (analyses were performed to identify outliers for all key

variables), resulting in a final sample size of 115 adolescents (67 male, 48 female). Participants were recruited from a secondary school in Belgium. Pupils of the selected age group of 11-14 years old that were present at the time of the researcher's visit were asked to participate in a study on video games. Each research session was run by a female research assistant and participants were stationed individually at a computer in a class room. Participants were told that the study was designed to improve the production value of video games and were instructed to play "RuneScape" for 15 minutes (starting from the beginning of the game). Participants were instructed to enlarge the game screen as much as possible.

RuneScape is a free, online available multiplayer adventure game. This game was selected as it allows for manipulation of the clothes of the male/female avatar. As such, the avatars used in the sexualized conditions are exactly the same as the ones used in the non-sexualized conditions with the exception of the clothing (scantily vs. fully dressed) (images available upon request). RuneScape is a moderately violent game with a third-person perspective that challenges a player to pass as a warrior through a fantasy world. In this game, the warrior encounters several non-human and human enemies. The human enemies are fully dressed in the first level of the game. The goal of the game is to complete several quests without being defeated. It was ensured that there were no discrepancies in powers, abilities, or weaponry between avatars. The chosen warrior or avatar can be fully seen while playing the game.

Based on prior research on sexualization (APA, 2007; Dill & Thill, 2007), the male and female sexualized avatar were considered to be portrayed in a sexualized manner (experimental conditions). The female sexualized avatar wears revealing clothes emphasizing her slim body; the male sexualized avatar's upper body is unclad showing his muscularity. Both avatars thus (a) have a high degree of exposure of sexual body parts and (b) correspond to narrowly defined

appearance ideals. The non-sexualized male and female avatars wear clothes covering their full bodies (control conditions).

A pilot study among college students (22 women and 5 men) ensured the sexualized nature of the avatars. Participants rated the level of sexualization of each avatar of RuneScape on a 10-point semantic differential scale ranging from 1 (*no sexualization*) to 10 (*very high sexualization*). Sexualization was described according to the four indicators of sexualization of APA (2007). The female sexualized avatar was rated as the most sexualized character ($M = 5.48$, $SD = 1.97$), followed by the male sexualized avatar ($M = 5.41$, $SD = 1.97$). The level of sexualization for the non-sexualized male ($M = 2.06$, $SD = 0.97$) and female ($M = 2.22$, $SD = 1.17$) avatars were rather low. Both the male sexualized avatar ($t(17) = 9.06$, $p < .001$) and the female sexualized avatar ($t(16) = 8.65$, $p < .001$) scored significantly higher on sexualization than respectively the non-sexualized male and female avatars according to dependent t -tests. In this study, the level of sexualization did not differ between the sexualized male and female avatar ($t(26) = .27$, $p = .791$, $N = 27$), thereby supporting our manipulation.

Both boys and girls were randomly assigned across the four conditions: Sexualized male ($n = 30$) or female avatar ($n = 29$) versus non-sexualized male ($n = 26$) or female avatar ($n = 30$). More precisely, the cell sizes ranged between 10 and 20: Sexualized female avatar ($n_{male} = 16$, $n_{female} = 13$), sexualized male avatar ($n_{male} = 18$, $n_{female} = 12$), non-sexualized female avatar ($n_{male} = 20$, $n_{female} = 10$), and non-sexualized male avatar ($n_{male} = 13$, $n_{female} = 13$). Immediately after playing the game, the participants completed a questionnaire that, apart from the questions described below, also included questions to increase the credibility of the cover story.

Video game consumption. First, participants estimated the number of hours and minutes they played video games on a typical weekday and weekend day. Separate estimations for

weekdays and weekend days were required since adolescents have more free time during the weekend, potentially influencing the time spent on gaming. By multiplying the weekday hours by five and the weekend hours by two, the total amount of game play in one week was calculated. The average amount of playing time was 13.26 hr. per week ($SD = 13.07$). A square root transformation was applied to improve normality. Second, participants were asked whether they played RuneScape before and if so, how often they have played it using a 5-point scale ranging from “once” (= 1) to “ten times or more” (= 5). Thirty-one participants (27%) had prior experience with RuneScape, 38.71% of which played it over 5 times ($M = 3.00$, $SD = 1.61$). As familiarity with the experimental game can affect our results in an undesirable way, it is included as a control variable in all analyses with a score ranging from 0 (= *no prior experience*) to 5 (= *played it ten times or more*). Third, RuneScape can be categorized as a fantasy violence and roleplaying game. Therefore, participants were asked to indicate how often they played these genres of video games using a 5-point scale ranging from “never” (= 1) to “(almost) every day” (= 5) ($M_{fantasy\ violence} = 2.17$, $SD = 1.49$; $M_{roleplaying} = 2.16$, $SD = 1.42$). These differences in game consumption might potentially influence our results. Therefore, analyses were performed with familiarity with RuneScape, fantasy violence games, and roleplaying games as control variables.

Gender congruency. Gender congruency was measured in two different manners. The first was based on the (self-reported) sex of the participants, the second on the gender identity of the participants. The first coding was similar to several prior objectification studies (e.g., Slater & Tiggemann, 2010; Vandenbosch & Eggermont, 2014). Boys who played with the male [female] game character and girls who played with the female [male] character were rated as gender congruent ($n = 54$) [incongruent ($n = 61$)]. For the second coding of gender congruency, we relied on gender schema literature that advises to apply a more advanced measure of gender

identity (Bem, 1981b). Participants' gender identity was assessed using Children's Sex Role Inventory (CSRI) (Boldizar, 1991), an adaptation of the Bem Sex Role Inventory (BSRI) Short Form (Bem, 1981a, 1981b) assessing gender in adults. The CSRI was developed for research in children/adolescents and differs from the original scale in that it uses full sentences to describe the traits (Karniol, Stuemler-Cohen, & Lahav-Gur, 2012). The scale has been found to be a well-validated measure for identification with masculine and feminine characteristics in children (Belfi, Conrad, Dawson, & Nopoulos, 2014). Participants rated to what extent the 30 personality characteristics apply to them on a 4-point Likert scale ranging from "very false" (= 1) to "very true" (= 4). Ten items were stereotypically masculine (e.g., "I am good at taking charge of things"), 10 items were stereotypically feminine (e.g., "I am a warm person") and 10 items were gender-neutral (e.g., "I am an honest person"). The latter 10 items were used as filler items.

Masculine items ($M = 2.28$, $SD = 0.57$, $\alpha = 0.81$) and feminine items ($M = 2.72$, $SD = 0.64$, $\alpha = 0.88$) were averaged. Following the procedure of Bem (1981b) and others (e.g., Sellars, 2008), participants were classified in one of four distinct gender categories based on the median split of the masculinity and femininity scales: masculine (high scores on masculinity scale, low scores on femininity scale; $n = 12$), feminine (low scores on masculinity scale, high scores on femininity scale; $n = 18$), undifferentiated (low scores on both scales; $n = 32$) and androgynous (high scores on both scales; $n = 33$). These four categories were used to construct the gender congruency measure. Feminine participants playing with the female [male] game character and masculine participants playing with the male [female] character were rated as gender congruent [incongruent]. Adolescents with high levels of both masculinity and femininity are more adaptive and flexible (Bem & Lewis, 1975). Therefore, they are rated as congruent with the avatar, independent of the gender of the gamer. Participants categorized as undifferentiated, on

the other hand, are always rated as incongruent with the avatar's gender. In total, 50 participants were rated as incongruent and 45 participants as congruent with the avatar's gender.

Self-objectification. A scale adapted from Noll and Fredrickson's (1998) Self-Objectification Questionnaire was used (Vandenbosch et al., 2012). Participants rated the importance of 12 body attributes on a 10-point scale ranging from "not at all important" to "very important." Next, their mean scores on appearance-based body attributes (i.e., coloring, measurements, muscle tone, physical attractiveness, sex appeal, and weight; $\alpha = 0.77$) and competence-based body attributes (i.e., health, muscular strength, physical coordination, physical energy level, physical fitness, and stamina; $\alpha = 0.79$) were calculated. The difference between both mean scores assesses self-objectification (range -9 to 9). Four outliers, with a self-objectification value of less than the first quartile minus 1.5 times the interquartile range, were excluded from the analysis. The higher one's score, the higher the level of self-objectification. The mean level of self-objectification indicated that the adolescents valued competence-based attributes higher than appearance-based attributes ($M = -1.84$, $SD = 1.42$).

Results

Two general linear model (GLM) analyses with gender congruency (yes/no) and sexualization of the avatar (sexualized vs. non-sexualized) as independent variables and self-objectification as dependent variable tested H1 and H2a. The familiarity with RuneScape, fantasy violence games, and roleplaying games were included as covariates in all analyses. The gender congruency measure based on the self-reported sex of the participants was included in the first GLM analysis. H1 was supported as we found a significant main effect of sexualization on self-objectification, $F(1, 108) = 4.97$, $p = 0.028$, $\eta^2 = 0.044$. Participants who played the game with a sexualized avatar ($M = -1.60$, $SD = 1.42$) showed higher levels of self-objectification

compared to adolescents who played with a non-sexualized avatar ($M = -2.11$, $SD = 1.38$). The main effect of gender congruency was not significant, $F(1,108) = 0.09$, $p = 0.763$. In contrast to our expectations described in H2a, the interaction effect between gender congruency and sexualization was not significant, $F(1, 108) = 0.10$, $p = 0.751$. None of the control variables had a significant influence (all $F_s \leq 3.07$, all $p_s \geq 0.083$).

The GLM analysis was repeated with the gender congruency measure based on the gender identity of the participants. Similar results were found. Again, the main effect of sexualization of the avatar was significant, $F(1, 88) = 4.92$, $p = 0.029$, $\eta^2 = 0.053$, and no significant main effect was found for gender congruency, $F(1,88) = 0.04$, $p = 0.843$. Participants who played with the sexualized avatar ($M = -1.63$, $SD = 1.39$) showed higher levels of self-objectification than those who played with the control avatar ($M = -2.20$, $SD = 1.38$). Furthermore, the analysis revealed that the interaction effect between gender congruency and sexualization was not significant, $F(1, 86) = 0.68$, $p = 0.410$. None of the control variables had a significant influence (all $F_s \leq 2.93$, all $p_s \geq 0.090$). Together, these results are not consistent with H2a, but they do support H1.

Next, H2b was tested with a third and fourth GLM analysis. In these analyses, gender congruency (yes/no), sexualization of the avatar (sexualized vs. non-sexualized) and the participant's self-reported sex (male vs. female) were included as discrete between-subjects factors and self-objectification as the dependent variable. The familiarity with RuneScape, fantasy violence games, and roleplaying games were included as covariates in all analyses. Two analyses were conducted, one for each variant of gender congruency. Table 1 reports the results of the analyses. In both analyses, a significant main effect of participants' gender was found, $F_s \geq 4.91$, $p_s \leq 0.029$, $\eta^2_s \geq .045$. Female adolescents ($M_{congruency\ based\ on\ sex} = -1.39$, $SD = 1.29$;

$M_{congruency\ based\ on\ gender\ identity} = -1.42, SD = 1.33$) showed higher levels of self-objectification compared to male adolescents ($M_{congruency\ based\ on\ sex} = -2.17, SD = 1.42$; $M_{congruency\ based\ on\ gender\ identity} = -2.30, SD = 1.36$). Consistent with H1, each analysis showed a main effect of sexualization on self-objectification, $F_s \geq 4.30, p_s \leq 0.041, \eta p^2_s \geq .042$. However, H2b was not supported as the three-way interaction in each analysis was not significant, $F_s \leq 0.42, p_s \geq 0.518$. In both analyses, the main effect of gender congruency, the effects of the two-way interactions, and the effects of the control variables were not significant (all $F_s \leq 2.70$, all $p_s \geq 0.103$).

[TABLE 1 HERE]

A final GLM analysis tested H3a and H3b. The results are reported in Table 2. The GLM included sexualization of the avatar (sexualized vs. control) and the sex of the avatar (male vs. female) as discrete between-subject factors and game frequency as a continuous between-subject variable. The familiarity with RuneScape, fantasy violence games, and roleplaying games were included as covariates. The results yielded a marginally significant influence of sexualization, $F(1, 99) = 3.50, p = 0.065, \eta p^2 = 0.034$. In addition, the hypotheses were not supported since the three-way interaction was not significant, $F(1, 99) = 0.04, p = 0.852$. The main effects of game frequency and gender of the avatar, the effects of the two-way interactions, and the effects of two control variables (i.e., familiarity with RuneScape and fantasy violence games) were not significant (all $F_s \leq 0.93$, all $p_s \geq 0.338$). The control variable role playing games had a marginally significant effect on self-objectification, $F(1, 99) = 3.87, p = 0.052$. More specifically, adolescents who frequently play role playing games ($M = -2.13, SD = 1.92$ at mean +1 SD) showed lower levels of self-objectification than those not often playing role playing games ($M = -1.56, SD = 1.92$ at mean -1 SD).

[TABLE 2 HERE]

Discussion

The current experiment aimed to research the instant effect of playing a sexualized video game on self-objectification in adolescents. The findings indicate that playing a video game with a male or female sexualized avatar induces self-objectification in both adolescent boys and girls as compared to playing with a non-sexualized avatar. Gender congruency does not appear to be an important factor in this process. This finding was similar when addressing gender congruency based on adolescents' sex and gender identity (Bem, 1983). In addition, our results do not support the activation frequency hypothesis. When adolescents play the game RuneScape, activation frequency did not intensify the effect of playing with a sexualized female avatar. The results of this study provide several new insights into the relationships between media use and adolescents' objectified self-concepts.

Although previous objectification research among adolescents has mainly focused on magazines and television (e.g., Vandebosch & Eggermont, 2012), the current study indicates that this exclusive attention to traditional media may have been unwarranted. Our study demonstrated that video game play with a sexualized avatar increases self-objectification in adolescents. The occurrence of this effect is not unlikely as adolescents play video games three to four times a week (Gentile, 2009) and the best-selling video games have been found to portray sexualized avatars (Downs & Smith, 2009). Moreover, the finding that video game play with a sexualized avatar triggers self-objectification may also be relevant to previously reported associations between playing video games and adverse outcomes, such as body image disturbances (e.g., Barlett & Harris, 2008) and the acceptance of traditional gender role stereotypes (e.g., Yao, Mahood, & Linz, 2010). According to objectification theory (Fredrickson & Roberts, 1997), self-objectification may explain why these effects occur after playing video

games. Research has demonstrated that self-objectification guides individuals toward beliefs, attitudes, and behaviors that are compatible with their objectified self-concept, such as a strong focus on unattainable beauty ideals which can lead to body dissatisfaction (Grabe & Hyde, 2009), and the endorsement of traditional sexual gender role beliefs that tend to determine one's sexual role based on one's body (Gillen, Lefkowitz, & Shearer, 2006). The results of this study thus suggest that self-objectification may be part of an explanatory mechanism for the reported associations of video games with body image disturbances and gender stereotypes, and calls for research on the potential mediating role of self-objectification in these relationships.

The Role of Gender Congruency

The observation of prior literature that the most frequent gaming behavior occurs mainly in boys (Gentile, 2009), while self-objectification has particularly been seen as a female phenomenon (Moradi & Huang, 2008), does not reduce the importance of the reported finding on the association between video game play and self-objectification. On the contrary, in contrast to the gender congruency hypothesis, our study demonstrated that the gender of the sexualized character is not an important condition for the occurrence of self-objectification in game players. This result suggests that the fact that women are particularly sexualized in video games (e.g., Dill & Thill, 2007) does not protect boys or players scoring high on masculinity from self-objectification after having played video games. Regardless of their sex and gender identity, players were found to be affected by a sexualized female avatar. The study thus confirms the remark made earlier (Vandenbosch & Eggermont, 2013) that research on the relationship between media use and self-objectification has been overly focused on female media users. So far, only one (cross-sectional) study (Vandenbosch & Eggermont, 2013) has linked the use of sexually objectifying media with self-objectification in adolescent boys. The current study adds

that this link may be causal and stresses the need for longitudinal research among adolescent boys.

Moreover, this study introduces the suggestion that self-objectification in boys as well as in hyper-masculine media users may also be generated by exposure to sexualized women. This suggestion is in line with observations from prior body image scholars regarding relationships between exposure to images of sexualized women and distorted body-image outcomes. More specifically, Levine, Sweeney, and Wagner found in 1999 that both men and women reported more body dissatisfaction after exposure to advertisements showcasing sexualized female models. More recently, Johnson, McCreary, and Mills (2007) indicated that exposure to images of objectified women induced higher levels of distorted body-image outcomes among men as opposed to images of objectified male or neutral models. The idea that self-objectification in male media users is affected by exposure to sexualized women has not only been suggested in experimental research. Cross-sectional studies have reported similar relationships between television viewing/social media use and the development of an objectified self-concept among male and female media users (e.g., Manago, Ward, Lemm, Reed, & Seabrook, 2014; Vandenbosch & Eggermont, 2014). As research has also shown that women are sexualized to a greater extent than men in television and social media content (Kapidzic & Herring, 2014; Ward, 1995), the results of the survey studies suggest boys may also be affected by exposure to media content showing sexualized women.

In addition, our results relate to recent research of Yee, Ducheneaut, Yao, and Nelson (2011) on how players experience game play. This research found that the sex of the avatar predicted in-game behavior, but was unrelated to the sex of the player. The scholars of this study refer to the so-called Proteus effect that has been explained by self-perception theory (Bem,

1972). This theoretical mechanism, together with the study of Yee et al. (2011), suggests that a player embodies the virtual body of his/her avatar and takes on the identity of the avatar regardless of conflicts with one's own identity (e.g., incongruence between one's own sex and the avatar's sex). The principles of the Proteus effect are different from priming theory (Yee & Bailenson, 2009). Our experiment used a third-person game that was played through mouse clicking/keyboard use, while studies testing the Proteus effect have often operationalized avatar embodiment through the use of head mounted devices that substantially increase players' identifying with an avatar (e.g., Fox et al., 2013).

However, it is possible that embodiment did occur when participants in our study played the third-person game Runescape. Several studies have recently suggested that players can embody avatars while playing third-person perspective games (e.g., Ash, 2015; Ratan & Dawson, 2015; Ratan & Sah, 2015). This embodiment may explain why participants' own sex or gender identity was not important for the occurrence self-objectification in adolescent players. If the participants in our study embodied the avatar while playing the game, the congruence of the avatar's sex with their own sex or gender identity was irrelevant as they fully adopted the avatar's sex and characteristics that are associated with the sex of the avatar in the video game. Future research is needed to explore this explanation in more detail. This research should also include more recent theoretical innovations, such as the role of avatar self-relevance (Ratan & Dawson, 2015; Ratan & Sah, 2015). Avatar self-relevance is defined as "the extent to which the avatar user perceives the avatar as relevant to the self" (Ratan & Dawson, 2015, p.3). Avatar self-relevance has been shown to moderate the influence of avatars on individuals' self-perceptions and is increased by playing with a gender congruent avatar (Ratan & Dawson, 2015; Ratan & Sah, 2015). Potentially, research that includes avatar self-relevance when studying the effect of

gender congruent sexualized avatars on self-objectification may clarify the interplay between gender congruency and sexualized avatars.

The Role of Game Frequency

Women are often sexualized in video games (Dill & Thill, 2007; Downs & Smith, 2009) and Yee and his colleagues (2011) suggested both male and female players regularly play with female avatars. We tested whether playing with a sexualized female avatar would be more influential for frequent game players as this avatar may prime self-objectification more strongly among them. Our study did not find an intensifying effect of game frequency. A potential explanation may lie in the level of sexualization attributed to the female sexualized avatar. The results of the pilot study revealed that this avatar was evaluated as moderately sexualized. The cues associated with exposure to this rather moderate sexualized female avatar were able to activate schemas relating to self-objectification. However, the cues may have not been apparent enough to activate nodes in the memory that have previously been associated with playing with a sexualized female avatar in prior game play. Future research is needed to examine this explanation.

Limitations

Several limitations warrant attention. First, a few players of RuneScape managed to reach the next level during the experimental session. In this next level, there was a chance, albeit low, of meeting sexualized human characters. The possibility remains that this has affected our findings and should be taken into account in future research. Second, the cell sizes were relatively small in more complex analyses. Future experiments should try to include more participants to increase the power of the analyses. Third, only one video game served as stimulus, which limits the generalizability of the findings (see Reeves, Yeykelis, & Cummings, in

press). Fourth, a female research assistant organized the experimental session. This set-up may have influenced our findings. Future research is therefore recommended to use same-sex researchers. Fifth, the results of our pilot study may be biased because of a gender imbalance in our sample of college students. More female than male college students rated the level of sexualization of the avatars. As prior research that used a college student sample to rate the level of sexualization in media content also often suffers from such gender imbalance (e.g., Aubrey, 2006; Vandenbosch & Eggermont, 2013), we highlight the importance for future research to take this issue into account. Lastly, although the college students in the pilot study received in-depth training on sexualization, several students appeared to be unable to rate the level of sexualization. Future research is therefore warranted to ensure the training is successful among all college students.

Conclusion

In sum, the present study showed that adolescents are at risk for the effects of video game play with a sexualized avatar. Playing a video game with a sexualized avatar was shown to increase self-objectification in boys and girls. This effect occurs regardless of the gender or gender identity of the adolescent. Moreover, this effect was also independent from adolescents' frequency of playing video games. As adolescence is a critical period for identity formation, future research is highly needed to explore how these effects may be countered.

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Footnotes

¹ We would like to thank the anonymous reviewers for their suggestions on the experiment.

