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ORIGINAL ARTICLE

The Relationship Between Online Pornography and the Sexual Objectification of Women: The Attenuating Role of Porn Literacy Education

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Media literacy interventions partly aim at preventing undesirable media effects at a later point of time. However, longitudinal research on the interaction between media literacy education and media effects is lacking. In this longitudinal study among 1,947 13–25-year-olds, we started to address this lacuna by examining the potential of porn literacy education at schools to attenuate the longitudinal relationship between exposure to sexually explicit Internet material (SEIM) and views of women as sex objects. A two-way interaction effect emerged: The relationship between SEIM and sexist views became weaker, the more users had learned from porn literacy education. No gender or age differences occurred. This study thus provides some first evidence for the role of media education in reducing undesirable media effects.

Keywords: Teenagers, Youth, Emerging Adulthood, Objectification, Media Effects.

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Studies have shown that media literacy interventions may increase media literacy (Banerjee & Kubey, 2013; Bergsma & Carney, 2008; Jeong, Cho, & Hwang, 2012). With increased media literacy education, people are better equipped to critically analyze media messages that may influence their attitudes and behaviors (Bergsma & Carney, 2008). Such an increase is particularly beneficial when individuals remain capable of acting media literate at a later point in their lives and apply their media literacy skills to process and interpret media content with potentially undesirable effects (Potter, 2004, 2010, 2013). Media literacy education is thus assumed to interact with media effects. This assumption, however, has remained understudied (for an exception, see

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e.g., McLean, Paxton, & Wertheim, 2016), although it is present in theories on media literacy (Potter, 2004).

The lack of research on how media literacy education and media effects interact is surprising given decades of research on media literacy (e.g., Jeong et al., 2012) with the aim to prevent or diminish future adversarial media effects over a prolonged period of time (Potter, 2010). The gap between research on media literacy education and research on media effects is further illustrated by the separation between studying either the effects of specific media literacy intervention on critical skills and media processing (e.g., Banerjee & Kubey, 2013; Bergsma & Carney, 2008; Jeong et al., 2012) or the effects of media content on users' well-being (e.g., Bryant & Zillman, 2002). Research on the interaction between media effects and media literacy education, however, seems essential to support media literacy education initiatives that aim at preventing unwanted media effects. Recently, the need for research on this interaction became even more prominent as scholars have started to criticize both researchers' and society's support for media literacy programs, given the unclear impact of media education on preventing future adversarial media effects (e.g., Gill, 2012).

Against this background, the major goal of the current study was to empirically test the assumed interaction between media effects and media literacy education. Specifically, we studied whether media literacy education received in school intervened in the longitudinal relationship between exposure to media messages and adversarial attitudes. Media literacy education was conceptualized as the extent to which individuals perceived that they had learned from media literacy education in high school. A naturalistic approach (i.e., a two-wave panel study with self-reported data about past experiences with media literacy education) was used to address this goal. Moreover, we included potential additional moderators, that is, age and gender, which may further affect the impact of media literacy education on the relation between media use and outcomes.

The interaction between media literacy and media effects and the role of moderators were tested with regard to a highly understudied subject: the role of porn literacy education in schools in the relationship between the use of sexually explicit Internet material (SEIM) and views of women as sex objects. As the consumption of SEIM has become part of the daily media diet of a significant number of youth and is related to (adversarial) sexual outcomes (for a review, see e.g., Peter & Valkenburg, 2016), media literacy programs have also been advised to focus on this specific type of sexual media content (Albury, 2014; Haste, 2013; Peter & Valkenburg, 2009). As research has rarely examined such porn literacy education, the present study also empirically contributes to scholarly calls for more knowledge on these trainings and their effects (Albury, 2014; Haste, 2013; Peter & Valkenburg, 2009). Overall, our study may have implications for current debates concerning the necessity of media literacy education and its role as an individual difference factor in media effects theory (e.g., how media literacy education and media use interact in the long-term impact on adolescents' well-being).

Media literacy education and media effects

In reviewing several definitions of media literacy in the literature, Jeong et al. (2012, p. 2) have recently suggested that “media literacy centers on specific knowledge and skills that can help critical understanding and usage of the media.” To acquire media literacy, schools often organize media literacy education. Specifically, this school-based media literacy education encompasses initiatives to discuss (the production of) (biased) messages in popular media content in order to advance a critical and informed media literate approach toward media messages (e.g., Jeong et al., 2012). These trainings use a variety of methods, such as informing users about biased messages in media content and the potential unwanted effects of exposure to media content (Lewis & Jhally, 1998). Intervention studies have shown that more critical attitudes toward media content are indeed formed after media literacy education (e.g., Pinkleton, Austin, Chen, & Cohen, 2013).

According to one media literacy theory, the cognitive processing model by Potter (2004), a first important process underlying media literacy includes building critical knowledge structures, competences, and skills to encode and interpret media content. Past research has heavily focused on this first process by studying how media literacy interventions affect media literacy knowledge, competences, and skills (Banerjee & Kubey, 2013; Bergsma & Carney, 2008; Jeong et al., 2012). However, as explained by Potter (2004), whereas this first process is necessary to be media literate, it does not automatically make an individual media literate. Individuals may thus demonstrate media literacy knowledge, competences, and skills, but may still be influenced by media content (Gill, 2012; Potter, 2010). A second important process therefore involves the application of what people have learned during media literacy education when they process and encode media messages. This second process may make them eventually less susceptible to adversarial outcomes from media content (Potter, 2004), a process in which media literacy education and media effects finally interact.

Interactions between media effects and media literacy education have also been suggested by media effects theories. Social cognitive theory, for instance, posits that observing a promoted view or behavior in the environment may not be adopted when such views or behaviors conflict with other cognitions of the individual (Bandura, 2001), which could include critical cognitions adopted through media literacy education. In addition, the Acquisition, Activation, or Application model (3AM; Wright, 2011) outlines that whether people acquire, activate, or apply a script after media exposure depends on many factors including the amount of critical processing as well as the functional value and plausibility attributed to the media messages. However, research investigating under which contextual factors such critical processing occurs seems to be lacking. This study contributes to these media effects theories by proposing that individual differences in experience with media literacy education may form such a contextual factor.

More precisely, research has rarely evaluated whether media literacy education attenuates undesirable media effects (e.g., Andrew, Tiggemann, & Clark, 2015;

McLean et al., 2016). In addition, research on media literacy has rarely collected longitudinal evidence of the effectiveness of media literacy education, although such education aims at reducing undesirable media effects at a later point of time. As a result, we know little about the external validity of the results of media literacy education. In this context, the present study responds to voices questioning the external validity of media literacy education in countering unwanted media effects (see for instance Gill, 2012, regarding media effects on the sexual objectification of women). Intervention studies have also speculated about this protective influence, but have not empirically substantiated it. For instance, Austin and colleagues reported that their media literacy intervention reduced the strength of the relationship between the perceived desirability of media portrayals on smoking and outcomes relevant to smoking (Austin, Pinkleton, & Funabiki, 2007). They wondered whether the reduced strength of the studied media effect relationship would last over time, thus preventing harmful effects of smoking ads in the future (Austin et al., 2007). To our knowledge, empirical research that would test, and potentially support, this reasoning is lacking. Trying to address this gap in the literature, we focused on the interplay between exposure to SEIM, views of women as sex objects, and porn literacy education received during (secondary) school.

SEIM, women as sex objects, and porn literacy education

Popular media in general and pornographic media in particular have been criticized for advocating sexist views toward women (e.g., Fredrickson & Roberts, 1997; Wright & Donnerstein, 2014). Advertisements, television shows, magazine articles, and social media content regularly present women as decorative objects whose appearance is their most valuable asset (Vandenbosch, 2017). By frequently presenting women in revealing attire, popular media content not only invites other (male) media characters to gaze at women's body, but invites media users to do the same (Fredrickson & Roberts, 1997; Vandenbosch, 2017). Sexually explicit media also tend to promote women's role as sex objects for male pleasure (Wright & Donnerstein, 2014), perhaps even more so than general entertainment media. Several content analyses have consistently shown that women are often portrayed as sex objects in pornographic content (e.g., Gorman, Monk-Turner, & Fish, 2010; Klaassen & Peter, 2015). More specifically, a content analysis of bestselling and most-rented pornographic videos has found that more than one out of 10 scenes showed male ejaculation on female's body or face (Bridges, Wosnitzer, Scharrer, Sun, & Liberman, 2010). Such portrayal of the male orgasm is believed to express the objectification of women (Bridges et al., 2010; Schauer, 2005).

One theoretical framework that may explain how portrayals of women as sex objects may trigger viewers to adopt similar objectified views toward women is Bandura's (2001) social cognitive theory. This theory posits that when attractive role models show rewarded behavior, individuals' beliefs, attitudes, and behaviors are likely to change in accordance with the modeled behavior (Bandura, 2001). The 3AM (Wright, 2011) further builds on social cognitive theory and proposes that pornographic

messages may teach users about commonly accepted practices and rules for behavior in sexual interactions. These guidelines are organized within one's memory in a so-called *script*, which guides behavior. When repeatedly watching sexual media portrayals, new sexual scripts may be acquired, existing scripts may be activated, and eventually be applied (Wright, 2011).

Several longitudinal studies have supported the theoretical propositions made by social cognitive theory and the 3AM, showing that repeated exposure to pornography is related to an overall view of women as sex objects among adolescents (Peter & Valkenburg, 2009; Ward, Vandenbosch, & Eggermont, 2015). In a three-wave panel study among Dutch adolescents, Peter and Valkenburg (2009), for instance, reported that exposure to online pornography among adolescents positively predicted their notions of women as sex objects 6 months later. Cross-sectional research has found that the use of pornography positively predicted notions of women as sex objects among American male college students (Wright & Tokunaga, 2016), as well as among Japanese male and female college students (Omori, Zhang, Allen, Ota, & Imamura, 2011).

Similar results have been reported in experimental studies studying sexual media effects among young adults (e.g., MacKay & Covell, 1997; Mayerson & Taylor, 1987; Wright, Arroyo, & Bae, 2015). One study, for instance, exposed a group of college women to *Playboy* centerfolds that varied in the degree to which the women were scantily dressed. The study revealed that the more revealing the attire of the women was, the more the script that men are allowed to objectify women (i.e., apply a gaze to evaluate women's body) was activated among participants (Wright et al., 2015). Finally, a recent review on adolescents' use of online sexually explicit material has noted that research has produced several inconsistent findings for the relationship between online pornography and gender-stereotypical beliefs about women's sexual role (Peter & Valkenburg, 2016). However, findings on a positive association between adolescents' use of SEIM and the more specific concept of women as sex objects have been consistent, both cross-sectionally and longitudinally (Peter & Valkenburg, 2007, 2009).

The results on the relationship between SEIM use and views of women as sex objects warrant scholarly attention (Peter & Valkenburg, 2009). Views of women as sex objects typically include an instrumental interpretation of women's role in a society and may reduce them into objects of sexual gratification (Fredrickson & Roberts, 1997). These views form the basis for the benevolent and hostile sexism that continue to affect females of all ages negatively (Fredrickson & Roberts, 1997; Phipps, Ringrose, Renold, & Jackson, 2017). The persistent presence of the objectification of women in contemporary societies may further contribute to girls' and women's disproportionate suffering from mental health disorders, including eating disorders, depression, and sexual dysfunction (Fredrickson & Roberts, 1997, p. 173; for a review see Moradi & Huang, 2008).

Accordingly, media literacy interventions have been recommended to address unwanted (indirect) outcomes of SEIM exposure (Peter & Valkenburg, 2009). When

such interventions deal with pornography, they are called porn literacy education. Porn literacy education aims to increase awareness and an informed view of the goals and representations of sexual interactions in pornography (Albury, 2014). Such trainings are also typically organized within an educational context in which caregivers discuss pornographic content with pupils (i.e., porn literacy education; Albury, 2014). Porn literacy education may sensitize adolescents and young adults to how sexual behavior in relation to gender is represented in sexually explicit media content (Albury, 2014; Haste, 2013), for instance, by explaining that pornographic content is mainly produced by male directors and largely targeted at a male audience. Moreover, porn literacy education may draw individuals' attention to the often unrealistic and sometimes degrading nature of the portrayal of sexual events in pornographic content (Bengry-Howell, 2012; Haste, 2013). At the same time, porn literacy education may stimulate an open discussion about the entertaining and sexually gratifying role of pornography (Albury, 2014; Bengry-Howell, 2012; Haste, 2013). Porn literacy education may thus counter the processes that usually occur while watching pornography, such as the development of cognitions or scripts regarding the rewarding of certain behaviors (see social cognitive theory and the 3AM), and, as such, reduce the effects that exposure to pornography may have over time.

In contrast to media literacy education about mainstream media, porn literacy education is unlikely to use actual examples of pornographic content during the training and will never include the production of one's own media content (Albury, 2014). Educational materials that can be used are, for instance, videos that contain a (humorous) critical discussion of how sexual interactions are represented in pornography (Albury, 2014). Vivid (socially provoking or inappropriate) descriptions of previously seen pornographic scenes are sometimes shared by participants during such trainings (Haste, 2013). Furthermore, porn literacy education is often part of broader sexual health education programs (Albury, 2014) that aim to socialize adolescents toward a healthy, intimate, and rewarding sexuality. Haste (2013, p. 524) has called porn literacy even an "unavoidable feature of sex education" because (male) adolescents' SEIM use typically is a part of their developing sexuality. However, as porn literacy education is often not a formal part of sex education (Albury, 2014; Haste, 2013), important variations can emerge in the extent to which individuals have received porn literacy education in the past. Moreover, variations can emerge in the extent to which individuals learn from porn literacy education (Haste, 2013). How much people have learned from porn literacy education during their school years may therefore be an important individual difference variable.

In sum, research has described the relationship between exposure to SEIM and notions of women as a sex object as an unwanted media effect-relationship. Porn literacy education may be a tool to prevent this unwanted media effect. To address this particular suggestion, and the more general assumption that media literacy may prevent unwanted media effects, we aimed to study whether the extent to which individuals have learned from porn literacy education would predict decreases in the

long-term positive association between watching SEIM and adolescents' and young adults' notions of women as sex objects (H1).

Gender and developmental status as moderators

Social cognitive theory posits that the relation between an individual's environment (e.g., the use of SEIM) and his/her own cognitions may change depending on personal characteristics (Bandura, 2001). The 3AM model also notes that audience characteristics may change how users respond to sexual media messages (Wright, 2011). Finally, Potter's theory (2004) proposes that differences in individuals' prior experiences influence how media literacy interacts with media exposure. Together, these theories thus suggest that media literacy education may work differently for different media users. As outlined before, we conceptualize the extent to which individuals have learned from porn literacy education as an individual difference factor. However, the workings of this factor may further depend on other factors, such as age and gender.

Gender

Males have consistently been found to agree more often with traditional sexual gender stereotypes than females do (e.g., Vandenbosch & Eggermont, 2012). In addition, boys evaluate sexual messages in media content as more desirable and rate them as more accurate than girls do (Austin et al., 2015). Studies have also reported that exposure to sexually oriented media content is more likely to influence boys' and men's notions of women as sex objects as opposed to girls' and women's notions (Dill, Brown, & Collins, 2008; Lanis & Covell, 1995). In this context, Austin et al. (2015) suggested that sexual media literacy education may be especially effective in reducing the influence of sexual media use among males. Such influence of sexual media literacy education may be even more pronounced for SEIM, which males use more often than females (Peter & Valkenburg, 2011, 2016). At the same time, educators have pointed out that boys often respond "immaturely" to general sexual health education and may be unwilling to participate in programs designed to reflect on a healthy sexuality (Haste, 2013). As a result, boys may learn less from porn literacy education than girls do. However, the media literacy approach that boys do learn during these classes may impact them more strongly than their female classmates (Austin et al., 2015).

Overall, research suggests that boys may benefit more from porn literacy education than girls. Therefore, we hypothesized that the relationships between SEIM use, porn literacy education, and notions of women as sex objects would be stronger for male individuals than female individuals (H2).

Developmental status

There is reason to expect that adolescents and young adults differ in the influence that porn literacy education exerts. Adolescents may benefit more from porn literacy education than adults, for two reasons. First, as opposed to adults, adolescents are believed to have less critical processing skills and to react with more curiosity when facing sexual issues than young adults do (Miller & Benson, 1999; Ward, 2003). These

developmental differences suggest that adolescents are more susceptible to media literacy education when it comes to increasing resilience against the effects of SEIM. Emerging adults, in turn, may have developed critical skills toward SEIM beyond what they had learned in high school. Consequently, media literacy education may have a lower impact on emerging adults' resilience against influences of SEIM.

A second, and related, reason for a stronger influence of porn literacy education among adolescents comes from theoretical work on activation recency. By definition, the porn literacy education that adolescents receive in school has taken place more recently than that of (young) adults. The recency of training-related cognitions will thus make them more accessible and increase their likelihood of becoming activated when necessary (e.g., Bargh, Bond, Lombardi, & Tota, 1986). As a result, more recently received school-based porn literacy education may play a greater role in the relation between repeated SEIM use and sexual attitudes among adolescents than among emerging adults. As emerging adults received their training several years ago (assuming they did receive it), porn literacy may be less likely activated when they consume SEIM. This expectation of a recency effect also merges with intervention studies that have pointed to the decreasing impact of media literacy education over time (e.g., Austin & Johnson, 1997; Bird, Halliwell, Diedrichs, & Harcourt, 2013).

A recency effect may also explain why two of the few studies that examined the role of media literacy for short-term media effects found inconsistent results (e.g., Andrew et al., 2015; McLean et al., 2016). An experimental study among college women showed that media literacy did not interact with the short-term adversarial effect of exposure to mediated body ideals on body image (Andrew et al., 2015). However, an experimental study among early adolescent girls (McLean et al., 2016) found that media literacy protected girls from being dissatisfied about their body after exposure to mediated body ideals.

In sum, several lines of research suggest developmental-status differences and overall hint at the hypothesis that adolescents may benefit more from media literacy. To test this hypothesis, a last goal was to examine the prediction that the relationships among use of SEIM, porn literacy education, and notions of women as sex objects would be stronger for adolescents than emerging adults (H3).

Methods

Sample and procedure

The data that were used in the current study were part of a larger project on sexual media use among adolescents and emerging adults. Within this project, a two-wave panel study was fielded in the spring of 2015 with a short time interval of 2-months (see also van Oosten & Vandenbosch, 2017).¹ The time interval was chosen based on prior longitudinal research studying media effects (e.g., Gentile, Walsh, Ellison, Fox, & Cameron, 2004). Information about the online survey was provided to the young adults, adolescents, and parents of the adolescents. Participants were informed that the questionnaire included questions about their sexuality and their media

use. Parental consent was received from the parents of the adolescent participants. Both adults and adolescents were asked for informed consent each time before filling in the online questionnaire. The estimated duration for completing a survey was 20–30 minutes. We collaborated with the Dutch research bureau Veldkamp to randomly invite adolescents and young adults to participate by email. Participants were sampled from an existing online access panel that is representative of the Dutch adolescent and young adult population. The random sampling procedure reduces the self-selection bias in our sample.

At baseline, 1,213 adolescents (13–17 years old; response rate = 68%) and 1,173 young adults (18–25 years old; response rate = 47%) participated. Based on a comparison between our sample and the Dutch population, our sample in the first wave was comparable to the Dutch population. Almost 78.8% of the parents of the participants had obtained a higher degree than secondary education (73% for the Dutch population have a higher degree; CBS, 2014). Half of the participants (51.6%) were female (48.9% of the Dutch individuals are women). Two months later, 1,008 adolescents and 950 young adults participated again (attrition rate adolescents = 16.9%; attrition rate young adults = 19.1%).

A total of 1,947 respondents provided valid information on the variables used for the current study (1,007 adolescents and 940 young adults). Among adolescents, the mean age was 14.89 ($SD = 1.89$), and 22.34 ($SD = 2.07$) among young adults. Half of the respondents (48.3%) were male (adolescents 51.6%; young adults 44.7%). The majority of the sample (90.7%) had an exclusively heterosexual orientation (adolescents 93.1%; young adults 88.1%). A multivariate analysis of variance (MANOVA) using Pillai's trace showed no differences between those who participated in both waves and those who dropped out regarding age, gender, sexual orientation, use of SEIM, views of women as sex objects, and porn literacy education after Time 1, $V = .001$, $F(6, 2,379) = .57$, $p = .754$, $\eta_p^2 = .001$.

Measures

Gender, age, and sexual orientation

Participants reported their gender (1 = *male*, 2 = *female*) and age. For descriptive analyses, age was recoded into adolescents (<18 years old) and young adults (≥ 18 and <26 years of age). Participants also indicated the gender of the partners to whom they felt sexually attracted (Kinsey, Pomeroy, & Martin, 1948): *only to boys* (=1), *mainly to boys, but also to girls* (=2), *equally to boys and girls* (=3), *mainly to girls, but also to boys* (=4), or *only to girls* (=5). The latter response options were recoded to create a dichotomous variable "sexual orientation" with the codes: 1 (=not exclusively heterosexual) and 2 (=exclusively heterosexual). The relevant descriptives of this measure, and all other measures described below, can be found in Table 1.

Use of SEIM

This measure was adopted from Peter and Valkenburg (2008, p. 585). The time interval of the consumption of SEIM was changed to be applicable to the present study

Table 1 Descriptive Statistics (N = 1,947)

M (SD) or %	Range	All	Females	Males	Adolescents	Adults
1. Age T1	13–25	18.49 (4.12)	18.85 (4.19)	18.10 (4.01)	14.89 (1.43)	22.34 (2.07)
2. Gender T1	1–2	48.3%	—	—	51.6%	44.7%
3. Sexual orientation T1	1–2	90.7%	89.3%	92.2%	93.1%	88.1%
4. SEIM T1	1–7	1.86 (1.42)	1.31 (.72)	2.44 (1.72)	1.75 (1.36)	1.97 (1.47)
5. Porn literacy education T1	1–7	3.66 (1.66)	3.60 (1.66)	3.73 (1.66)	3.97 (1.68)	3.33 (1.57)
5. Women as sex objects T1	1–7	3.29 (1.21)	3.05 (1.18)	3.54 (1.20)	3.07 (1.21)	3.51 (1.17)
6. Women as sex objects T2	1–7	3.26 (1.21)	2.98 (1.13)	3.56 (1.22)	3.07 (1.25)	3.46 (1.13)

Note: Gender was coded as 1 = male, 2 = female; Sexual orientation was coded as 1 = not exclusively heterosexual, 2 = exclusively heterosexual. SEIM = sexually explicit Internet material.

(2 months instead of 6 months). In particular, we asked how frequently adolescents had (intentionally) consumed, during the last 2 months, the following material on the Internet: (a) pictures with clearly exposed genitals, (b) videos with clearly exposed genitals, (c) pictures in which people are having sex, (d) or videos in which people are having sex. A response scale with the categories *never* (=1), *less than once a month* (=2), *once a month* (=3), *multiple times a month* (=4), *once a week* (=5), *multiple times a week* (=6), and *daily* (=7) was used. A mean score was created for the included items as principal component analysis (PCA) showed the four items loaded higher than .40 on one factor (Time 1 eigenvalue = 3.43, explained variance = 85.64%, $\alpha = .94$). The variable “use of SEIM” showed higher scores when the participant used SEIM more frequently.

Porn literacy education

As mentioned above, sexual education classes can, but do not necessarily have to, include porn literacy education. Moreover, as porn literacy trainings are usually interwoven in the general sex education classes, respondents may not recall these trainings as distinct porn literacy education. We therefore refrained from directly measuring frequency of porn literacy education. Instead, we focused on measuring the extent to which participants had learned about sexually explicit material in their sex education classes, as learning about SEIM from these classes implies having received porn literacy education.

In this measure, we followed a two-step procedure. Participants were asked first whether they had received classes about relationship formation and sexual topics during secondary school. This question was asked to determine who was eligible to respond to the question about porn literacy education as the youngest participants in our sample may have not yet participated in a class on sexuality (and thus also may have not received porn literacy education). Second, participants who indicated having participated in classes about sex and relationships were asked to evaluate on a response scale ranging from *totally not true* (=1) to *totally true* (=7) the proposition that these classes had taught them something about the use of sexually explicit images and movies on the Internet. The higher participants scored on this measure, the more they perceived that they had learned about Internet pornography in the sexual education classes in school. Participants who had *not* received a class on relationship formation and sexual topics ($n = 132$) automatically received the code *totally not true* (=1) as they had never participated in a class about any sexual issue during secondary school and thus could not have received porn literacy education at school.²

Views of women as sex objects

Participants rated their level of agreement with four items from Peter and Valkenburg's adjusted version (2007) of Ward's scale (2002) by using a response scale ranging from *totally not true* (=1) to *totally true* (=7). Due to space constraints, only the four items with the highest factor loadings (>.70) in a recent study by van

Oosten, Peter, and Boot (2015) were selected. An example item is “An attractive woman should expect sexual advances.” A mean score was created for the included items as PCA showed the four items loaded higher than .40 on one factor (Time 1 eigenvalue = 2.28, explained variance = 57.07%, $\alpha = .74$; Time 2 eigenvalue = 2.36, explained variance = 58.87, $\alpha = .76$). The resulting variable “women as sex objects” showed higher scores when the participant agreed more strongly with views of women as sex objects.

Analytical strategy

To explore the relationship between SEIM use and views of women as sex objects, a multiple linear regression analysis was performed.³ Gender, age, sexual orientation, and the Time 1 variable of views of women as sex objects were entered as control variables in line with prior research on SEIM use (e.g., Vandenbosch & Peter, 2016). The use of SEIM at Time 1 was entered as the predictor of views of women as sex objects at Time 2.

Next, Hypotheses 1–3 were tested. When testing interaction effects, all predictors were centered (except for the binary variables) and interaction variables of the centered versions of the predictors were created (Dalley & Buunk, 2009; Dawson, 2014). A total of three regression analyses including interaction effects were performed. These regression analyses all included gender and sexual orientation, and the centered versions of age, use of SEIM, and notions of women as sex objects, at Time 1. For all regression analyses, 95% bias-corrected bootstrapped confidence intervals were checked (1,000 bootstrap samples) to test the robustness of the significance tests based on normal test theory, although the normality distribution was not violated according to Kline (2011). Furthermore, simple regression slopes of the MODPROBE model (Hayes & Matthes, 2009) were retrieved to interpret significant interaction effects.

Results

Descriptive statistics

A total of 823 participants indicated having consumed SEIM during the last 2 months (42.3% score higher than *never*). Most of these participants ($n = 530$, 27.3% score higher than *never* but lower than *multiple times a month*) had consumed SEIM once or less than once a month. Furthermore, 293 participants indicated having consumed SEIM more than once a month (15% score equal to or higher than *multiple times a month*).

Table 2 shows the zero-order correlations between the relevant variables. A MANOVA analysis using Pillai's trace indicated differences between males and females regarding use of SEIM at Time 1, views of women as sex objects at Times 1 and 2, and porn literacy education at Time 1, $V = .177$, $F(4, 1942) = 104.41$, $p < .001$, $\eta_p^2 = .177$. Univariate analyses of variance (ANOVAs) further showed that males scored higher than females on the use of SEIM at Time 1, $F(1, 1945) = 368.33$,

Table 2 Zero-Order Correlations ($N = 1,947$)

	Zero-order correlations						
	1	2	3	4	5	6	7
1. Age T1	1.00	.09**	-.10**	.10**	-.21**	.18**	.16**
2. Gender T1		1.00	-.05*	-.40**	-.04	-.20**	-.24**
3. Sexual orientation T1			1.00	-.09**	.06**	.03	.04
4. SEIM T1				1.00	-.02	.30**	.28**
5. Porn literacy education T1					1.00	.11**	.06*
6. Women as sex objects T1						1.00	.65**
7. Women as sex objects T2							1.00

Note: Gender was coded as 1 = male, 2 = female; Sexual orientation was coded as 1 = not exclusively heterosexual, 2 = exclusively heterosexual. SEIM = sexually explicit Internet material.

* $p < .05$. ** $p < .01$.

$p < .001$, and views of women as sex objects at Times 1 and 2, $F(1, 1945) = 81.61$, $p < .001$, $F(1, 1945) = 116.46$, $p < .001$. No significant difference occurred for porn literacy education at Time 1, $F(1, 1945) = 1.86$, $p = .173$.

In addition, differences for these variables occurred between adolescents and young adults, $V = .073$, $F(4, 1942) = 38.137$, $p < .001$, $\eta_p^2 = .073$. Univariate ANOVAs showed that young adults scored higher than adolescents on the use of SEIM at Time 1, $F(1, 1945) = 12.71$, $p < .001$, and views of women as sex objects at Times 1 and 2, $F(1, 1945) = 66.31$, $p < .001$, $F(1, 1945) = 52.63$, $p < .001$, but lower on porn literacy education at Time 1, $F(1, 1945) = 58.93$, $p < .001$.

SEIM, women as sex objects, and media literacy education

First, we tested whether exposure to SEIM would relate to a stronger acceptance of views of women as sex objects over time (see Table 3, Model 1). The model explained 44% of the variance. Use of SEIM at Time 1 ($p < .01$) predicted views of women as sex objects at Time 2.

Hypothesis 1 posited that porn literacy education would relate to a decrease in the relationship between exposure to SEIM and the acceptance of views of women as sex objects (see Table 3, Model 2). In line with hypothesis 1, the interaction effect between use of SEIM and porn literacy education ($p < .05$) was significant. To interpret the interaction effect, three simple slopes of the predictive value of SEIM use were calculated. The first slope showed a positive relationship with SEIM use when the moderator had a *centered mean* value (unstandardized $B = .05$, $SE = .02$, $t = 2.82$, $p < .005$). The second slope was one standard deviation (*SD*) above the centered mean of the moderator and had a substantially lower value than the first slope: SEIM did not predict notions of women as sex objects among individuals who had learned extensively from porn literacy education ($B = .01$, $SE = .02$, $t = 0.47$, $p = .64$). The final slope was one *SD* under the centered mean of the moderator. The value of this slope was higher

Table 3 Regression Analyses to Predict Views of Women as Sex Objects 2 Months Later (*N* = 1,947)

	Model 1			Model 2			Model 3			Model 4		
	Unstandardized			Unstandardized			Unstandardized			Unstandardized		
	B	SE	Beta	B	SE	Beta	B	SE	Beta	B	SE	Beta
Constant	1.17***	.15	—	3.52***	.10	—	3.53***	.10	—	3.56***	.10	—
Gender T1 (ref girls)	-.24***	.05	-.10	-.24***	.05	-.10	-.24***	.05	-.10	-.24***	.05	-.10
Age T1	.02**	.01	.06	.02**	.01	.05	.02**	.01	.06	.02**	.01	.06
Sexual orientation T1 (ref hetero)	.11	.07	.03	.11	.07	.03	.11	.07	.03	.09	.07	.02
Views of women as sex objects T1	.60***	.02	.60	.60***	.02	.60	.60***	.02	.60	.59***	.02	.59
SEIM T1	.05**	.02	.06	.05**	.02	.05	.06	.05	.07	.05**	.02	.06
Porn literacy education T1	—	—	—	-.00	.01	.00	-.03	.04	-.04	.00	.01	.00
SEIM T1 × Porn literacy education T1	—	—	—	-.02 *	.01	-.04	.01	.03	.01	-.03**	.01	-.06
SEIM T1 × Moderator	—	—	—	—	—	—	-.01	.04	-.02	-.01**	.00	-.05
Porn literacy education × Moderator	—	—	—	—	—	—	.01	.03	.03	.01**	.00	.03
SEIM T1 × Porn literacy education	—	—	—	—	—	—	-.02	.03	-.05	-5.07	.00	-4.00
T1 × Moderator												
F-value	<i>F</i> (5, 1941) = 303.34***			<i>F</i> (7, 1939) = 218.05***			<i>F</i> (10, 1936) = 152.63***			<i>F</i> (10, 1936) = 154.60***		
Adjusted R ²	.44			.44			.44			.44		
Unadjusted R ² change	.002*			.002*			.002*			.00		

Note: Moderator in Model 3 is gender and in Model 4 is age. SEIM = sexually explicit Internet material. **p* < .01. ***p* < .01. ****p* < .001.

than the slope for individuals with moderate levels of porn literacy education and particularly higher than the second slope for individuals with high levels of porn literacy education ($B = .08, SE = .02, t = 3.80, p < .001$). Together, these results suggest that the strength of the positive relationship between SEIM use and views of women as sex objects decreased when the intensity of porn literacy education increased. Hypothesis 1 was thus supported.

Gender and developmental status

Hypothesis 2 predicted that gender would further moderate the relation between SEIM use and porn literacy education (see Table 3, Model 3). The three-way interaction effect between SEIM use, porn literacy education, and gender was not significant. Males and females thus did not differ in the influence that porn literacy education had on the relation between SEIM use and notions of women as sex objects.

Hypothesis 3 predicted a three-way interaction effect between age, SEIM use, and porn literacy education (see Table 3, Model 4). This was not the case. We thus found no differences between adults and adolescents regarding the combined role of SEIM use and porn literacy education in predicting views of women as sex objects.

Discussion

The current study aimed to bring together research on media effects and on media literacy education in a hitherto hardly tested combination with a focus on an understudied issue (i.e., the role of porn literacy education in the influence of porn consumption over time). In most studies on media literacy, the assumption that media literacy education affects future adversarial media effects is strongly present, but highly understudied. This gap has led scholars to challenge the assumption (e.g., Gill, 2012) and called for a better understanding of the interplay between media effects and media literacy education over time.

The present study initially addressed this lacuna in the field and suggests that media literacy education may attenuate potentially unwanted media effects over time. More precisely, the extent to which adolescents and young adults had learned about porn in their sex education in school appeared to moderate the relation between young people's SEIM use and notions of women as sex objects. Individuals who learned from porn literacy education at schools showed no relationship between SEIM use and notions of women as sex objects. In contrast, such a relationship between SEIM use and notions of women as sex objects did emerge for individuals who indicated that they learned little to nothing at school about the use of SEIM. This relationship was similar among males and females as well as among adolescents and young adults.

Our findings add some initial external validity to the conclusions of intervention studies (e.g., Pinkleton et al., 2013), namely that media literacy education may be a useful approach to increase resilience toward potentially problematic (sexual) media

effects. Moreover, they provide a tentative answer to the questions of researchers on the longer-term implications of media literacy trainings (e.g., Potter, 2010). In line with earlier studies (Peter & Valkenburg, 2007, 2009), we found that the more individuals used SEIM, the more they adopted notions of women as sex objects. This relation was less distinct for those who had learned more from porn literacy education. Our finding suggests that the tools individuals developed during porn literacy education were applied when watching SEIM and helped the users to interpret the content shown in SEIM (Potter, 2004).

Our results thus point to the potential of porn literacy education to diminish the strength of the relationship between SEIM use and stereotypical sexual attitudes. Gill (2012) raised the issue of whether the influence of media literacy education on overcoming sexual media effects may be overestimated. She emphasized that research should not take such influence of media literacy education as self-evident and called for longitudinal studies (Gill, 2012, p. 740). In her own research, she found that adolescent girls who were capable of critically discussing sexually oriented media content indicated that popular media still influenced their thoughts and emotions. As a result, she suggested that adolescents may not necessarily be immune to the influence of sexual media exposure even if their critical skills to process sexual media messages may increase after training. Prior research already showed that sexual media literacy interventions increase adolescents' media literacy (e.g., Austin et al., 2015). However, no study to date has examined the role of participation in such interventions in the development of media effects over time, with Gill's critical question (2012) having been unaddressed. For the relationship between SEIM use and notions of women as sex objects, our results showed that porn literacy education may have this capacity of preventing unwanted media effects.

The similar results for boys and girls suggest that porn literacy education is equally effective in training the skills of both groups. Also, although adults showed lower levels of porn literacy education than adolescents, porn literacy education did not differ in its impact on the link between SEIM use, and notions of women as sex objects. This finding hints at the idea that the porn literacy education received during secondary school is still effective during emerging adulthood. Influences of recency activation thus do not seem to apply for the period between adolescence and emerging adulthood. At the same time, our finding also suggests that developmental differences between adolescents and emerging adults play no role in the extent to which porn literacy education relates to the link between SEIM use and views of women as sex objects. The developmental literature (Miller & Benson, 1999; Ward, 2003) has put forward the idea that adolescents' still ongoing cognitive development is related to reduced critical skills. In this view, the benefits of following a media literacy intervention would be greater for adolescents than for young adults. Our findings tentatively suggest that this is not the case although an intervention study comparing the direct effect of media literacy trainings between adolescents and emerging adults is needed to further substantiate this suggestion with empirical evidence. Moreover, research

focusing on other sexual attitudes or behaviors that refer to, for instance, more advanced sexual experiences may still find substantial developmental differences.

Our study is a first step into demonstrating the external validity of media literacy education. However, it deals with only one specific type of sexual content, SEIM, and one outcome, notions of women as sex objects. We focused on women as sex objects as this is a frequently studied outcome of SEIM use (Peter & Valkenburg, 2016) and at the same time seems to be a main focus of sexual media literacy education (Bengry-Howell, 2012). However, future research should further explore the external validity of the role of media literacy education for other types of sexual media content and other outcomes.

Future research also needs to consider several limitations of the current study. First, the study was done in the Netherlands. The Netherlands is known as rather liberal in terms of sexual matters (e.g., Schalet, 2000; Ševčíková, Šerek, Barbovski, & Daneback, 2014), which may have influenced how porn literacy education was organized in the schools as well as the content and format chosen. The liberal context may have facilitated students' ability to speak freely about the subject and to ask questions. Moreover, the Dutch cultural context may have affected adolescents' and young adults' willingness to adopt, and reflect on, the knowledge discussed during the classes. Cross-cultural research is needed to examine this issue.

Second, we used a general and subjective self-report measure of porn literacy education. As a result, we do not know what the exact content was of the porn literacy education. Also, it is unclear whether the participants who indicated that they had learned extensively from such education received more or better porn literacy education than others, paid more attention to such education than others, or are biased in their memory of what they learned about porn from sexual education in school. Moreover, social desirability biases in the self-reported answers may have affected our findings. Anonymity and confidentiality measures are known to reduce this bias, but may not fully eliminate it (Meston, Heiman, Trapnell, & Paulhus, 1998). Prior research among young adults, however, noted that the bias seems to be rather small (Meston et al., 1998). Taking these limitations into consideration, this study should not be considered proof of the effectiveness of porn literacy education in school, because this would require a longitudinal experimental design testing the effectiveness of specific interventions over time. The present study should instead be considered a first step in increasing our knowledge on whether receiving sexual education in school that deals with pornographic content can have an impact on the extent to which porn influences people over time.

This study will hopefully spark future research on detailed measures of the characteristics of the received porn literacy education (e.g., whether it focused on increasing knowledge and/or increasing critical skills and capacities) as well as additional measures on cognitive, behavioral, and affectionate outcomes related to porn literacy (Potter, 2013). Such research may further explain *why* the influence of porn literacy education in our study occurred and on which components future interventions

should focus. More specifically, such research may clarify why and when the individuals in our study indicated to have learned more or less intensively from porn literacy education. In addition, such research can further capture the individual variance in cognitive processes underlying media literacy.

Third, the results need to be interpreted by taking into account that adolescents and adults did *not* overall hold the notion that women are sex objects. The interaction effect also added only a rather small amount of explained variance to our model. Future research may test whether porn literacy education may especially be needed in groups of individuals characterized by high scores on gender stereotypes, such as hyper gender individuals. Fourth and finally, a 2-month time interval was used in the current study and, as such, we cannot determine how media literacy training may affect the relationship between pornography use and adolescents' and adults' views of women as sex objects that develops over a longer period.

In sum, the current longitudinal study underlines the role of porn literacy education in reducing the relation between SEIM use and views of women as sex object. Moreover, males and females equally benefit from porn literacy education. The impact of these classes seems to remain effective when adolescents grow older.

Notes

- 1 The data of this two-wave panel study have also been used in other papers of the authors. These papers can be acquired by sending an email to the first author.
- 2 Additional multiple hierarchical regression analyses were performed for the sample that excluded the 132 participants who had not received sexual health education ($n = 1,815$). The results for Model 2 $F(7, 1,807) = 206.94, p < .001, R^2 = .44$, Model 3 $F(10, 1,804) = 144.77, p < .001, R^2 = .44$, and Model 4 $F(10, 1,804) = 146.83, p < .001, R^2 = .45$ appeared to be similar to the reported results in Table 3.
- 3 Additional multiple linear regression analyses testing two-way interaction effects between SEIM use at Time 1 and gender as well as age indicated that not gender but age moderated the relationship between SEIM use at Time 1 and views of women as sex objects at Time 2, $p < .05$. The simple slopes analyses of the predictive value of SEIM use indicated a positive and significant relationship with SEIM use among late adolescents and early young adults. The predictive value of SEIM was also significant and even stronger among early and middle adolescents. Lastly, SEIM use had no predictive role among the oldest young adults. These results suggest that the relationship between SEIM use and views of women as sex objects decreased in strength with increasing age.

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