

ORIGINAL ARTICLE

Adolescents' Exposure to Sexually Explicit Internet Material and Notions of Women as Sex Objects: Assessing Causality and Underlying Processes

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The aim of this study was to clarify causality in the previously established link between adolescents' exposure to sexually explicit Internet material (SEIM) and notions of women as sex objects. Furthermore, the study investigated which psychological processes underlie this link and whether the various influences varied by gender. On the basis of data from a three-wave panel survey among 962 Dutch adolescents, structural equation modeling initially showed that exposure to SEIM and notions of women as sex objects had a reciprocal direct influence on each other. The direct impact of SEIM on notions of women as sex objects did not vary by gender. However, the direct influence of notions of women as sex objects on exposure to SEIM was only significant for male adolescents. Further analyses showed that, regardless of adolescents' gender, liking of SEIM mediated the influence of exposure to SEIM on their beliefs that women are sex objects, as well as the impact of these beliefs on exposure to SEIM.

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A small but consistent body of research from various parts of the world has shown that a considerable number of adolescents have contact with sexually explicit Internet material (SEIM; Flood, 2007; Lo & Wei, 2005; Peter & Valkenburg, 2006a; Wolak, Mitchell, & Finkelhor, 2007). Evidence has also emerged that adolescents' exposure to such material is related to a number of sexual attitudes and cognitions (Lo & Wei, 2005; Peter & Valkenburg, 2006b, 2008a, 2008b). More specifically, a recent study has demonstrated that adolescents are more likely to believe that women are sex objects when they use SEIM more often (Peter & Valkenburg, 2007). The study initially supports what both journalists and scholars have recently articulated—that sexual media content may play an important role in the objectification of women

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(e.g., American Psychological Association Task Force on the Sexualization of Girls, 2007; Levy, 2005; Paul, 2005; Ward, 2002; Ward & Friedman, 2006).

However, three shortcomings limit the use of Peter and Valkenburg's (2007) study for our understanding of how SEIM contributes to adolescents' beliefs that women are sexual objects. The first shortcoming of Peter and Valkenburg's study concerns the unclear causal direction between adolescents' exposure to SEIM and notions of women as sex objects. The authors emphasized that the study's cross-sectional design did not permit internally valid conclusions about (a) whether exposure to SEIM causes notions that women are sexual objects; (b) whether adolescents who hold such notions are particularly attracted to SEIM; or (c) whether exposure to such material and notions of women as sex objects are reciprocally related to each other. Therefore, the first goal of this study is to investigate, in a longitudinal design, the causal nature of the relation between exposure to SEIM and beliefs that women are sex objects.

A second problem in Peter and Valkenburg's (2007) study refers to its focus on direct relations between adolescents' exposure to SEIM and notions of women as sex objects. A focus on direct relations characterizes most of the studies on the effects of sexual media content on adolescents (for a review, see Ward, 2003) and is a necessary first step in emerging research fields. However, an exclusive preoccupation with direct relations between SEIM and, for instance, notions of women as sex objects may neglect important indirect relations between the two variables. More importantly, when we focus only on direct relations, we are not able to investigate how and why two variables are related. Therefore, the second goal of this study is to initially assess the processes that may underlie the relation between adolescents' exposure to SEIM and their notions of women as sex objects.

A third problem in Peter and Valkenburg's (2007) investigation concerns the role of gender. The authors found that adolescents' gender did not moderate the strength of the association between exposure to SEIM and beliefs that women are sex objects. Although research on the effects of sexually explicit material on adults has produced similar results (Zillmann & Bryant, 1982, 1988), the finding is at odds with several studies that have shown that mainstream sexual media content affects male and female adolescents differently (for a review, see Ward, 2003). Given requests for a stronger focus on the moderating influence of gender on the effects of sexual media content (e.g., Ward, 2003), the third goal of this study is to reinvestigate whether a potential relation between exposure to SEIM and notions of women as sex objects differs between male and female adolescents.

Following Fredrickson and Roberts (1997), notions of women as sex objects may be defined as ideas about women that reduce them to their sexual appeal in terms of their outer appearance and their body (parts). Such notions also entail a strong concern with women's sexual activities as a main criterion of their attractiveness and focus on women as sexual playthings that are eager to fulfill male sexual desires. By sexually explicit Internet material, we mean (audio-)visual content on the Internet that depicts sexual activities in unconcealed ways, often with close-ups of

(aroused) genitals and of oral, anal, and vaginal penetration. We do not imply that adolescents who use SEIM are morally wrong nor do we suggest that exposure to SEIM is inherently bad. Adolescents grow up in a sexualized media environment with boundaries that are increasingly defined by the Internet (e.g., Peter & Valkenburg, 2007; Ward, 2003). Furthermore, a peak of sexual interest during adolescence is typical of sexual development (Savin-Williams & Diamond, 2004). As a result, researchers have emphasized the primacy of understanding how adolescents' exposure to SEIM may affect their sexual development (Brown et al., 2006; Wolak et al., 2007). Our study responds to this call.

Assessing causality

Adolescents' exposure to SEIM can be related to notions of women as sex objects in three ways: as an antecedent, as a consequence, or reciprocally. When exposure to SEIM represents an *antecedent* of notions of women as sex objects, more frequent exposure to SEIM results in stronger beliefs that women are sex objects. Generally, scholars have argued that because of its obtrusive visual character, sexually explicit material is likely to elicit effects in adolescents (e.g., Greenberg, Linsangan, & Soderman, 1993). Focusing on the visual character of sexually explicit material, content analyses have shown that the objectification of women, for example, through full-screen genitalia shots, outnumbers the objectification of men by 2:1 (Cowan, Lee, Levy, & Snyder, 1988; Ertel, 1990). Scholars have also pointed to the objectification of women in scenes in which the man ejaculates on the body, the face, or in the mouth of a woman (Cowan & Dunn, 1994; Jensen & Dines, 1998). Brosius, Weaver, and Staab (1993), for example, found that this practice occurred in 98% of the pornographic movies studied.

Despite the consistent results of content analyses, no study to date has compellingly demonstrated that adolescents' exposure to SEIM impacts their notions of women as sex objects. The only existing investigation on the issue established a positive association between exposure to SEIM and notions of women as sex objects, but was not able to specify a causal direction between the two variables due to its correlational design (Peter & Valkenburg, 2007). However, experimental research on the effects of *nonexplicit* sexual content has shown that exposure to a television clip that objectified women increased notions of women as sex objects (Ward, 2002, only for girls; Ward & Friedman, 2006). Thus, the available evidence gives reason to hypothesize that adolescents will more strongly believe that women are sex objects if they use SEIM more frequently. We call this the effects hypothesis.

Exposure to SEIM as a *consequence* of existing notions of women as sex objects implies that adolescents who believe that women are sex objects turn to SEIM more often than adolescents who do not hold such views. Such selective exposure processes have been well documented in research on media use. People generally tend to select media content that matches their dispositions, attitudes, and motives, whereas they avoid material that does not conform to their dispositions, attitudes, and motives

(e.g., Oliver, 2002; Zillmann & Bryant, 1985). Although, to date, no study has specifically investigated selective exposure to sexually explicit Internet material, there is strong reason to assume that people selectively use such material. For example, Peter and Valkenburg (2006a) found that adolescents were more likely to use SEIM when they were male and high sensation seekers. Other scholars have reported similar findings (Flood, 2007; Lo & Wei, 2005; Wolak et al., 2007). In a related study on the influence of self-objectification on exposure to sexually objectifying television content, Aubrey (2006) showed that women who viewed themselves primarily in terms of externally perceivable attributes avoided sexually objectifying television. As a result, it seems justified to assume that adolescents who believe that women are sex objects are more likely to use SEIM than adolescents who do not share such views. We call this the selective-exposure hypothesis.

Finally, in a *reciprocal* relation adolescents' exposure to SEIM is both an antecedent and a consequence of their notions that women are sex objects. Reciprocal relations between adolescents' use of sexual media content and their sexual beliefs have been most explicitly formulated in Steele and Brown's (1995) media practice model (Brown, 2000; Steele, 1999). Among other things, the model assumes that adolescents select sexual content that corresponds with their beliefs, interests, and motives. Furthermore, the model predicts a reciprocal nature between adolescents' use of sexual content and its effects. A specific type of sexual media content may affect a particular sexual belief, but this effect cannot be separated from the influence that the particular sexual belief exerts on the selection of the specific sexual content. Such reciprocal relations between the use of sexual content and its effects have hardly been studied empirically, Steele and Brown's work notwithstanding (Steele, 1999; Steele & Brown, 1995). However, research on the association between violent media content and aggressiveness in adolescents (Slater, Henry, Swaim, & Anderson, 2003) and between news attention and political knowledge (Eveland, Shah, & Kwak, 2003) has provided first evidence of reciprocal relations between media use and media effects. Consequently, this reciprocal pattern may also describe the association between adolescents' exposure to SEIM and their notions of women as sex objects.

On the basis of existing research on adolescents' exposure to SEIM (Lo & Wei, 2005; Peter & Valkenburg, 2006b, 2007, 2008a, 2008b), it seems currently impossible to favor either the effects hypothesis or the selective-exposure hypothesis. Neither the effects hypothesis nor the selective-exposure hypothesis *alone* seems a valid description of the relation between adolescents' exposure to SEIM and their notions of women as sex objects. However, if both the effects of SEIM on notions of women as sex objects and the selective exposure to SEIM may co-occur, then a reciprocal pattern may best describe how exposure to SEIM and notions of women as sex objects are causally related. Our hypothesis reads:

H1a/b: (a) As adolescents use SEIM more frequently, they will be more likely to believe that women are sex objects. (b) At the same time, stronger beliefs that women are sex objects will result in more frequent exposure to SEIM.

Assessing underlying processes

In line with H1a and H1b, below we outline potential underlying processes: first for the effect of exposure to SEIM on notions of women as sex objects and subsequently for the opposite impact of these notions on exposure.

Mediation of the influence of exposure to SEIM on notions of women as sex objects

A number of theories have been used to explain people's use and reaction to sexually explicit material, for example, the confluence model (Malamuth, Linz, Heavey, Barnes, & Acker, 1995), the excitation transfer model (Zillmann, 1971), and the arousal/hedonic valence model (Zillmann, Bryant, Comisky, & Medoff, 1981). Although these models have inspired considerable research, they seem, in their focus on sexual aggression, too specific for the purposes of this study. A more suitable framework for the investigation of the processes that underlie the relation between exposure to SEIM and notions of women as sex objects is provided by the sexual behavior sequence approach (Byrne, 1977; Fisher, 1986; Fisher & Barak, 2001). Initially following the logic of classical conditioning, the sexual behavior sequence approach states that people respond to both unconditioned sexual stimuli (e.g., coitus in sexually explicit material) and conditioned sexual stimuli (e.g., particular aspects of the reality portrayed in sexually explicit material). The effects that these stimuli may have on preparatory and, eventually, overt sexual behavior are expected to be mediated by three response subsystems. The sexual arousal subsystem states that the cues in unconditioned and conditioned sexual stimuli elicit physiological sexual arousal, which in turn may result initially in preparatory and then in overt sexual behavior. The cognitive-expectative response subsystem suggests that the cues in unconditioned and conditioned sexual stimuli trigger informational and imaginative responses, which motivate, through expectative responses, preparatory and overt sexual behavior. The affective-evaluative response subsystem, finally, proposes that affective responses (e.g., liking, shame) to unconditioned and conditioned sexual stimuli mediate the influence of these stimuli first on evaluations and subsequently on preparatory and overt sexual behavior (for a detailed description of the approach, see Byrne, 1977; Fisher, 1986)

As a "conceptually comprehensive heuristic guide" (Fisher & Barak, 2001, p. 317), the sexual behavior sequence approach and its various subsystems are also able to inspire research that is not ultimately concerned with sexual behavior. Furthermore, in its focus on affective responses as mediators, it can easily integrate more advanced thinking about the link between affects and cognitions (e.g., Forgas, 2001; Frijda, Manstead, & Bem, 2000). Therefore, we used the sexual behavior sequence approach for the purposes of this study in two ways. First, we only focused on the affective-evaluative subsystem of the sexual behavior sequence approach. Second, within the affective-evaluative subsystem, we put emphasis on the link between affective responses to sexually explicit material and cognitions. The sexual behavior sequence approach originally considers an individual's evaluative response to sexually explicit

material an affect, just like the preceding affective responses that mediate the influence of sexually explicit material on evaluative responses. However, there is tentative evidence from research within the sexual behavior sequence approach that affective responses to sexual stimuli can also elicit cognitive responses (Fisher, Fisher, & Byrne, 1977). More generally, evidence has accumulated that affects can influence cognitions, such as beliefs and attitudes (Forgas, 2001; Frijda et al., 2000), which is particularly important for the present study with its focus on beliefs that women are sex objects. In sum, the sexual behavior sequence approach not only lends itself to study sexual beliefs as outcomes; it is also apt to specify how affective responses link exposure to sexually explicit material to sexual beliefs.

In terms of affective responses to SEIM, we look at adolescents' liking of SEIM. It has been well documented that liking, as an affective response to media content, is an important mediator of this content's influence on cognitions (e.g., Burke & Edell, 1989; Edell & Burke, 1987; Holbrook & Batra, 1987). Therefore, liking may also mediate the impact of SEIM on notions of women as sex objects. The sexual behavior sequence approach specifies this process as follows: SEIM with its characteristics of unconcealed sexual activity and genital imagery presents an unconditioned sexual stimulus to adolescents. This unconditioned sexual stimulus is accompanied by conditioned erotic stimuli, for example, the sexual objectification of women. The mere exposure effect suggests that as adolescents become more familiar with SEIM, their liking of SEIM will increase (for a review, see Bornstein, 1989). As adolescents start to like SEIM, they may also become more positive toward the sexual objectification of women because the two stimuli are associated. As a consequence, greater liking of SEIM will lead to more distinct notions that women are sex objects. Similar processes, in which paired stimuli influence cognitions through affective responses that are evoked by the unconditioned stimulus, have been documented in persuasion and advertising research (for a review, see Eagly & Chaiken, 1993). They have also been suggested for the effects of music videos (Hansen & Hansen, 2000).

In sum, we expect that liking of SEIM mediates the impact of adolescents' exposure to SEIM on their notions of women as sex objects. This means that we expect an indirect effect of SEIM on notions of women as sex objects via liking. Our hypothesis reads:

H2: (a) As adolescents consume SEIM more frequently, their liking of SEIM will increase, which in turn (b) results in stronger beliefs that women are sex objects. (c) Exposure to SEIM thus exerts at least part of its effect on notions of women as sex objects indirectly through liking of SEIM.

Mediation of the influence of notions of women as sex objects on exposure to SEIM

There is robust evidence both from selective exposure and uses-and-gratification research that people select media content that corresponds with their needs, motives, and cognitions (for reviews, see Ruggiero, 2000; Zillmann & Bryant, 1985). As mentioned above, this suggests that adolescents' beliefs that women are sex objects may predict their exposure to SEIM. In addition, it has been documented that

exposure to media content reflects the extent to which it is linked with pleasant affects (for a review, see Oliver, 2002). This suggests that adolescents may use SEIM depending on the pleasantness of the affects encountered. On the basis of cognitive dissonance theory (Festinger, 1957; for a review, see Cotton, 1985), we can further expect that media content that confirms existing cognitions is related to more pleasant affects than media content that disconfirms existing cognitions. Assuming that adolescents have at least a rough notion of SEIM, this suggests that adolescents with more distinct notions of women as sex objects will find SEIM more pleasant, and thus more likeable, than adolescents who do not hold such views.

Thus, if notions of women as sex objects may predict the extent to which adolescents find SEIM likeable and if liking of SEIM may influence exposure to SEIM, it can be expected that, in the exposure process, liking of SEIM may mediate the impact of beliefs that women are sex objects on exposure to SEIM. Put differently, we expect an indirect effect of beliefs that women are sex objects via liking of SEIM on exposure to SEIM. Our hypothesis reads:

H3: (a) As adolescents have stronger beliefs that women are sex objects, their liking for SEIM will increase, which in turn (b) will lead to more frequent exposure to SEIM. (c) Beliefs that women are sex objects thus exerts at least part of its effect on exposure to SEIM indirectly through liking of SEIM.

Gender differences

It has been well documented that men and women differ in their sexual behavior and attitudes. For example, men masturbate more often and have more positive attitudes toward casual sex than women (for a meta-analysis, see Oliver & Hyde, 1993). Similarly, men use sexually explicit material more often than women do (e.g., Traeen, Spitznogle, & Beverfjord, 2004), which has also been confirmed for adolescents and their use of SEIM (Flood, 2007; Lo & Wei, 2005; Peter & Valkenburg, 2006a; Wolak et al., 2007). Finally, men report higher subjective sexual arousal to sexually explicit material than women (e.g., Steinman, Wincze, Sakheim, Barlow, & Mavissakalian, 1981). Thus, there seem to be robust gender differences when we look at *main* effects of gender on various variables related to sex and the use and reception of sexually explicit material.

However, there is some initial evidence that gender differences may not emerge when *moderator* effects of gender are examined. In two experiments, Zillmann and Bryant (1982, 1988) did not find gender differences in the effects of sexually explicit material on estimates of unusual sex practices, recommendations of the imprisonment of rapists, and sexual satisfaction. There is also some first evidence that the association between SEIM and beliefs that women are sex objects does not differ between male and female adolescents (Peter & Valkenburg, 2007). These findings tentatively suggest that gender may not moderate the influence of SEIM on notions of women as sex objects, as predicted in H1a. However, few studies exist that could substantiate expectations on whether notions of women as sex objects increase

exposure to SEIM, as hypothesized in H1b. Neither is there any literature that could help specify whether adolescents' gender affects the indirect effects predicted in H2c and H3c. As a result, we abstain from formulating hypotheses and pose research questions instead:

RQ1: Does gender moderate the hypothesized influences (a) of SEIM on notions of women as sex objects and (b) of notions of women as sex objects on exposure to SEIM?

RQ2: Does gender moderate the hypothesized indirect effects (a) of SEIM, via liking, on notions of women as sex objects and (b) of notions of women as sex objects, via liking, on SEIM?

Method

Sample and procedure

To investigate the hypothesized direct and indirect effects adequately, we conducted a three-wave panel study. The first wave of our three-wave panel survey was fielded in May and June 2006 among 2,341 Dutch adolescents aged 13–20. The second wave was fielded 6 months later, in November and December 2006, and the last wave was fielded in May and June 2007. We included postadolescents because large parts of “identity work” and, arguably, sexual belief formation are not completed before late adolescence and emerging adulthood (Steinberg & Morris, 2001). Respondents were interviewed online. Online surveys or, more generally, computer-mediated surveys are superior to other modes of interviewing when sensitive issues are studied (e.g., Mustanski, 2001). Prior to the first wave, institutional approval, parental consent for minors' participation, and adolescents' informed consent were obtained. In all waves, adolescents were notified that the survey would be about sexuality and the Internet and that they could stop at any time they wished.

Sampling and fieldwork were carried out by Qrius, a Dutch research institute specializing in research among adolescents. Respondents were recruited, by means of a quota sample, from an existing online panel managed by Qrius. The members of Qrius' online panel had been sampled in all parts of The Netherlands. The sample was quoted for participants' gender and age. Respondents' gender and age generally influences their willingness to participate and respond in surveys on sensitive issues (e.g., Ross, Daneback, Mansson, Tikkanen, & Cooper, 2003; Wiederman, 1993). The resulting sample mirrored the national distributions of age and gender among Dutch adolescents. It is worth noting that, already in 2005, more than 95% of Dutch adolescents had home access to the Internet (Duimel & De Haan, 2007). As a result, one of the typical problems of online surveys—a systematic bias in samples through differing Internet access—may be less troublesome in The Netherlands than in countries where adolescents' Internet access is more limited.

To improve the confidentiality and privacy of the answering process, we emphasized on the introduction screen of each online questionnaire, that the answers would be analyzed only by the principal investigators. Moreover, we asked respondents to fill in the questionnaire in privacy. Finally, we explained that it

was impossible for the principal investigators to identify who had filled in the questionnaire. Qrius did not link respondents' answers in our questionnaire to their names and contact information, providing us only with the respondents' answers and a unique number code for each respondent. This procedure has proven successful in various other studies on sensitive issues (Peter & Valkenburg, 2006a). Completing the questionnaire, which was largely identical in all three waves, took 15 minutes on average.

Of the 2,341 adolescents who had completed the questionnaire in the first wave, 404 (17.3%) terminated their membership in the online panel during the investigation period. They were thus no longer eligible for wave 2 and/or wave 3. For the third wave, we recontacted only those 1,426 respondents who had completed the questionnaire in wave 2 because we interpreted nonparticipation or an incomplete questionnaire in wave 2 as the respondents' wish to no longer participate in the study. In the third wave, 1,123 adolescents participated, and 1,052 returned a complete questionnaire, which is also the number of respondents that completed the questionnaires in all three waves. Across the three waves, the cooperation rate was 54%, calculated according to the guidelines of the American Association for Public Opinion Research (2006), formula 1, on the basis of the eligible cases in wave 3 and fully completed interviews only. Attrition could not be reduced further although, in waves 2 and 3, respondents were reminded three times to participate in the study. In waves 2 and 3, they were also offered an extra bonus of 10 Euros for participation, in addition to the 2.50 Euros that they received for filling in each questionnaire and the final bonus of 5 Euros that they received for completing all three questionnaires.

Younger adolescents were less likely to participate in all three waves of the survey than older adolescents ($M_{\text{non-part.}} = 16.18$, $SD = 2.28$, $M_{\text{part.}} = 16.78$, $SD = 2.26$), $t(1935) = -5.76$, $p < .001$. Boys (49%) participated less often than girls (60%) in all three waves, $\chi^2(1, N = 1937) = 13.85$, $p < .001$. Moreover, participants differed from nonparticipants in that they had less permissive sexual attitudes, felt less involvement with SEIM, had more critical attitudes toward pornography, and were older at the time of their first sexual experiences. Because gender and age are associated with sexual attitudes, involvement with and attitudes toward pornography, and sexual behavior (Brooks-Gunn & Graber, 1999; Oliver & Hyde, 1993; Traeen et al., 2004), these two variables may affect both the participation in the survey and the clusters of variables in which participants and nonparticipants differed. When we controlled for gender and age, the differences between participants and nonparticipants largely disappeared, with one exception that is relevant to this study. Respondents who completed all three waves were still significantly less likely to believe that women are sex objects than respondents who completed only the first wave and showed somewhat less variance in their answers, ($M_{\text{non-part.}} = 2.74$, $SD = .82$, $M_{\text{part.}} = 2.56$, $SD = .77$), $t(1935) = 5.01$, $p < .001$. However, exposure to SEIM and liking of SEIM did not differ between the two groups.

In sum, although the cooperation rate in our three-wave panel survey was suboptimal, nonparticipation resulted in little unexplainable systematic differences

in the data. The gender and age differences in participation merge with other sex-related research and point to a more general problem in this type of research (e.g., Ross et al., 2003; Wiederman, 1993). Most importantly, with respect to the variables used in this study, respondents who participated in all waves had similar levels of exposure to, and liking of, SEIM as those who participated only in the first wave. The difference in notions of women as sex objects, particularly the slightly lower variance among those who completed all waves, may decrease rather than increase our chances to reject the null hypotheses.

Measures

Exposure to SEIM

We largely followed an operationalization used by Peter and Valkenburg (2006a), which has been shown to be valid and reliable. Respondents were asked to indicate how often, in the 6 months prior to each interview, they had intentionally looked at (a) pictures with clearly exposed genitals; (b) movies with clearly exposed genitals; (c) pictures in which people are having sex; (d) movies in which people are having sex. Adolescents were notified that the question was about sexually explicit, pornographic content on or from the Internet. Adolescents were also told that looking at such content did not imply being online, but could also refer to sexually explicit material downloaded from the Internet. The response categories were 1 (*never*), 2 (*less than once a month*), 3 (*1–3 times a month*), 4 (*once a week*), 5 (*several times a week*), 6 (*every day*), and 7 (*several times a day*). In all three waves, the items formed a unidimensional scale (explained variance 88% in wave 1, 89% in waves 2 and 3). Cronbach's alpha was .95 in all three waves. For information about the means and standard deviations, see Table 1.

Women as sex objects

We used an operationalization by Peter and Valkenburg (2007). The five items of the scale were: "Unconsciously, girls always want to be persuaded to have sex," "Sexually active girls are more attractive partners," "There is nothing wrong with boys being interested in a woman only if she is pretty," "An attractive woman asks for sexual advance," and "There is nothing wrong with boys being primarily interested in a woman's body." Response categories ranged from 1 (*disagree completely*) to 5 (*agree completely*). The items formed a unidimensional scale (explained variance 52% in wave 1 and 55% in waves 2 and 3). Cronbach's alpha was .77 in wave 1, .79 in wave 2, and .80 in wave 3. For means and standard deviations, see Table 1.

Gender

Male adolescents were coded zero, female adolescents were coded one.

Liking of SEIM

We measured this construct with the two items "I find sex on the Internet nice" and "I find sex on the Internet attractive." Respondents were notified that the items

Table 1 Zero-Order Correlations Between the Variables in the Model And Scale-Relevant Information

| | Exposure SEIM (w1) | Exposure SEIM (w2) | Exposure SEIM (w3) | Liking SEIM (w1) | Liking SEIM (w2) | Liking SEIM (w3) | NWSO (w1) | NWSO (w2) | NWSO (w3) |
|--------------------|-----------------------|-----------------------|-----------------------|---------------------|---------------------|---------------------|--------------|--------------|--------------|
| Exposure SEIM (w2) | .69 | | | | | | | | |
| Exposure SEIM (w3) | .66 | .73 | | | | | | | |
| Liking SEIM (w1) | .62 | .54 | .50 | | | | | | |
| Liking SEIM (w2) | .52 | .64 | .57 | .62 | | | | | |
| Liking SEIM (w3) | .48 | .54 | .63 | .58 | .69 | | | | |
| NWSO (w1) | .37 | .35 | .32 | .37 | .36 | .30 | | | |
| NWSO (w2) | .36 | .42 | .37 | .37 | .41 | .36 | .59 | | |
| NWSO (w3) | .35 | .36 | .41 | .33 | .37 | .42 | .55 | .66 | |
| M | 2.08 | 2.13 | 2.13 | 2.38 | 2.36 | 2.31 | 2.60 | 2.58 | 2.54 |
| SD | 1.40 | 1.48 | 1.45 | 1.13 | 1.12 | 1.08 | 0.77 | 0.78 | 0.77 |

Note: All correlations are significant at $p < .001$. SEIM = sexually explicit Internet material; NWSO = notions of women as sex objects; w1 = wave 1; w2 = wave 2; w3 = wave 3.

referred to pornographic material on the Internet. Response categories ranged from 1 (*does not apply at all*) to 5 (*applies completely*). The items correlated $r = .78, p < .001$ in wave 1, $r = .74, p < .001$ in wave 2, and $r = .76, p < .001$ in wave 3. Means and standard deviations can be found in Table 1.

Adolescents' can only report their liking of SEIM validly if they have ever been in contact with SEIM. In the first wave, 90 respondents (9% of the respondents that completed all three waves) reported that they had never been in touch with such material. Because the analysis technique (see below) used does not accept missing cases, we had to exclude these 90 respondents from the analysis. Missing cases imputation is not possible because the missing answers in wave 1 were valid "nonanswers" and not random ones. As a result, the number of cases available for analysis reduced to 962.

Data analysis

We tested our model with structural equation modeling, using AMOS 7.0. For the constructs of exposure to SEIM and notions of women as sex objects, item parcels served as indicators. Item parceling has become common in structural equation modeling, most notably in psychology, education, and organizational research (for a review, see Bandalos & Finney, 2001). It is advised to use item parcels rather than individual items to estimate latent constructs because item parcels lead to more parsimonious models; reduce the chances for double loadings to occur; diminish the impact of the various sources of sampling error; and are less likely than individual items to violate the assumption of normal distribution (e.g., Little, Cunningham, Shahar, & Widaman, 2002). However, item parceling should only be used if the underlying construct is unidimensional and if researchers are interested in relations among the latent constructs and not among the items (Bandalos & Finney, 2001; Little et al., 2002). These conditions were met in our study.

Variables in sex research are typically skewed. The distribution of our variables presented no exception to that rule. Shapiro–Wilk tests showed that none of the variables of the model were distributed normally. As a result, the assumption of multivariate normality was also not met. To alleviate problems that can arise from the violation of these assumptions, scholars have suggested the bootstrap method (Efron & Tibshirani, 1993). In the bootstrap method, a computer generates a series of datasets that would be obtained if the estimation study were repeated many times. Each bootstrap sample results from sampling, *with replacement*, from the original data. In all the bootstrap samples, the value of interest is computed. The most desirable characteristic of bootstrapping is that it constitutes a nonparametric approach that estimates values of interest without making assumptions about the distribution type of the variables or the sampling distribution of the statistic. As a result, the bootstrap method produces more accurate results if assumptions such as the normal distribution of variables and test statistics are violated. The bootstrap method may thus offer important additional information on the statistical significance of our estimates.

Results

Assessing causality

Hypothesis 1a predicted that adolescents would be more likely to believe that women are sex objects if they used SEIM more often. Hypothesis 1b proposed that stronger beliefs that women are sex objects would result in more frequent exposure to SEIM. The zero-order correlations in Table 1 show a positive influence of exposure to SEIM (wave 1) on notions of women as sex objects (wave 3), $r = .35, p < .001$. A positive influence of notions of women (wave 1) on exposure to SEIM (wave 3) also occurred, $r = .32, p < .001$. However, a rigorous test to assess the causal direction between exposure to SEIM and notions of women as sex objects has to include prior levels of the dependent variable as control variables (Cole & Maxwell, 2003). Figure 1 shows a cross-lagged structural equation model that included, for the dependent variables exposure to SEIM and notions of women as sex objects as measured in the third wave, their prior levels as measured in the first wave. To test the significance of the influences hypothesized in H1a and H1b, we proceeded in three steps. First, we tested whether the fit of the model in Figure 1 would improve after adding the hypothesized influences in a stepwise fashion. Second, we conducted the traditional significance tests on the basis of normal theory to assess the strength of the hypothesized influences. Finally, we assessed the significance of the hypothesized influences on the basis of the bootstrapping method.

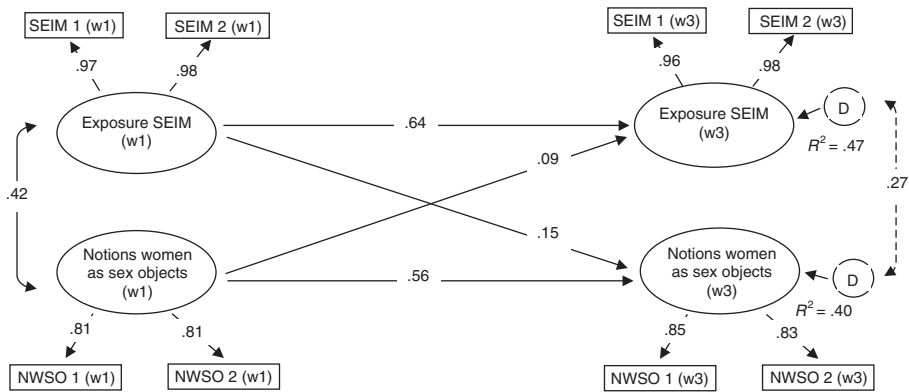


Figure 1 Causality between exposure to sexually explicit Internet material (SEIM) and notions of women as sex objects.

Note: Coefficients are standardized estimates, significant at least at $p < .01$. The dashed curve represents the covariance between the disturbance terms (D). w1 = wave 1; w3 = wave 3. The ovals represent latent constructs. The rectangles represent the manifest item parcels that served as indicators of the latent constructs. In line with recommendations by Cole and Maxwell (2003), we allowed error variances of the same item parcel to covary over time, if necessary. For clarity reasons, error variances, their impact on the manifest indicators, and covariances between error terms are not shown.

The fit of our model in Figure 1 *without* the paths from exposure to SEIM (wave 1) on notions of women as sex objects (wave 3) and from notions of women as sex objects (wave 1) on exposure to SEIM (wave 3) was acceptable, $\chi^2(12, N = 962) = 38.83$, $p < .001$, CFI = .99, RMSEA = .048, with the 90% confidence interval (CI) of the RMSEA being between .032 and .066. Adding, as hypothesized in H1a, the influence of exposure to SEIM (wave 1) on notions of women as sex objects (wave 3) significantly improved the model fit, $\Delta\chi^2(1, N = 962) = 22.48$, $p < .001$. Adding, as hypothesized in H1b, the impact of notions of women as sex objects (wave 1) on exposure to SEIM (wave 3) led to another significant improvement of the model fit, $\Delta\chi^2(1, N = 962) = 9.47$, $p < .01$. The final fit of the full model as shown in Figure 1 was excellent, $\chi^2(10, N = 962) = 6.88$, $p = .74$, CFI = 1.00, RMSEA = .001 (90% CI: .000 to .026).

The statistical significance of the hypothesized influences as indicated by the model fit improvements was also confirmed by significance tests on the basis of normal theory. Exposure to SEIM (wave 1) had a significant positive impact on notions of women as sex objects (wave 3), $\beta = .15$, $B = .079$, $SE = .018$, $p < .001$. At the same time, notions of women as sex objects (wave 1) positively affected exposure to SEIM (wave 3), $\beta = .09$, $B = .210$, $SE = .069$, $p < .01$.

Finally, bootstrapping supported the significance of the influences hypothesized in H1a and H1b. On the basis of 1,000 bootstrapping samples, we estimated a 95% bias-corrected confidence interval (CI) for the impact of exposure to SEIM (wave 1) on notions that women are sex objects (wave 3) and for the influence of notions of women as sex objects (wave 1) on exposure to SEIM (wave 3). Generally, when the bias-corrected CI does not include zero, the effect can be said to differ significantly from zero. The 95% bias-corrected CI for the (unstandardized) impact of exposure on beliefs that women are sex objects was between .039 and .118. The 95% bias-corrected CI ranged between .069 and .357 for the (unstandardized) effect of beliefs on exposure. Thus, none of the 95% bias-corrected CI's included zero. In sum, three different ways of assessing statistical significance supported H1a and H1b. As predicted in H1a, adolescents' increased use of SEIM led to stronger beliefs that women are sex objects. Simultaneously, stronger beliefs that women are sex objects increased the use of SEIM, which supported H1b.

Assessing underlying processes

Hypothesis 2a predicted that as adolescents consumed SEIM more frequently, their liking of SEIM would increase. This, in turn, would result in stronger beliefs that women are sex objects (H2b). Exposure to SEIM was thus predicted to exert at least part of its effect on notions of women as sex objects indirectly through liking of SEIM (H2c). Hypothesis 3a stated that adolescents would like SEIM more if they had stronger beliefs that women are sex objects. Greater liking, in turn, would lead to more frequent exposure to SEIM (H3b). Thus, beliefs that women are sex objects were expected to exert at least part of their effect on exposure to SEIM indirectly through liking of SEIM (H3c).

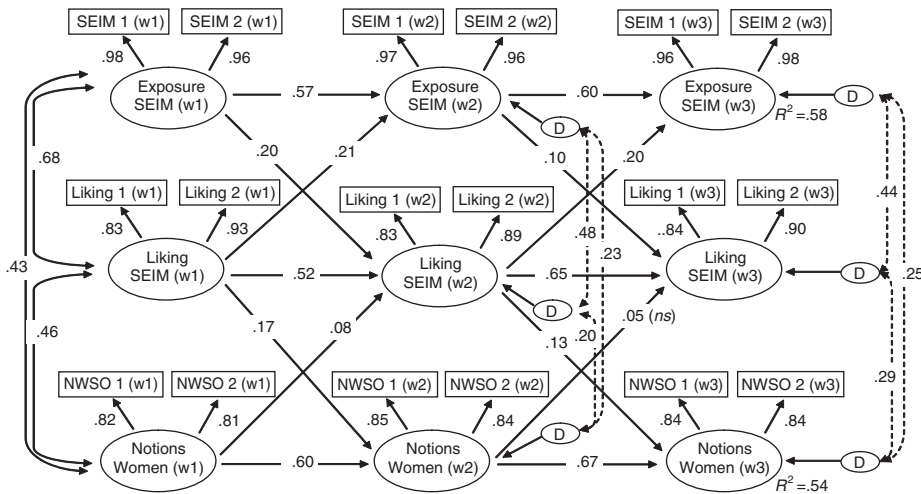


Figure 2 Processes underlying the link between exposure to sexually explicit Internet material (SEIM) and notions of women as sex objects.

Note: Coefficients are standardized estimates, significant at least at $p < .05$, unless indicated otherwise. Dashed curves are covariances between disturbance terms (D). w1 = wave 1; w2 = wave 2; w3 = wave 3. For clarity reasons, error variances, their impact on the manifest indicators, and covariances between error terms are not shown.

To test the indirect effects implied in these hypotheses rigorously, the independent variable must precede the mediating variable in time, which, in turn, must temporally precede the dependent variable (Cole & Maxwell, 2003). Furthermore, to preclude spurious influences, prior levels of the mediating and the dependent variable must be included as control variables in the model, along with the simultaneous influences of the other variables in the model (Cole & Maxwell, 2003). Finally, if an influence of a variable is expected in one particular time period (e.g., between waves 1 and 2), this influence needs to be modeled also between the two variables in subsequent time periods (e.g., between waves 2 and 3). Meeting these requirements results in a model as shown in Figure 2. For a more detailed account of the logic of testing mediation in longitudinal designs with structural equation modeling, we refer to Cole and Maxwell (2003).

To assess the statistical significance of the influences hypothesized in H2 and H3 compellingly, we analyzed, first, whether the model’s fit would improve if we included the hypothesized influences successively in the model. Second, we estimated the significance of the hypothesized effects on the basis of normal theory and, finally, also on the basis of bootstrapping.

Liking as a mediator of the influence of SEIM on notions of women as sex objects

The fit of our model in Figure 2 *without* the influences hypothesized in H2a and H2b was acceptable, $\chi^2(96, N = 962) = 294.87, p < .001, CFI = .987, RMSEA = .046$

(90% CI: .040 to .053). Adding the impact of exposure to SEIM (wave 1) on liking (wave 2) as hypothesized in H2a improved the model's fit significantly, $\Delta\chi^2(1, N = 962) = 25.50, p < .001$. A significant improvement of the model's fit also resulted when we additionally included the impact of liking (wave 2) on notions of women as sex objects (wave 3) as it was hypothesized in H2b, $\Delta\chi^2(1, N = 962) = 13.62, p < .001$. The eventual fit of the model was good, $\chi^2(94, N = 962) = 255.75, p < .001$, CFI = .990, RMSEA = .042 (90% CI: .036 to .049).

Significance tests on the basis of both normal theory and bootstrapping confirmed the statistical significance of the hypothesized influences as indicated by the model fit improvements. Figure 2 shows a significant positive influence of exposure to SEIM (wave 1) on liking of SEIM (wave 2), $\beta = .20, B = .157, SE = .030, p < .001$. Bootstrapping (1,000 bootstrap samples) elicited a 95% bias-corrected CI for this impact of exposure on liking lying between .096 and .218. Similarly, liking of SEIM (wave 2) positively affected notions of women as sex objects (wave 3), $\beta = .13, B = .079, SE = .021, p < .001$ (bootstrapped 95% bias-corrected CI: .030 to .131). In sum, all the three ways of testing the significance of the hypothesized influences supported H2a and H2b. More frequent exposure to SEIM increased adolescents' liking of such material, which, in turn, led to stronger beliefs that women are sex objects.

Hypothesis 2c stated that the influence of exposure to SEIM on notions of women as sex would run at least partly through liking of SEIM. The results presented concerning H2a and H2b already suggested that this is the case. However, scholars have recently emphasized that a rigorous analysis of such hypothesized indirect effect also encompasses a formal significance test (e.g., Preacher & Hayes, 2008). This test investigates whether the product that the (unstandardized) effect of the independent variable on the mediator and the (unstandardized) effect of the mediator on the dependent variable form (i.e., $.157 \times .079 = .012$) differs significantly from zero. A standard error for the indirect effect can be computed on the basis of the estimates of the two involved effects and their asymptotic variances (for formulas, see Preacher, Rucker, & Hayes, 2007). The test showed that the indirect effect of exposure (wave 1) via liking (wave 2) on notions of women as sex objects (wave 3) was significant, $B = .012, SE = .004, p < .01$. Bootstrapping (1,000 samples) confirmed this result. The 95% bias-corrected CI interval for the indirect effect of exposure via liking on beliefs that women are sex objects was between .004 and .024. Hypothesis 2c was supported.

Scholars have recently pointed out the problems associated with traditional tests of complete or partial mediation and have suggested to solely focus on the size of the indirect effect (Preacher & Hayes, 2008). However, in the absence of convincing criteria to evaluate the size of an indirect effect, we think it may be still be informative to analyze whether an originally significant effect of an independent on a dependent variable no longer differs from zero once the mediator is included. To investigate this for the effect of exposure to SEIM (wave 1) on notions of women as sex objects

(wave 3), we tested the model in Figure 2 as a nested model with two conditions: when an additional direct path from exposure to SEIM (wave 1) to notions of women as sex objects (wave 3) was constrained to 0, and when it was allowed to vary. If the model with the constrained path does not change the model's fit, the direct path from exposure to notions of women as sex objects does not differ from zero. The model with the constrained path did not lead to a significant chi-square change, $\Delta\chi^2(1, N = 962) = 0.48, p = .49$. Thus, the effect of adolescents' exposure to SEIM (wave 1) on their beliefs that women are sex objects (wave 3) was no longer significant once liking of SEIM (wave 2) was included in the model.

Liking as a mediator of the influence of notions of women as sex objects on SEIM

The fit of our model in Figure 2 *without* the influences hypothesized in H3a and H3b was acceptable, $\chi^2(96, N = 962) = 292.89, p < .001, CFI = .988, RMSEA = .046$ (90% CI: .040 to .052). Adding the impact of notions of women as sex objects (wave 1) on liking (wave 2) as hypothesized in H3a improved the model's fit significantly, $\Delta\chi^2(1, N = 962) = 6.62, p < .05$. When we additionally included, as hypothesized in H3b, the impact of liking (wave 2) on exposure to SEIM (wave 3), another significant improvement of the model's fit resulted, $\Delta\chi^2(1, N = 962) = 30.52, p < .001$. The improvements of the model fit suggest that stronger notions of women as sex objects resulted in greater liking of SEIM, which, in turn, led to more frequent exposure to SEIM.

These results were confirmed by significance tests on the basis of both normal theory and bootstrapping. More distinct notions of women as sex objects (wave 1) led to greater liking of SEIM (wave 2), $\beta = .08, B = .123, SE = .047, p < .01$. The bootstrapped 95% bias-corrected CI for this impact ranged from .030 to .227. Greater liking of SEIM (wave 2) resulted in more frequent exposure to SEIM (wave 3) $\beta = .20, B = .270, SE = .048, p < .001$ (bootstrapped 95% bias-corrected CI: .154 to .389). In sum, Hypotheses 3a and 3b were supported. Stronger beliefs that women are sex objects increased adolescents' liking of SEIM, which, in turn, lead to more exposure to SEIM.

We also formally tested whether the indirect effect of notions of women as sex objects on exposure to SEIM via liking differed significantly from zero, as it was predicted in H3c. The product of the two involved effects differed significantly from zero, $B = .033, SE = .014, p < .05$ (bootstrapped 95% bias-corrected CI: .010 to .071). H3c was supported.

To see whether the originally significant effect of notions of women as sex objects (wave 1) on exposure to SEIM (wave 3) would no longer be significant once liking was in the model, we used the nested-model logic outlined above. We compared a model in which an additional direct path from notions of women as sex objects (wave 1) to exposure (wave 3) was constrained to 0, with a model in which this path was allowed to vary. The model with the constrained path did not significantly improve the model's fit, $\chi^2(1, N = 962) = 3.57, ns$. Thus, notions of women as sex

objects (wave 1) no longer exerted an influence on exposure to SEIM (wave 3) if liking (wave 2) was included in the model.

Gender differences

Our two research questions asked whether adolescents' gender moderated the direct and indirect effects just demonstrated. Because our moderating variable gender is a discrete variable, we opted for multiple-group analysis to test whether the paths of interests differed between male and female adolescents. Although, for continuous moderator variables, the modeling of interaction effects in structural equation models is still debated (e.g., Coenders, Batista-Foguet, & Saris, 2008), scholars have recommended the use of multiple-group analysis when moderating variables are discrete (e.g., Rigdon, Schumacker, & Wothke, 1998). In the multiple-group analyses, we followed a strategy outlined by Jaccard and Wan (1996). First, we estimated a model in which we did not pose any cross-group constraints, that is, we allowed the particular direct and indirect effects to vary between male and female adolescents. In a subsequent model, we constrained, one at a time, each direct effect and each path that was part of an indirect effect to be equal across the two groups. Finally, we tested whether the fit of the constrained model differed from the fit of the unconstrained model. A significant change in the model fit indicated that the constrained path differed between male and female adolescents.¹

Did gender moderate the *direct* effect of exposure to SEIM on notions of women as sex objects and that of notions of women as sex objects on exposure to SEIM (RQ1)? The fit of the model without cross-group constraints (i.e., the model for both groups considered simultaneously) was very good, $\chi^2(19, N = 962) = 13.15$, $p = .87$, CFI = 1.000, RMSEA = .000 (90% CI: .000 to .015). Constraining the path from SEIM on notions on women as sex objects did not result in a significant difference between model fits, $\Delta\chi^2(1, N = 962) = .32$, *ns*. Thus, gender did not moderate the influence of exposure to SEIM on notions of women as sex objects. However, when we constrained the path from notions of women as sex objects on SEIM, the model fit changed significantly compared with the unconstrained model, $\Delta\chi^2(1, N = 962) = 7.62$, $p < .01$. Thus, gender did moderate the impact that notions of women as sex objects exerted on exposure to SEIM. Among male adolescents, stronger beliefs that women are sex objects resulted in more frequent exposure to SEIM, $B = .242$, $SE = .107$, $p < .05$. Among female adolescents, this was not the case, $B = -.097$, $SE = .061$, *ns*.

Did the strength of the *indirect* effect of exposure to SEIM, via liking, on notions of women as sex objects differ between male and female adolescents? Furthermore, did gender moderate the indirect effect that notions of women as sex objects (wave 1) exerted on exposure to SEIM through liking (wave 3) (RQ2)? The model without cross-group constraints showed a good fit, $\chi^2(188, N = 962) = 330.93$, $p < .001$, CFI = .989, RMSEA = .028 (90% CI: .023 to .033). Constraining, one at a time, the four paths that constitute the indirect effects across the two groups did not significantly change the model fit. None of these constraints resulted in a chi-square

difference value greater than 0.8 (with one degree of freedom). In sum, the indirect effect of SEIM on notions of women as sex objects (and vice versa) via the liking of such material did not differ between male and female adolescents.²

Discussion

In both public and academic debates on the sexualization of women, there has recently been a renewed interest in potential media influences on beliefs that women are sex objects (e.g., American Psychological Association Task Force on the Sexualization of Girls, 2007; Levy, 2005; Paul, 2005; Ward, 2002; Ward & Friedman, 2006). More specifically, Peter and Valkenburg (2007) have demonstrated that adolescents' exposure to SEIM is associated with stronger beliefs that women are sex objects. On the basis of a three-wave panel, this study has assessed the causality and some initial underlying processes of the association that Peter and Valkenburg described. Moreover, the study has investigated potential gender differences in the various direct and indirect relations between exposure to SEIM and notions that women are sex objects.

Causality assessed

Adolescents' exposure to SEIM was both a cause and a consequence of their beliefs that women are sex objects. More frequent exposure to SEIM caused stronger beliefs that women are sex objects. At the same time, stronger beliefs that women are sex objects led to more frequent exposure to SEIM, albeit only for male adolescents. Our finding brings together selective exposure and media effects perspectives and merges with recent more comprehensive theorizing about the relation between mediated communication and socialization (Eveland et al., 2003; Slater, 2007; Slater et al., 2003). This type of more comprehensive theorizing also points to two possible long-term consequences of our results, which may be of considerable social relevance. On the one hand, the reciprocal pattern we found may spiral up (Slater, 2007). In the long run, this may lead to clearly elevated levels of both beliefs that women are sex objects and the use of SEIM. On the other hand, our reciprocal pattern may stagnate or even reduce in its effect size. Several dampening impacts are conceivable, such as maturation, habituation to SEIM, assumption of roles in which the sexual objectification of women is not tolerated, and learning of opposite beliefs and values from other sources. We need longitudinal research over longer periods of time to more thoroughly understand the long-term consequences of our findings.

Underlying processes assessed

Our study may also initially contribute to a better understanding of the processes that underlie the link between exposure to SEIM and notions of women as sex objects. Liking of SEIM mediated both the influence of SEIM on notions of women as sex objects and the impact that these notions exerted in turn on exposure to SEIM. On the one hand, more frequent exposure to SEIM resulted in greater liking of SEIM,

which, in turn, elicited more distinct notions of women as sex objects. On the other hand, more distinct notions of women as sex objects led to greater liking of SEIM, which resulted in greater exposure to SEIM.

The mediating role of liking in the impact of exposure to SEIM on notions of women as sex objects was in line with predictions of the sexual behavior sequence approach (Byrne, 1977; Fisher, 1986) and has a general and a specific implication for further research. The general implication is that the effects of SEIM on adolescents' sexual beliefs are most likely not direct. Although the establishment of direct effects of SEIM presents the necessary first step in an emerging research field, we need to realize that the processes that underlie the link between exposure and belief formation are more complex than we can currently envision.

The more specific implication of the mediating role of liking is that we cannot ignore affects if we want to grasp how adolescents form sexual beliefs when they use SEIM. Earlier models of the effects of sexually explicit material have typically focused on sexual arousal as a mediator (Zillmann, 1971; Zillmann et al., 1981). Our results show that other affective reactions to SEIM, such as the liking of the material, may also explain how SEIM impacts adolescents' sexual beliefs. The influence of affects on cognitions that we found merges with recent social-psychological theorizing about how feeling and thinking are interrelated (Forgas, 2001; Frijda et al., 2000). Future research may find a fruitful task in further elaborating on the interplay between affects and cognitions as mediators of the effects of SEIM.

Our finding that liking mediated the impact of notions of women as sex objects on exposure to SEIM dovetails with selective exposure perspectives and uses-and-gratifications research (e.g., Oliver, 2002; Ruggiero, 2000; Zillmann & Bryant, 1985). The finding suggests that adolescents turn to SEIM to the extent that it mirrors their sexual beliefs and elicits pleasant affects. Although previous research suggested selective exposure processes in adolescents' use of SEIM (Flood, 2007; Peter & Valkenburg, 2006a, 2008a; Wolak et al., 2007), we now have some first evidence of how such selective exposure processes may look. This has important consequences for more comprehensive model building of the effects of SEIM on sexual beliefs. In line with Slater's (2007) conceptualization of exposure as an endogenous variable, Peter and Valkenburg (2006b) found evidence of an Orientation 1–Stimulus–Orientation 2–Response (O-S-O-R) model of how exposure to SEIM may be related to sexual attitudes. Peter and Valkenburg used adolescents' gender as an Orientation 1 variable, thus focusing on a demographic variable to predict exposure to SEIM. However, the model in the present study suggests that the link between Orientation 1 and the Stimulus in the O-S-O-R model may be more complex and include cognitions, such as sexual beliefs, and affects, such as the liking of SEIM. As a result, a more integrative model is conceivable in which personality characteristics (as Orientation 1 variable) affect cognitions (as Orientation 2 variable), which influence affects (as Orientation 3 variable), which eventually result in exposure to SEIM (Stimulus variable). Although such a 3O-S-O-R model seems complex at first glance, it is supported by recent integrative accounts of media effects (e.g., Slater, 2007).

Gender differences

Male and female adolescents did not differ in the strength of the positive effect that exposure to SEIM exerted on notions of women as sex objects. However, only among male adolescents did beliefs that women are sex objects lead to more frequent exposure to SEIM. Furthermore, none of the indirect effects established differed between male and female adolescents. In our view, it is premature to draw conclusions from these findings before they have been replicated. That said, it seems that the predominant focus on male audiences in studies on sexually explicit material may have led our attention away from potentially interesting research questions on gender differences and commonalities in the effects of such material. More generally, therefore, future research should include both males and females as potential recipients of SEIM. More specifically, the following three aspects deserve attention in future research.

First, our finding that the effect of SEIM was the same for male and female adolescents tentatively merges with research among adults that has not found gender differences in the effects of sexually explicit material (Zillmann & Bryant, 1982, 1988). Thus, although females generally report lower absolute levels of exposure to sexually explicit material, it seems that both females and males react similarly when their exposure to such material increases. This difference between main and moderator effects of gender needs more research. Second, research traditionally operationalizes gender as a dichotomous variable. However, gender, as a social construction, may resemble much more a continuous variable and, therefore, may need to be operationalized differently. Finally, the fact that we did not find any moderating gender effect on the mediation patterns may also partly result from still-existing statistical obstacles in the investigation of moderated mediation in structural equation modeling. Although the use of multiple-group analysis is still recommended when moderator variables are discrete (Jaccard & Wan, 1996; Rigdon et al., 1998), it would in our view be desirable to have procedures that allow for a precise estimation and post hoc probing of the moderated indirect effect (for a procedure in regression analysis, see Preacher et al., 2007). More rigorous statistical tools for the investigation of moderation mediation in structural equation models may enable us to detect moderator effects with greater sensitivity than it is currently possible.

Limitations

Our study suffers from at least three limitations. First, our study is not based on a random sample. We agree with other researchers that a potential bias in our sample should not affect the processes and mechanisms in which we were interested (Bogaert, 1996). However, studies based on random samples may elicit different effect sizes. Therefore, replication of our results is desirable. Second, the attrition rate across the three waves was relatively high. Similarly, high attrition rates are not uncommon in research on sensitive issues among adolescents (Zimmer-Gembeck & Helfand, 2008). Moreover, we found few systematic differences between adolescents who participated in all three waves and those who stopped earlier. Still, we cannot entirely preclude that attrition affected our results. Finally, we conducted our research in The Netherlands

that traditionally has a liberal policy toward adolescent sexuality and sexually explicit material. As result, we call for cross-national comparative research, preferably in countries with more restrictive policies toward sexually explicit material.

Conclusion

Although presumed in journalistic accounts of the issue (Levy, 2005; Paul, 2005), academic research has largely ignored the influence of SEIM on beliefs that women are sex objects. In line with the study by Peter and Valkenburg (2007), our investigation suggests that, at least among adolescents, SEIM affects the development of beliefs that woman are sex objects, albeit indirectly through the liking of such material. Although, in our view, notions of women as sex objects present undesirable views of gender relations, our findings do not imply that adolescents need to be protected from the Internet. Nor do our results in any way call for censorship of sexually explicit material that conforms to current laws about the display of such material. In line with other researchers (Flood, 2007; Wolak et al., 2007), we think that a distinction needs to be made between exposure to SEIM as a result of developmentally appropriate sexual curiosity and the unintended consequences of this exposure. Currently, adolescents grow up in a media environment that provides them with unprecedented access to sexually explicit material. Even in a sexually liberal country with comprehensive sex education, such as The Netherlands, adolescents are not uniformly educated about the social and sexual reality they may encounter in SEIM. Therefore, it is not surprising that they are influenced by the reality depicted in SEIM, for example, about the sexual objectification of women. What is needed, then, is an age-appropriate education about the Internet and the sexually explicit material adolescents may encounter there, based on a thorough understanding of the psychological processes that underlie the effects of this material.

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Notes

- 1 The same results as presented here emerged when we first constrained all direct or indirect effects jointly, then tested it against the unconstrained model, and subsequently freed each involved constrained parameter one at a time to locate which paths would differ between female and male adolescents.
- 2 In developmental terms, our sample is relatively broad, and young people undergo major changes in adolescence. To test whether the influences found would differ between younger and older adolescents, we examined all key influence paths as put forward in Hypotheses 1 to 3 for moderating effects of age. Because age is a metric variable, we did not run multiple-group analyses, but re-estimated the models in Figures 1 and 2 with

interaction effects between age and the independent or mediating variable of interest. We transformed each independent and mediating variable involved in an interaction into a manifest variable, with the additive scale of the variable as the indicator. All interacting variables were centered around their mean to avoid multicollinearity problems. For example, to test for Figure 1 whether the influence of SEIM (wave 1) on notions of women as sex objects (wave 3) varied by age, we created an interaction effect between SEIM (wave 1) and age. We found no significant interaction effects with adolescents' age. Neither the direct effects in Figure 1 nor the indirect effects in Figure 2 differed for younger and older adolescents. Bootstrapping confirmed these results. Whenever both interacting variables were exogenous variables, we double-checked our results with a procedure developed by Mathieu, Tannebaum, and Salas (1992). In this procedure, the interacting variables and the interaction effect variable are turned into latent composites, with their loadings and error variances fixed to values previously computed (for relevant formulas, see Mathieu et al., 1992). However, also in these analyses, no moderating effect of age emerged.

References

- American Association for Public Opinion Research. (2006). *Standard definitions: Final dispositions of case codes and outcome rates for surveys*. Retrieved April 1, 2008, from http://www.aapor.org/uploads/standarddefs_4.pdf.
- American Psychological Association Task Force on the Sexualization of Girls. (2007). *Report of the APA task force on the sexualization of girls*. Retrieved March 5, 2007, from www.apa.org/pi/wpo/sexualization.html.
- Aubrey, J. S. (2006). Exposure to sexually objectifying media and body self-perceptions among college women: An examination of the selective exposure hypothesis and the role of moderating variables. *Sex Roles, 55*, 159–172.
- Bandalos, D. L., & Finney, S. J. (2001). Item parceling issues in structural equation modeling. In G. A. Marcoulides & R. E. Schumacker (Eds.), *Advanced structural equation modeling: New developments and techniques* (pp. 269–296). Mahwah, NJ: Erlbaum.
- Bogaert, A. F. (1996). Volunteer bias in human sexuality research: Evidence for both sexuality and personality differences in males. *Archives of Sexual Behavior, 25*, 125–140.
- Bornstein, R. F. (1989). Exposure and affect: Overview and meta-analysis of research, 1968–1987. *Psychological Bulletin, 106*, 265–289.
- Brooks-Gunn, J., & Graber, J. A. (1999). What's sex got to do with it? The development of sexual identities during adolescence. In R. J. Contrada & R. D. Ashmore (Eds.), *Self, social identity, and physical health: Interdisciplinary explorations* (pp. 155–182). New York: Oxford University Press.
- Brosius, H.-B., Weaver, J. B., & Staab, J. F. (1993). Exploring the social and sexual reality of contemporary pornography. *Journal of Sex Research, 30*, 161–170.
- Brown, J. D. (2000). Adolescents' sexual media diets. *Journal of Adolescent Health, 27S*, 35–40.
- Brown, J. D., L'Engle, K. L., Pardun, C. J., Guo, G., Kenneavy, K., & Jackson, C. (2006). Sexy media matter: Exposure to sexual content in music, movies, television, and magazines predicts black and white adolescents' sexual behavior. *Pediatrics, 117*, 1018–1027.
- Burke, M. C., & Edell, J. A. (1989). The impact of feelings on ad-based affect and cognition. *Journal of Marketing Research, 26*, 69–83.

- Byrne, D. (1977). Social psychology and the study of sexual behavior. *Personality and Social Psychology Bulletin*, *3*, 3–30.
- Coenders, G., Batista-Foguet, J. M., & Saris, W. E. (2008). Simple, efficient and distribution-free approach to interaction effects in complex structural equation models. *Quality and Quantity*, *42*, 369–396.
- Cole, D. A., & Maxwell, S. E. (2003). Testing mediational models with longitudinal data: Questions and tips in the use of structural equation modeling. *Journal of Abnormal Psychology*, *112*, 558–577.
- Cotton, J. L. (1985). Cognitive dissonance in selective exposure. In D. Zillmann & J. Bryant (Eds.), *Selective exposure in communication* (pp. 11–33). Hillsdale, NJ: Erlbaum.
- Cowan, G., & Dunn, K. F. (1994). What themes in pornography lead to perceptions of the degradation of women? *Journal of Sex Research*, *31*, 11–21.
- Cowan, G., Lee, C., Levy, D., & Snyder, D. (1988). Dominance and inequality in X-rated videocassettes. *Psychology of Women Quarterly*, *12*, 299–311.
- Duimel, M., & De Haan, J. (2007). *Nieuwe links in het gezin [New links in the family]*. The Hague, The Netherlands: SCP.
- Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Belmont, CA: Thomson Wadsworth.
- Edell, J. A., & Burke, M. C. (1987). The power of feelings in understanding advertising effects. *Journal of Consumer Research*, *14*, 421–433.
- Efron, B., & Tibshirani, R. J. (1993). *An introduction to the bootstrap*. Boca Raton, FL: Chapman & Hall.
- Ertel, H. (1990). *Erotika und Pornographie: Repräsentative Befragung und psychophysiologische Langzeitstudie zu Konsum und Wirkung. [Erotica and pornography: Representative survey and psycho-physiological longitudinal study on consumption and effects]*. Munich, Germany: PVU.
- Eveland, W. P., Jr., Shah, D. V., & Kwak, N. (2003). Assessing causality in the cognitive mediation model: A panel study of motivations, information processing, and learning during campaign 2000. *Communication Research*, *30*, 359–386.
- Festinger, L. (1957). *A theory of cognitive dissonance*. Evanston, IL: Row Peterson.
- Fisher, W. A. (1986). A psychological approach to human sexuality: The sexual behavior sequence. In D. Byrne & K. Kelley (Eds.), *Alternative approaches to the study of sexual behavior* (pp. 131–171). Hillsdale, NJ: Erlbaum.
- Fisher, W. A., & Barak, A. (2001). Internet pornography: A social psychological perspective on Internet sexuality. *Journal of Sex Research*, *38*, 312–323.
- Fisher, W. A., Fisher, J. D., & Byrne, D. (1977). Consumer reactions to contraceptive purchasing. *Personality and Social Psychology Bulletin*, *3*, 293–296.
- Flood, M. (2007). Exposure to pornography among youth in Australia. *Journal of Sociology*, *43*, 45–60.
- Forgas, J. P. (Ed.). (2001). *Handbook of affect and social cognition*. Mahwah, NJ: Erlbaum.
- Fredrickson, B. L., & Roberts, T. A. (1997). Objectification theory: Toward understanding women's lived experiences and mental health risks. *Psychology of Women Quarterly*, *21*, 173–206.
- Frijda, N. H., Manstead, A. S. R., & Bem, S. (Eds.). (2000). *Emotions and beliefs: How feelings influence thoughts*. Cambridge, U.K.: Cambridge University Press.

- Greenberg, B. S., Linsangan, R., & Soderman, A. (1993). Adolescents' reactions to television sex. In B. S. Greenberg, J. D. Brown, & N. L. Buerkel-Rothfuss (Eds.), *Media, sex, and the adolescent* (pp. 196–224). Creskill, NJ: Hampton Press.
- Hansen, C. H., & Hansen, R. D. (2000). Music and music videos. In D. Zillmann & P. Vorderer (Eds.), *Media entertainment. The psychology of its appeal* (pp. 175–196). Mahwah, NJ: Erlbaum.
- Holbrook, M. B., & Batra, R. (1987). Assessing the role of emotions as mediators of consumer responses to advertising. *Journal of Consumer Research*, **14**, 404–420.
- Jaccard, J., & Wan, C. K. (1996). *Lisrel approaches to interaction effects in multiple regression*. Thousand Oaks, CA: Sage.
- Jensen, R., & Dines, G. (1998). The content of mass-marketed pornography. In G. Dines, R. Jensen, & A. Russo (Eds.), *Pornography. The production and consumption of inequality* (pp. 65–100). New York: Routledge.
- Levy, A. (2005). *Female chauvinist pigs. Women and the rise of raunch culture*. New York: Free Press.
- Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling*, **9**, 151–173.
- Lo, V.-H., & Wei, R. (2005). Exposure to Internet pornography and Taiwanese adolescents' sexual attitudes and behavior. *Journal of Broadcasting and Electronic Media*, **49**, 221–237.
- Malamuth, N. M., Linz, D. G., Heavey, C. L., Barnes, G., & Acker, M. (1995). Using the confluence model of sexual aggression to predict men's conflict with women: A 10-year follow-up-study. *Journal of Personality and Social Psychology*, **69**, 353–369.
- Mathieu, J. E., Tannenbaum, S. I., & Salas, E. (1992). Influences of individual and situational characteristics on measures of training effectiveness. *Academy of Management Journal*, **35**, 828–847.
- Mustanski, B. S. (2001). Getting wired: Exploiting the Internet for the collection of sexually valid data. *Journal of Sex Research*, **38**, 292–301.
- Oliver, M. B. (2002). Individual differences in media effects. In J. Bryant & D. Zillmann (Eds.), *Media effects: Advances in theory and research* (2nd ed., pp. 507–524). Mahwah, NJ: Erlbaum.
- Oliver, M. B., & Hyde, J. S. (1993). Gender differences in sexuality: A meta analysis. *Psychological Bulletin*, **114**, 29–51.
- Paul, P. (2005). *Pornified: How pornography is transforming our lives, our relationships, and our families*. New York: Times Books.
- Peter, J., & Valkenburg, P. M. (2006a). Adolescents' exposure to sexually explicit material on the Internet. *Communication Research*, **33**, 178–204.
- Peter, J., & Valkenburg, P. M. (2006b). Adolescents' exposure to sexually explicit online material and recreational attitudes toward sex. *Journal of Communication*, **56**, 639–660.
- Peter, J., & Valkenburg, P. M. (2007). Adolescents' exposure to a sexualized media environment and notions of women as sex objects. *Sex Roles*, **56**, 381–395.
- Peter, J., & Valkenburg, P. M. (2008a). Adolescents' exposure to sexually explicit Internet material and sexual preoccupation: A three-wave panel study. *Media Psychology*, **11**, 207–234.
- Peter, J., & Valkenburg, P. M. (2008b). Adolescents' exposure to sexually explicit Internet material, sexual uncertainty, and attitudes toward uncommitted sexual exploration: Is there a link? *Communication Research*, **35**, 579–601.

- Preacher, K. J., & Hayes, A. F. (2008). Contemporary approaches to assessing mediation in communication research. In A. F. Hayes, M. D. Slater, & L. B. Snyder (Eds.), *The SAGE sourcebook of advanced data analysis methods for communication research* (pp. 13–54). Thousand Oaks, CA: Sage.
- Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and applications. *Multivariate Behavioral Research*, **42**, 185–227.
- Rigdon, E. E., Schumacker, R. E., & Wothke, W. (1998). A comparative review of interaction and nonlinear modeling. In R. E. Schumacker & G. A. Marcoulides (Eds.), *Interaction and nonlinear effects in structural equation modeling* (pp. 1–16). Mahwah, NJ: Erlbaum.
- Ross, M. W., Daneback, K., Mansson, S.-A., Tikkanen, R., & Cooper, A. (2003). Characteristics of men and women who complete or exit from an on-line Internet sexuality questionnaire: A study of instrument dropout biases. *Journal of Sex Research*, **40**, 396–402.
- Ruggiero, T. E. (2000). Uses and gratifications theory in the 21st century. *Mass Communication and Society*, **3**, 3–37.
- Savin-Williams, R. C., & Diamond, L. M. (2004). Sex. In R. M. Lerner & L. Steinberg (Eds.), *Handbook of adolescent psychology* (2nd ed., pp. 189–231). Hoboken, NJ: Wiley.
- Slater, M. D. (2007). Reinforcing spirals: The mutual influence of media selectivity and media effects and their impact on individual behavior and social identity. *Communication Theory*, **17**, 281–303.
- Slater, M. D., Henry, K. L., Swaim, R. C., & Anderson, L. L. (2003). Violent media content and aggressiveness in adolescents: A downward spiral model. *Communication Research*, **30**, 713–736.
- Steele, J. R. (1999). Teenage sexuality and media practice: Factoring in the influences of family, friends, and school. *Journal of Sex Research*, **36**, 331–341.
- Steele, J. R., & Brown, J. D. (1995). Adolescent room culture: Studying media in the context of everyday life. *Journal of Youth and Adolescence*, **24**, 551–576.
- Steinberg, L., & Morris, A. S. (2001). Adolescent development. *Annual Review of Psychology*, **52**, 83–110.
- Steinman, D. L., Wincze, J. P., Sakheim, D. H., Barlow, D. H., & Mavissakalian, M. (1981). A comparison of male and female patterns of sexual arousal. *Archives of Sexual Behavior*, **10**, 529–547.
- Traen, B., Spitznogle, K., & Beverfjord, A. (2004). Attitudes and use of pornography in the Norwegian population 2002. *Journal of Sex Research*, **41**, 193–200.
- Ward, L. M. (2002). Does television exposure affect emerging adults' attitudes and assumptions about sexual relationships? Correlational and experimental confirmation. *Journal of Youth and Adolescence*, **31**, 1–15.
- Ward, L. M. (2003). Understanding the role of entertainment media in the sexual socialization of American youth: A review of empirical research. *Developmental Review*, **23**, 347–388.
- Ward, L. M., & Friedman, K. (2006). Using TV as a guide: Associations between television viewing and adolescents' sexual attitudes and behavior. *Journal of Research on Adolescence*, **16**, 133–156.
- Wiederman, M. W. (1993). Demographic and sexual characteristics of nonresponders to sexual experience items in a national survey. *Journal of Sex Research*, **30**, 27–35.

- Wolak, J., Mitchell, K., & Finkelhor, D. (2007). Unwanted and wanted exposure to online pornography in a national sample of youth Internet users. *Pediatrics*, **119**, 247–257.
- Zillmann, D. (1971). Excitation transfer in communication-mediated aggressive behavior. *Journal of Experimental Social Psychology*, **7**, 419–434.
- Zillmann, D., & Bryant, J. (1982). Pornography, sexual callousness, and the trivialization of rape. *Journal of Communication*, **32**(4), 10–21.
- Zillmann, D., & Bryant, J. (1985). *Selective exposure to communication*. Hillsdale, NJ: Erlbaum.
- Zillmann, D., & Bryant, J. (1988). Pornography's impact on sexual satisfaction. *Journal of Applied Social Psychology*, **18**, 438–453.
- Zillmann, D., Bryant, J., Comisky, P. W., & Medoff, N. J. (1981). Excitation and hedonic valence in the effect of erotica on motivated intermale aggression. *European Journal of Social Psychology*, **11**, 233–252.
- Zimmer-Gembeck, M. J., & Helfand, M. (2008). Ten years of longitudinal research on U.S. adolescent sexual behavior: Developmental correlates of sexual intercourse, and the importance of age, gender and ethnic background. *Developmental Review*, **28**, 153–224.

L'exposition des adolescents à du contenu sexuellement explicite dans Internet et la perception des femmes comme objets sexuels : Une évaluation de la causalité et des processus sous-jacents

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Résumé

Cette étude visait à clarifier la causalité du lien précédemment établi entre l'exposition des adolescents à du contenu sexuellement explicite dans Internet (CSEI) et la perception des femmes comme étant des objets sexuels. L'étude a également cherché à connaître les processus psychologiques qui sous-tendent ce lien et à déterminer si les diverses influences variaient selon le genre. À partir de données tirées d'une enquête par panel à trois vagues auprès de 962 adolescents néerlandais, la modélisation par équation structurelle a d'abord révélé que les deux phénomènes s'influençaient réciproquement et directement. L'impact direct du CSEI sur la perception des femmes comme objets sexuels ne variait pas selon le genre. Toutefois, l'influence directe de la perception des femmes comme objets sexuels sur l'exposition à du CSEI n'était significative que pour les adolescents de sexe masculin. Des analyses plus poussées ont montré que, peu importe le genre des adolescents, un intérêt pour le CSEI médiait l'influence qu'avait l'exposition à du CSEI sur leurs conceptions des femmes comme objets sexuels, ainsi que l'impact de ces conceptions sur l'exposition à du CSEI.

Adolescents' Exposure to Sexually Explicit Internet Material and Notions of Women as Sex Objects: Assessing Causality and Underlying Processes

성적으로 명백히 인터넷 자료에 대한 어른들의 노출과 섹스대상으로서의 여성의 개념: 인과관계와 기본적인 과정들에의 접근들

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요약

본 연구의 목적은 성적으로 명백한 인터넷 재료들(SEIM)에 대한 어른들의 노출과, 섹스 대상자들로서의 여성의 개념사이에 있어 기존에 확립된 연계내에서의 인과관계를 명백히 하고자 하는 것이다. 더우기, 본 연구는 어떠한 심리적과정들이 이러한 관계를 강조하고 있는지, 그리고 여러 영향들이 젠더에 따라 다르게 나타나는지에 대해 연구하였다. 962명의 네덜란드 어른들을 대상으로 한 3각 패널 조사로부터 데이터에 근거한 구조적 평형 모델링은 SEIM에 대한 노출과 섹스 대상자로서의 여성들의 개념은 서로간 상호교환적인 직접적인 영향을 가지고 있다는 것을 보여주고 있다. 여성을 섹스대상자로서 간주하는 것에 대한 SEIM의 직접적인 영향은 젠더에 따라 다르지 않았다. 그러나, SEIM의 노출에 관한 섹스 대상자로서의 여성의 개념의 직접적인 영향은 남성어른사이에서만 중요한 것으로 나타났다. 추가적인 분석들에 따르면, SEIM의 취향은 어른들의 젠더에 관계없이 SEIM에 대한 노출의 영향을 중재한 것으로 나타났다.

青少年接触色情网络内容和女性作为性对象的观念：

评估因果关系和潜在过程

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摘要

本研究目的在于澄清以前建立的青少年接触色情网络内容和把女性作为性对象之间的因果关系。此外，本研究调查了这种关联的心理过程，和是否因性别不同而异。我们把962位荷兰青少年三重纵向调查数据作为基础，利用结构方程模型进行分析。最初结果显示，青少年接触色情网络内容和把女性作为性对象有相互的直接影响。青少年接触色情网络对女性作为性对象直接的影响并不因性别不同而有差别。然而，女性作为性对象对青少年接触色情网络的直接影响只对男性青少年重要。进一步分析显示，无论青少年是什么性别，对色情内容的爱好是该类内容把女性作为性对象观念的形成和影响的中介。