
Processes Underlying the Effects of Adolescents' Use of Sexually Explicit Internet Material: The Role of Perceived Realism

Communication Research

37(3) 375–399

© The Author(s) 2010

Reprints and permission: <http://www.sagepub.com/journalsPermissions.nav>

DOI: 10.1177/0093650210362464

<http://crx.sagepub.com>



Jochen Peter¹ and Patti M. Valkenburg¹

Abstract

Although research has repeatedly demonstrated a link between adolescents' exposure to sexually explicit Internet material (SEIM) and sexual attitudes, the processes underlying this association are not well understood. More specifically, studies have pointed to a mediating role of perceived realism, but internally valid evidence is missing. To address these problems, the authors used data from a three-wave panel study among 959 Dutch adolescents. They investigated whether two dimensions of the perceived realism of SEIM—social realism and utility—mediated the impact of SEIM on adolescents' instrumental attitudes toward sex (i.e., the notion of sex as primarily physical and casual rather than affectionate and relational). Structural equation modeling showed that more frequent use of SEIM increased both the perceived social realism and the perceived utility of SEIM. In turn, these two perceptions led to more instrumental attitudes toward sex. No evidence of reverse causality emerged.

Keywords

pornography, teenagers, media effects, perceived reality, sexuality, adolescence, youth, sexual socialization

Research from various countries has shown that many adolescents, particularly males, use sexually explicit Internet material (SEIM; Flood, 2007; Lo & Wei, 2005; Peter & Valkenburg, 2006a; Wolak, Mitchell, & Finkelhor, 2007). As a result, scholars have increasingly turned to the potential attitudinal, emotional, and behavioral consequences

¹University of Amsterdam, Netherlands

Corresponding Author:

Jochen Peter, The Amsterdam School of Communication Research (ASCoR), University of Amsterdam, Kloveniersburgwal 48, 1012 CX Amsterdam, Netherlands

Email: j.peter@uva.nl; p.m.valkenburg@uva.nl

that exposure to such material may have for adolescents. Earlier research, which was based on correlational designs, has shown that exposure to SEIM is associated with more permissive sexual attitudes and sexual uncertainty (Lo & Wei, 2005; Peter & Valkenburg, 2006b, 2007, 2008b). Recent research, which has used longitudinal designs, has specified the causality of these findings by demonstrating that more frequent exposure to SEIM leads to greater sexual preoccupation, less progressive gender role attitudes, sexual dissatisfaction, and an earlier onset of oral and vaginal sex (Brown & L'Engle, 2009; Peter & Valkenburg, 2008a, 2009a, 2009b).

Although current research provides a relatively consistent picture of adolescents' exposure to SEIM and its effects, we still know little about the processes that underlie these effects. The lack of knowledge about how SEIM affects adolescents impedes more advanced theory formation because general patterns of media effects remain unidentified. In this study, we focus on the perceived realism of SEIM as a variable that potentially underlies the effects of SEIM on adolescents. Studying this variable is important for at least two reasons. First, claims about the effects of sexually explicit material have often been countered by the argument that consumers of sexually explicit material recognize the exaggerated, unrealistic character of such material, which renders real-world consequences unlikely (for a review, see Linz & Malamuth, 1993). However, some studies have found that adult users of sexually explicit material vary in the extent to which they perceive such material as realistic (Ertel, 1990; Hald & Malamuth, 2008). Moreover, several scholars have argued that adolescents, in particular, may lack the sexual experience, socioemotional maturity, and critical thinking skills to make sense of what they encounter in SEIM (e.g., Huston, Wartella, & Donnerstein, 1998; Thornburgh & Lin, 2002). As a result, they may easily accept what they see in SEIM as a representation of the real world (Strasburger, 2004). Therefore, when dealing with the potential effects of SEIM on adolescents, the perceived realism of such material seems an important variable.

A second, more specific reason for dealing with perceived realism comes from a recent study that has suggested that the perceived realism of SEIM mediates the effects of such material on sexual attitudes (Peter & Valkenburg, 2006b). However, as the authors themselves concede, the correlational design of the study was not able to demonstrate the causal direction in the mediation pattern found. Because experiments on the effects of SEIM are ethically impossible with adolescents, Peter and Valkenburg have requested longitudinal designs to study more rigorously whether the perceived realism of SEIM mediates the effects of SEIM on sexual attitudes.

This study has two goals. First, we will address the causality issue in research on the mediating role of perceived realism. With a three-wave panel study, we will disentangle whether the perceived realism of SEIM mediates the effects of SEIM on sexual attitudes or vice versa. Second, in response to calls for more research on the role of the perceived realism of SEIM (Bogaert, Woodard, & Hafer, 1999; Hald & Malamuth, 2008), we will extend the research focus to two important subdimensions of perceived realism, the perceived social realism of SEIM and its perceived utility (for a review of the dimensions of perceived realism, see Busselle & Greenberg, 2000). The perceived social realism of SEIM refers to the extent to which the content of SEIM is perceived to be similar to real-world

sex. This subdimension of perceived realism has proven relevant in research with minors (e.g., Dorr, Kovaric, & Doubleday, 1990; Wright, Huston, Reitz, & Piemyat, 1994) and seems paramount when studying adolescents' perceptions of the realism of SEIM. The perceived utility of SEIM refers to the extent to which adolescents perceive SEIM as a useful source of information about sex and as applicable to the real world. Scholars have suggested that SEIM may function as a de facto sex educator of youth (e.g., Brown & L'Engle, 2009; Zillmann, 2000). However, to date we lack evidence of whether adolescents perceive SEIM as a valuable source of sexual information. In sum, if it can be shown that adolescents differ in their perceptions of SEIM's social realism and in the extent to which they perceive such material as a useful source of information about sex, we might have a first indication of how and why SEIM affects adolescents.

By SEIM we mean professionally produced or user-generated (audio)visual material on or from the Internet that typically intends to arouse the viewer and depicts sexual activities and (aroused) genitals in unconcealed ways, usually with close-ups on oral, anal, and vaginal penetration. *Playboy*-type nudity is not included in this definition. We prefer the term *sexually explicit material* to the term *pornography*. As various scholars have pointed out (e.g., Faulstich, 2000; Fisher & Barak, 1991; Linz & Malamuth, 1993), pornography is not only a polarized and emotionally loaded term but also invites idiosyncratic connotations that obfuscate its meaning.

Exposure to SEIM and Instrumental Attitudes Toward Sex

To study the role of perceived realism in the effects of SEIM on adolescents, we focus on adolescents' instrumental attitudes toward sex as an outcome variable. *Instrumental attitudes toward sex* refer to the notion of sex as a primarily physical, casual game in which one's own sexual pleasure is more important than affectionate or relational aspects (Hendrick & Hendrick, 1987). Instrumental attitudes toward sex are conceptually similar to other sexual attitudes recently studied in the field, such as permissive sexual attitudes and recreational attitudes towards sex, which have been found to be associated with more frequent exposure to SEIM (Brown & L'Engle, 2009; Lo & Wei, 2005; Peter & Valkenburg, 2008b) and with a greater perceived realism of SEIM (Peter & Valkenburg, 2006b).

Generally, there are at least three reasons for a potential effect of SEIM on adolescents' sexual attitudes. First, due to their developing sexuality adolescents are curious about sexual matters (e.g., Savin-Williams & Diamond, 2004). This heightened sexual interest may render them particularly receptive to the messages about sexuality implied in SEIM. At the same time, however, many adolescents may have difficulties with understanding the reality portrayed in sexually explicit material as a specific, pornographic representation of sex, given their limited sexual experiences (Huston et al., 1998; Thornburgh & Lin, 2002). Second, content analyses of sexually explicit material have suggested that the portrayal of sex in such material is rather homogeneous (e.g., Brosius, Weaver, & Staab, 1993; Cowan & Campbell, 1994; Cowan, Lee, Levy, & Snyder, 1988; Ertel, 1990; Jensen & Dines, 1998). Media effects are generally stronger when individuals are confronted with homogeneous messages about a particular issue than when they are confronted with heterogeneous messages about that issue (e.g., Peter, 2004). Third and finally, the obtrusive visual

character of sexually explicit material may intensify the experiential states that accompany the use of such material (e.g., Greenberg, Linsangan, & Soderman, 1993). Consequently, it may be particularly difficult for adolescents to counterargue the messages conveyed in SEIM.

Against this backdrop, it seems plausible that SEIM may affect adolescents' instrumental attitudes toward sex. Content analyses have shown that sexually explicit material depicts sex as a predominantly physical activity between casual partners while relational and affectionate aspects of sex are usually ignored (Brosius et al., 1993; Ertel, 1990). With an increasing use of SEIM, adolescents may consequently more easily endorse instrumental attitudes toward sex. This influence of SEIM on adolescents' sexual attitudes has been documented in a recent longitudinal study, which found that the frequent use of sexually explicit material led to more sexually permissive attitudes among male adolescents (Brown & L'Engle, 2009). Therefore, we hypothesize as follows:

Hypothesis 1a (H1a): More frequent exposure to SEIM will lead to more instrumental attitudes toward sex.

Advanced approaches to media effects have recently conceptualized media effects as dynamic, mutually reinforcing interplay between people's choice of a particular media content and the influence that this content has on them (M. D. Slater, Henry, Swaim, & Anderson, 2003). For example, M. D. Slater's (2007) reinforcing-spiral framework suggests a reciprocal relation between media use and media effects: The use of a particular media content may not only affect a particular outcome variable, for example attitudes, but this outcome variable may also influence future use of that particular media content. In the present study, this means not only that exposure to SEIM may influence instrumental attitudes toward sex (as hypothesized in H1a) but also that these attitudes may affect exposure to SEIM.

Derived from the more general reinforcing-spiral framework (M. D. Slater, 2007), the assumption that instrumental attitudes toward sex affect exposure to SEIM has its specific foundation in selective exposure theory (Festinger, 1957; for reviews, see Cotton, 1985; Hart et al., 2009). Selective exposure theory posits that people strive to defend their attitudes from challenges by selectively choosing attitude-consistent information while avoiding attitude-inconsistent information. In that view, people turn to particular media content because they expect their preexisting attitudes to be confirmed (Oliver, 2002).

Generally, it has been well documented that people select information that matches their attitudes (for a meta-analysis, see Hart et al., 2009). Specifically, young people's selective exposure to media content has been shown for violent media content (M. D. Slater et al., 2003), sexually objectifying media (Aubrey, 2006), various music genres (Rubin, West, & Mitchell, 2001), and political news (Knobloch-Westerwick & Meng, 2009). Whereas, to date, research on adolescents' selective exposure to SEIM is scarce, there is strong reason to assume that adolescents selectively use such material. Sexologists agree that young people do not enter adolescence as a blank slate but already have notions of, and attitudes toward, love and sex, which have formed through nonsexual experiences

in childhood and preadolescence (e.g., Money, 1986; Simon & Gagnon, 1986; Stoller, 1979). Because sexually explicit material typically displays instrumental attitudes toward sex (Brosius et al., 1993), adolescents who hold such attitudes may be more likely to use SEIM given that it is consistent with such attitudes. Conversely, adolescents who do not hold instrumental attitudes toward sex may be less likely to use SEIM because this material is inconsistent with their attitudes. Therefore, we hypothesize as follows:

Hypothesis 1b (H1b): More instrumental attitudes toward sex will lead to more frequent exposure to SEIM.

Perceived Realism as a Mediator of the Effects of SEIM on Instrumental Attitudes Toward Sex

If perceived realism mediates the effects of SEIM on adolescents' instrumental attitudes toward sex, two separate influences are implied. First, exposure to SEIM increases the extent to which adolescents perceive such material as realistic. Second, a greater perceived realism of SEIM leads to more instrumental attitudes toward sex. This pattern has been suggested recently by Peter and Valkenburg (2006b). The mediating role of perceived realism may be ascribed to the representativeness heuristic (Kahneman & Tversky, 1972), provided that perceived realism judgments are conceptually comparable to judgments about the probability of events. The general idea is that, when adolescents judge the realism of SEIM, they compare the sex depicted in SEIM with their sexual scripts. *Sexual scripts* refer to cognitive models "that people use to guide and evaluate social and sexual interactions" (Rose & Frieze, 1993, p. 499). Sexual scripts are typically acquired in childhood and throughout adolescence, and there is increasing evidence that sexual media content affects these scripts (Eggermont, 2006; Stulhofer, Busko, & Landpriet, 2010; Tolman, Kim, Schooler, & Sorsoli, 2007).

Depending on the degree of similarity between adolescents' sexual scripts and the depiction of sex in SEIM, the extent of the perceived realism of SEIM may vary. Because sexual media content influences sexual scripts, there should be a greater overlap of sexual scripts and the depicted sex in SEIM among those who use SEIM more frequently than among those who use SEIM less frequently. As a result, when comparing sex in SEIM with their sexual scripts, those who use SEIM more often should see a greater similarity between the two—and thus perceive SEIM as more realistic—than those who use SEIM less often.

This positive relation between exposure to sexually explicit material and the perceived realism of that material has been reported both for adolescents (Peter & Valkenburg, 2006b) and adults (Ertel, 1990; however, see also Hald & Malamuth, 2008, who found no relation). Several studies have also documented a positive association between exposure to nonsexual media content and the perceived realism of that content (e.g., Elliott & Slater, 1980; Greenberg, Neuendorf, Buerkel-Rothfuss, & Henderson, 1982; D. Slater & Elliott,

1982). In sum, then, there is both theoretical and empirical reason to assume that more frequent exposure to SEIM will result in greater perceived realism of such material.

The second part of the mediation pattern—the effect of perceived realism on instrumental attitudes toward sex—may be explained with basic principles of persuasion. Generally, scholars have suggested that media content that is perceived as realistic elicits stronger persuasive effects than media content that is perceived as unrealistic (e.g., Busselle & Greenberg, 2000; Potter, 1988). More specifically, the perceived realism of media content may facilitate persuasion effects because material that is perceived as realistic may be more engaging and is less likely to be discounted (Busselle, Ryabovolova, & Wilson, 2004; Huesmann, Eron, Klein, Brice, & Fischer, 1983). As a result, people may more easily accept messages from media content that they perceive as realistic than from media content that they perceive as unrealistic. Several empirical studies have confirmed this assumption: The effects of media content were generally stronger when this content was perceived as realistic (Greenberg et al., 1982; Huesmann et al., 1983; Perse, 1986; Potter, 1986; Rubin, Perse, & Taylor, 1988; D. Slater & Elliott, 1982). The positive relation between perceived realism and media effects has also been found both for nonexplicit and explicit sexual media content (Peter & Valkenburg, 2006b; Rivadeneyra & Ward, 2005; Ward & Rivadeneyra, 1999). Therefore, we expect that greater perceived realism of SEIM will lead to more instrumental attitudes toward sex.

Our hypothesis on perceived realism as a mediator of the effects of SEIM on instrumental attitudes toward sex reads as follows:

Hypothesis 2 (H2): (a) As adolescents use SEIM more frequently, their perceived realism of SEIM will increase, which in turn (b) will lead to more instrumental attitudes toward sex. (c) Exposure to SEIM thus exerts at least parts of its effect on instrumental attitudes toward sex through the perceived realism of SEIM.

Perceived Realism as a Mediator of the Effects of Instrumental Attitudes Toward Sex on SEIM

A potential mediating role of perceived realism in the effect of instrumental sexual attitudes on SEIM (as hypothesized in H1b) also implies two effects: first, an effect of instrumental attitudes toward sex on the perceived realism of SEIM and, second, an effect of perceived realism on exposure to SEIM. The potential impact of instrumental attitudes toward sex on perceived realism may be explained with evaluative-cognitive consistency theory (Rosenberg, 1956; for a review, see Eagly & Chaiken, 1993). The theory holds that attitudes and related beliefs are organized in a state of balance. Similar to other cognitive consistency theories (e.g., Festinger, 1957; Heider, 1946; Osgood & Tannenbaum, 1955), evaluative-cognitive consistency theory assumes that threats to this state of balance, for example, beliefs that are inconsistent with attitudes, are experienced as unpleasant. As a result, people try to restore balance, for instance, by adjusting beliefs in a way that they become consistent with attitudes. Formally, evaluative-cognitive consistency theory focuses on a perceiver's (P) evaluation of an attitude object (x ; e.g., unaffectionate sex), the perceiver's evaluation of an impersonal entity (y ; e.g., the depiction of sex in SEIM), and on the three relations between P , x , and y . Balance or consistency occurs when all three

relations between P , x , and y are positive or when two relations are negative and one is positive. Imbalance or inconsistency occurs in all other cases.

Because the portrayal of unaffectionate sex is typical of sexually explicit material (Brosius et al., 1993), the depiction of sex in sexually explicit material (y) can be assumed to be positively related to unaffectionate sex (x). An adolescent (P) who supports instrumental attitudes toward sex evaluates unaffectionate sex (x) positively. When asked to judge the realism of how sex is depicted in SEIM (y), this adolescent will evaluate the realism of SEIM positively in order to maintain cognitive consistency: The relations between P , x , and y are all positive. Conversely, an adolescent who does not support instrumental attitudes toward sex—and thus evaluates unaffectionate sex (x) negatively—will evaluate the realism of sex in SEIM (y) negatively to maintain cognitive consistency: In that case, two relations are negative and one is positive. On the basis of cognitive consistency theory, we thus expect that more instrumental attitudes toward sex will lead to a greater perceived realism of SEIM.

The potential impact of perceived realism on exposure to SEIM can be conceptualized within the theoretical framework of uses and gratifications. Uses and gratifications research considers media users as active individuals who are aware of their motives of media use and accordingly select media content that provides the gratifications they seek (Palmgreen, Wenner, & Rosengren, 1985; Rubin, 2002; Ruggiero, 2000). Earlier research has focused on motives of media use, such as relaxation, passing time, and escapism (e.g., Greenberg, 1973). Recent approaches have responded to the emergence of reality-based media content and have found that curiosity about other people presents an important motive for using such content (Nabi, Stitt, Halford, & Finnerty, 2006). SEIM with its unconcealed portrayal of sexual activities that are not simulated can be seen as a reality-based media content. Because sexual curiosity peaks in adolescence (Savin-Williams & Diamond, 2004), SEIM may be particularly attractive for adolescents. More specifically, if adolescents perceive SEIM as realistic and useful, it may trigger their curiosity even more and, as a result, they may be likely to use such material. Therefore, we expect that the extent to which adolescents perceive SEIM as realistic will increase their exposure to SEIM.

Our hypothesis on perceived realism as a mediator of the effects of instrumental attitudes toward sex on exposure to SEIM reads as follows:

Hypothesis 3 (H3): (a) As adolescents have more instrumental attitudes toward sex, their perceived realism of SEIM will increase, which in turn (b) will lead to more frequent exposure to SEIM. (c) Instrumental attitudes toward sex thus exert at least part of their effect on exposure to SEIM indirectly through the perceived realism of SEIM.

Method

Sample and Procedure

Our study is based on a three-wave panel survey. A three-wave panel design is the minimum requirement to investigate mediation adequately in nonexperimental designs (e.g., Cole & Maxwell, 2003). The first wave was fielded in May and June 2006 among 2,341

Dutch adolescents aged 13 to 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 the sociosexual development of young people is only completed in young adulthood (Arnett, 2000). Because little research on optimal time lags exists in our field, we based our choice of a 6-month time interval between the waves on two pragmatic considerations. First, adolescents are able to validly assess the frequency of their SEIM use for a 6-month period (Peter & Valkenburg, 2006a). Second, adolescents are volatile respondents, particularly in surveys on sex-related issues, which typically leads to high attrition rates (Zimmer-Gembeck & Helfand, 2008). Inappropriately long time lags between waves may thus increase the risk of losing too many respondents.

Sampling and fieldwork were done 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 this online panel had originally been sampled in all parts of the Netherlands. We chose gender and age as quota characteristics for the sampling. These two characteristics have been found to influence respondents' willingness to participate and respond in surveys on sensitive issues (e.g., Ross, Daneback, Mansson, Tikkanen, & Cooper, 2003; Wiederman, 1993). The resulting sample reflected national distributions of age and gender among Dutch adolescents. Before the first wave was fielded, institutional approval, parental consent for minors' participation, and adolescents' informed consent were obtained.

Respondents were asked to fill in an online questionnaire. In each wave, they were (re-) contacted by email and could decide themselves when, within 1 week, they filled in the online questionnaire. Because online surveys or, more generally, computer-mediated surveys do not involve an interviewer, they have proven to be the best mode of interviewing when sensitive issues are studied (e.g., Mustanski, 2001). Due to inequalities in Internet access in a population, online surveys may suffer from systematically biased samples. This problem is less troublesome in the Netherlands, especially when adolescents are interviewed, because 97% of Dutch adolescents have home access to the Internet (Duimel & De Haan, 2007).

Prior to all waves, we notified the respondents that the study was about sexuality and the Internet. Respondents were asked to complete the questionnaire in privacy. We also explained that it was impossible for the principal investigators to identify who had filled in the questionnaire. The research bureau only provided us with a number code for each respondent with which we linked the measurements of the three waves. Respondents were also aware of the fact that they could stop the survey at any time they wished. On average, it took respondents 15 minutes to complete the questionnaire.

Between the first and the third wave, 404 (17.3%) of the 2,341 adolescents who had completed the questionnaire in Wave 1 (W1) terminated their membership in the online panel. These respondents were thus no longer eligible for Wave 2 (W2) and/or Wave 3 (W3). For W3, we only recontacted those 1,426 respondents who had completed the questionnaire in W2 because we interpreted nonparticipation or an incomplete questionnaire in W2 as respondents' wish to no longer participate in the study. In W3, 1,123 adolescents participated, and 1,052 returned a complete questionnaire, which presents the number of

respondents that completed the questionnaires in all three waves. Across all three waves, then, the cooperation rate was 54%, calculated according to the guidelines of the American Association for Public Opinion Research (2006) on the basis of the eligible cases and completed questionnaires in W3. Attrition could not be reduced further although, in both W2 and W3, respondents were reminded three times to participate in the study. In W2 and W3, they were finally also offered an extra bonus of €10 for participation, in addition to the €2.50 that they received for filling in each questionnaire and the final bonus of €5 that they received for completing all three questionnaires.

Older adolescents were more likely to participate in all three waves than younger adolescents ($M_{part.} = 16.78$, $SD = 2.26$, $M_{nonpart.} = 16.18$, $SD = 2.28$), $F(1, 1935) = 33.17$, $p < .001$, $\eta^2 = .017$. Girls (60%) participated more often than boys (49%) in all three waves, $\chi^2(1, N = 1937) = 13.85$, $p < .001$, $\Phi = .11$. These gender and age differences in participation have been described in other sex-related research and seem to present a more general problem in this type of research (e.g., Ross et al., 2003; Wiederman, 1993). Further analyses showed that participants held less instrumental attitudes toward sex and tended to perceive SEIM as less realistic than did nonparticipants. However, when we controlled for gender and age, these two differences between participants and nonparticipants vanished. Thus, nonparticipation did not result in unexplainable systematic differences in the data.

Measures

Exposure to SEIM. We 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 the interview, they had intentionally looked at (a) pictures with clearly exposed genitals, (b) videos with clearly exposed genitals, (c) pictures in which people are having sex, and (d) videos in which people are having sex. In the introduction of the question, adolescents were informed that the question was about sexually explicit, pornographic content on or from the Internet. They 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. Further, adolescents were told that genitals referred to the penis and the vagina (and thus not to typical *Playboy*-type nudity) and that *having sex* meant unconcealed vaginal, anal, or oral penetration. 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 at least 88% in the three waves). Cronbach's alpha was .95 in all three waves. For information about the means and standard deviations, see Table 1.

Instrumental attitudes toward sex. We used the four items with the highest factor loadings from the scale developed by Hendrick and Hendrick (1987). The four items were as follows: "Sex is primarily physical," "The main goal of sex is that you yourself have a good time," "Sex is just a game," and "Sex is a physical need, like eating." Response categories ranged from 1 (*fully disagree*) to 5 (*fully agree*). In all three waves, the items

formed a unidimensional scale (explained variance at least 60%). Cronbach's alpha was at least .78 in the three waves. For means and standard deviations, see Table 1.

Perceived social realism and perceived utility of SEIM. The perceived social realism of SEIM was operationalized with four items that have often been used in perceived realism scales (e.g., Busselle, 2001; Konijn, Bijvank, & Bushman, 2007). We adjusted the items to perceptions of SEIM. The items were "Sex on the Internet is realistic" (Item 1), "Sex on the Internet is similar to sex in real life" (Item 2), "Sexual situations depicted in sex on the Internet often appear in real life" (Item 3), and "In reality, the sex people have is like the sex that appears on the internet" (Item 4). The items that we chose for the operationalization of the perceived utility of SEIM were geared toward an operationalization by Busselle (2001). The three items used were as follows: "By watching sex on the Internet, you can learn things you wouldn't learn otherwise" (Item 5), "By watching sex pictures or sex videos on the Internet, you learn how to behave when having sex" (Item 6), and "Sex on the Internet gives you valuable information about sex" (Item 7). Respondents were instructed that the seven items referred to pornographic content on or from the Internet. Response categories ranged from 1 (*fully disagree*) to 5 (*fully agree*).

According to Busselle and Greenberg (2000), social realism and utility are different dimensions of perceived realism. Therefore, we tested the factorial validity of this conceptualization in a first-order confirmatory factor analysis (CFA) model. A well-fitting first-order CFA model suggests that the identified dimensions can be operationalized as independent (yet correlated) scales and analyzed separately. For all three waves, the CFA indicated a cross-loading of Item 5 on both perceived social realism and utility. When we removed this item from the model, the model fits of the measurements in all three waves became very good. For example, in W1, the model fit was $\chi^2(8, N = 959) = 10.28, p = .25$, Comparative Fit Index (CFI) = .999, root mean square error of approximation (RMSEA) = .018 (90% confidence interval [CI]: .000/.044). Based on the CFA, we subsequently operationalized social realism with Items 1 to 4. Cronbach's alpha was at least .88 across the three waves. The perceived utility of SEIM was operationalized with Items 6 and 7. The correlation between the two items was at least $r = .75, p < .001$, in the three waves. Means and standard deviations can be found in Table 1.

A total of 93 respondents did not answer any or only a few of the items with which perceived social realism and perceived utility were tapped. Because these respondents reported that they had never used SEIM, we accepted these nonanswers as valid answers rather than as randomly missing answers. Therefore, we did not use missing cases imputation techniques. The number of cases available for analysis thus reduced to 959.

Data Analysis

We tested our model with structural equation modeling, treating all variables as latent constructs.¹ Two item parcels (i.e., the averaged item scores of two or more items) served as manifest indicators for the latent constructs of exposure to SEIM, perceived social realism, and instrumental attitudes toward sex. Perceived utility was measured with only two items and therefore not subjected to item parceling. The item parcels were created using a procedure suggested by Russell, Kahn, Spoth, and Altmaier (1998). First, we factor

Table 1. Zero-Order Correlations Between the Variables in the Models and Scale-Relevant Information

	1	2	3	4	5	6	7	8	9	10	11	12
1. Exposure SEIM (W1)	1.00											
2. Exposure SEIM (W2)	.68	1.00										
3. Exposure SEIM (W3)	.65	.73	1.00									
4. Social realism (W1)	.30	.27	.23	1.00								
5. Social realism (W2)	.25	.42	.30	.51	1.00							
6. Social realism (W3)	.24	.29	.35	.41	.48	1.00						
7. Perceived utility (W1)	.45	.41	.33	.58	.43	.37	1.00					
8. Perceived utility (W2)	.39	.52	.41	.41	.64	.45	.58	1.00				
9. Perceived utility (W3)	.37	.37	.46	.36	.44	.68	.51	.60	1.00			
10. Instrumental attitudes (W1)	.20	.21	.17	.32	.27	.22	.31	.26	.21	1.00		
11. Instrumental attitudes (W2)	.19	.30	.23	.27	.34	.32	.27	.37	.31	.53	1.00	
12. Instrumental attitudes (W3)	.21	.27	.28	.25	.30	.34	.29	.34	.35	.49	.62	1.00
M	2.09	2.14	2.14	2.14	2.03	2.45	2.36	2.32	2.43	2.44	2.37	2.33
SD	1.40	1.49	1.46	0.81	0.81	0.83	0.96	0.96	0.96	0.80	0.80	0.81

Note: All correlations were significant at least at $p < .001$. SEIM = Sexually explicit Internet material. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.

analyzed the items meant to measure each variable. Based on the sizes of the factor loadings, we then alternately assigned each item to the first or second item parcel. To illustrate, for exposure to SEIM, this meant that items ranked 1 and 3 on the factor formed the first item parcel, and items ranked 2 and 4 on the factor formed the second item parcel. Generally, item parceling leads to more parsimonious models, reduces the chances for double loadings to occur, and diminishes the impact of the various sources of sampling error (e.g., Little, Cunningham, Shahar, & Widaman, 2002). However, item parceling should only be used if relations among the latent constructs, and not among the items, are studied (Little et al., 2002) and if the underlying construct is unidimensional (Bandalos & Finney, 2001; Little et al., 2002). These conditions were met.

Variables in sex research are typically skewed. Shapiro-Wilk tests showed that also the variables in this study were not normally distributed. As a result, the assumption of multivariate normality was also not met. Scholars have recommended the bootstrap method to alleviate the resulting statistical problems (Efron & Tibshirani, 1993). Therefore, we tested the statistical significance of all analyses reported below not only with traditional parametric tests but also with the bootstrap method. We estimated a bootstrap bias-corrected 95% CI (bc 95% CI) for all values of interest (1,000 bootstrap samples, $N = 959$ each). If this interval includes zero, a given estimate is not significant. We accepted an estimate as significant only if both the tests based on normal theory and the tests based on bootstrapping indicated a statistically significant difference from zero.

Results

Hypothesis 1a predicted that exposure to SEIM would lead to more instrumental attitudes toward sex. Hypothesis 1b stated that more instrumental attitudes toward sex would increase exposure to SEIM. Table 1 shows the zero-order correlation of all variables involved in the analyses of this study. Although the correlations are in line with H1a and H1b, they do not present an adequate test of the hypotheses. To test H1a and H1b rigorously, models are necessary that include previous levels of the various dependent variables (i.e., autoregressive effects) along with controls for simultaneous influences of predictor variables (for elaboration, see Cole & Maxwell, 2003). Figure 1 presents such a model.

The fit of the model as shown in Figure 1 was acceptable, $\chi^2(31, N = 959) = 151.61$, $p < .001$, CFI = .989, RMSEA = .064 (90% CI: .054/.064). Exposure to SEIM had a significant positive impact on instrumental attitudes toward sex, both between W1 and W2, $\beta = .07$, $B = .039$, $SE = 0.016$, $p < .05$ (bc 95% CI: .005/.074), and between W2 and W3, $\beta = .08$, $B = .041$, $SE = 0.016$, $p < .01$ (bc 95% CI: .001/.080). Thus, H1a was supported. However, instrumental attitudes toward sex influenced exposure to SEIM only between W1 and W2, $\beta = .08$, $B = .162$, $SE = 0.057$, $p < .01$ (bc 95% CI: .056/.274), but not between W2 and W3, $\beta = .00$, $B = -.003$, $SE = 0.053$, ns (bc 95% CI: -.133/.143). H1b was thus only partly supported.

Our mediation analyses below focus on the predictors as measured at W1 and on the outcomes as measured at W3. Therefore, we also tested a model (not shown) in which we only investigated the influences of the predictors at W1 on the outcomes at W3. The fit of that model was very good, $\chi^2(10, N = 959) = 11.63$, $p = .31$, CFI = 1.00, RMSEA = .013 (90% CI: .000/.039). Exposure to SEIM at W1 had a significant positive impact on instrumental attitudes toward sex at W3, $\beta = .11$, $B = .062$, $SE = 0.018$, $p < .001$ (bc 95% CI: .028/.107). However, instrumental attitudes toward sex at W1 did not influence exposure to SEIM at W3, $\beta = .03$, $B = .064$, $SE = 0.059$, ns (bc 95% CI: -.077/.176).

Jointly, Hypotheses 2a, 2b, and 2c predicted an indirect effect of SEIM on instrumental attitudes toward sex via the perceived realism of SEIM. Likewise, Hypotheses 3a, 3b, and 3c jointly predicted a reverse indirect effect from instrumental attitudes toward sex on

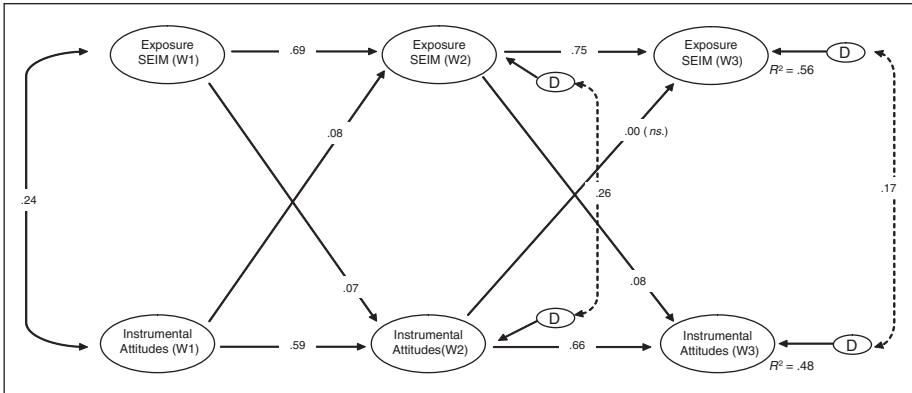


Figure 1. Assessing causality between exposure to sexually explicit Internet material (SEIM) and instrumental attitudes toward sex

Note: Coefficients are standardized estimates, significant at least at $p < .05$ (two-tailed), unless indicated otherwise. The ovals represent latent constructs. Dashed curves are covariances between disturbance terms (D). For clarity reasons, observed variables and error terms as well as the measurement model are not shown. In this and all other models, we allowed error variances of the same item parcel to covary over time, following recommendations by Cole and Maxwell (2003). W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.

exposure to SEIM via perceived realism. Following Cole and Maxwell (2003), a rigorous test of these hypotheses leads to a model as displayed in Figures 2 and 3. Figure 2 shows the model when perceived social realism was the mediator. Figure 3 shows the model when perceived utility was the mediator.

Social realism as a mediator. The fit of the model in Figure 2 was good, $\chi^2(94, N = 959) = 233.67, p < .001, CFI = .991, RMSEA = .039$ (90% CI: .033/.046). In line with H2a, more frequent exposure to SEIM (W1) led to a greater perceived social realism of SEIM (W2), $\beta = .07, B = .039, SE = 0.017, p < .05$ (bc 95% CI: .001/.072). As expected in H2b, greater perceived social realism (W2) resulted in more instrumental attitudes toward sex, $\beta = .10, B = .100, SE = 0.034, p < .01$ (bc 95% CI: .020/.186). Also the indirect effect of SEIM (W1) on instrumental attitudes (W3) via perceived social realism (W2) was significant, $B = .004, SE = 0.02, p < .05$ (bc 95% CI: .001/.010). H2c was thus supported.

Despite recent criticism of traditional tests of complete or partial mediation and suggestions to focus on the size of indirect effects instead (e.g., Preacher & Hayes, 2008), we think that it is still 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. After all, to date convincing criteria to evaluate the size of an indirect effect are still lacking. To investigate complete or partial mediation for the effect of exposure to SEIM (W1) on instrumental attitudes toward sex (W3), we tested the model in Figure 2 as

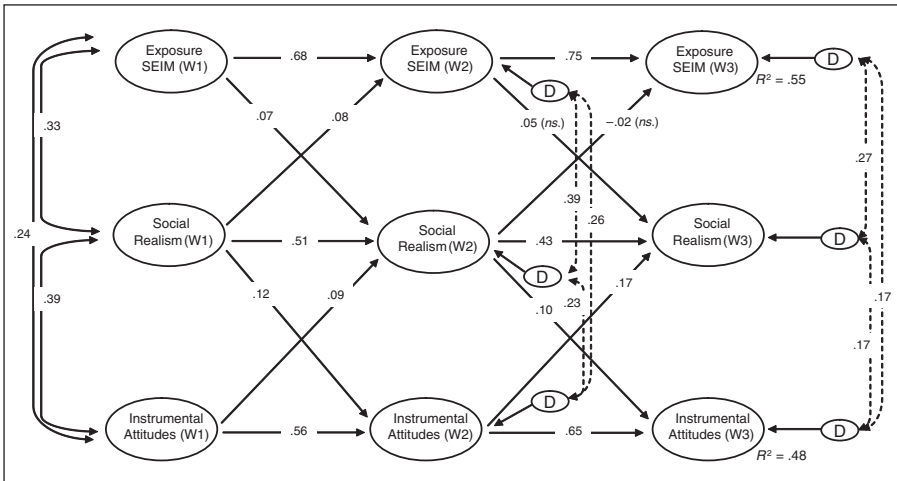


Figure 2. Perceived social realism as a mediator of the impact of exposure to sexually explicit Internet material (SEIM) on instrumental attitudes toward sex

Note: Coefficients are standardized estimates, significant at least at $p < .05$ (two-tailed), unless indicated otherwise. Dashed curves are covariances between disturbance terms (D). For clarity reasons, observed variables and error terms as well as the measurement model are not shown. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.

a nested model with two conditions: when the direct path from exposure to SEIM (W1) to instrumental attitudes toward sex (W3) 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 instrumental attitudes does not differ from zero. The model with the constrained path did not lead to a significant χ^2 change, $\Delta\chi^2(1, N = 959) = 2.67, p = .10$. Thus, the effect of adolescents' exposure to SEIM (W1) on instrumental attitudes toward sex (W3) was no longer significant once the perceived social realism of SEIM (W2) was included.

Figure 2 also shows the results of the tests of H3a, H3b, and H3c. As predicted by H3a, more instrumental attitudes toward sex (W1) led to a greater perceived social realism of SEIM (W2), $\beta = .09, B = .101, SE = 0.039, p < .01$ (bc 95% CI: .014/.173). In contrast to H3b, however, greater perceived social realism of SEIM (W2) did not increase exposure to SEIM (W3), $\beta = -.02, B = -.035, SE = 0.051, ns$ (bc 95% CI: -.168/.084). As a result, the indirect effect hypothesized in H3c was also not significant, $B = -.003, SE = 0.005, ns$ (bc 95% CI: -.021/.537).

Perceived utility as a mediator. The overall fit of the model in Figure 3 was good, $\chi^2(94, N = 959) = 264.67, p < .001, CFI = .988, RMSEA = .044$ (90% CI: .037/.050). As hypothesized in H3a, adolescents perceived SEIM as more useful (W2) when they used SEIM more often (W1), $\beta = .13, B = .079, SE = 0.020, p < .001$ (bc 95% CI: .029/.123). In line with H3b, greater perceived utility of SEIM (W2) resulted in more instrumental attitudes

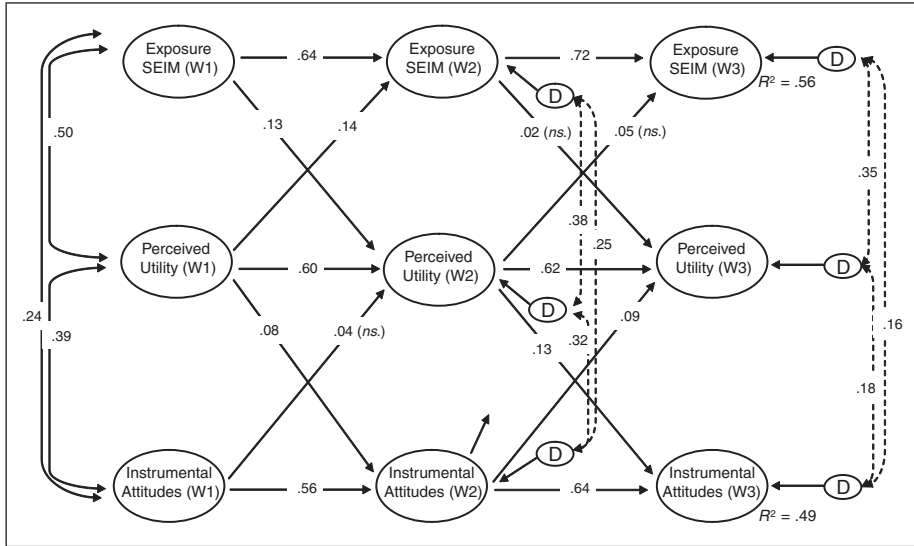


Figure 3. Perceived utility as a mediator of the impact of exposure to sexually explicit Internet material (SEIM) on instrumental attitudes toward sex

Note: Coefficients are standardized estimates, significant at least at $p < .05$ (two-tailed), unless indicated otherwise. Dashed curves are covariances between disturbance terms (D). For clarity reasons, observed variables and error terms as well as the measurement model are not shown. W1 = Wave 1; W2 = Wave 2; W3 = Wave 3.

toward SEIM (W3), $\beta = .13$, $B = .113$, $SE = 0.030$, $p < .001$ (bc 95% CI: .040/.177). Consequently, also the indirect effect of SEIM (W1) via perceived utility (W2) on instrumental attitudes toward sex (W3) was significant, $B = .009$, $SE = 0.002$, $p < .001$ (bc 95% CI: .003/.019). H3c was thus also supported.

To test whether the originally significant effect of SEIM (W1) on instrumental attitudes toward sex (W3) would lose its significance once perceived utility was in the model, we followed the nested-model logic outlined above. The model in which the path from SEIM (W1) to instrumental attitudes (W3) was constrained did not change the model fit compared to the model in which it was allowed to vary, $\Delta\chi^2(1, N = 959) = 0.59$, $p = .44$. Thus, the effect of SEIM (W1) on instrumental attitudes (W3) was no longer significant if the mediator perceived utility of SEIM was part of the model.

As shown in Figure 3, neither H3a nor H3b were supported. Instrumental attitudes toward sex (W1) did not affect the extent to which adolescents perceived SEIM as useful (W2), $\beta = .04$, $B = .046$, $SE = 0.042$, ns (bc 95% CI: $-.048/.155$). Similarly, perceived utility (W2) did not influence exposure to SEIM (W3), $\beta = .05$, $B = .078$, $SE = 0.050$, ns (bc 95% CI: $-.046/.181$). The indirect effect of instrumental attitudes toward sex (W1) on the use of SEIM (W3) via perceived utility (W2) was also not significant, $B = .004$, $SE = 0.004$, ns (bc 95% CI: $-.003/.024$).

In sum, H2a, H2b, and H2c were generally supported: More frequent exposure to SEIM resulted in a greater perceived utility of SEIM, which in turn led to more instrumental attitudes toward sex. Support for H3a was mixed. Whereas more instrumental attitudes toward SEIM increased the perceived social realism of SEIM, they did not affect the perceived utility of SEIM. H3b and H3c remained generally unsupported: Neither the perceived social realism of SEIM nor its perceived utility increased exposure to SEIM. As a result, in none of the analyses did instrumental attitudes toward sex exert an indirect effect on exposure to SEIM via the perceived realism of SEIM.²

Discussion

Although research on the implications of adolescents' use of SEIM has quickly increased in the past years, our knowledge about the processes that underlie potential effects of SEIM is still very limited. This study provides first evidence that adolescents' perceptions of the realism of SEIM may explain how their use of SEIM affects instrumental attitudes toward sex. With a three-wave panel design, the study confirmed, and extended, findings of earlier cross-sectional research on the mediating function of perceived realism in the link between SEIM and attitudes toward casual sex (Peter & Valkenburg, 2006b). When adolescents used SEIM more frequently, they perceived it as more socially realistic and as more useful. In turn, stronger perceptions of the social realism and the utility of SEIM resulted in more instrumental attitudes toward sex. At the same time, however, neither the perceived social realism of SEIM nor its perceived utility mediated the impact of instrumental sexual attitudes on SEIM. Overall, the study suggests that the perceived social realism and the perceived utility of SEIM as dimensions of the perceived realism of SEIM may play an important role in the processes that underlie the effects of SEIM on adolescents' instrumental attitudes toward sex.

Against the backdrop of these findings, it is striking that research has only recently started to pay attention to the role of perceived realism in the effects of sexually explicit material (Bogaert et al., 1999; Hald & Malamuth, 2008; Peter & Valkenburg, 2006b). One of the reasons may be a strong focus on direct effects in much research on the consequences of sexually explicit material. Doubtlessly, the study of direct effects is important in the early stages of a developing research field. However, too strong an adherence to direct effects may not only reinforce simplistic notions of the effects of sexually explicit material but it may also impede a theoretically more profound understanding of how and why such material affects individuals. Our study suggests that the perceived realism of SEIM is an important concept to comprehend the effects of SEIM on adolescents' sexual attitudes. As a result, we support calls by other researchers for more research on the concept (Bogaert et al., 1999; Hald & Malamuth, 2008) and add that this should be accompanied by further attention to the processes that underlie the effects of SEIM.

Future research on the role of perceived realism of SEIM may also pay attention to the dimensional structure of perceived realism. Because of the scarce research on the topic, we operationalized and tested two plausible subdimensions of perceived realism, the perceived social realism of SEIM, and its perceived utility. Our operationalizations have

proven to be reliable, but elaboration and refinement of the utility measure in particular seem desirable. Moreover, based on Busselle and Greenberg's review (2000) of the perceived realism concept, it may be worth studying whether other subdimensions of perceived realism present relevant constructs in research on the effects of SEIM. Promising subdimensions could be the perceived probability of the events presented in SEIM (i.e., the likelihood with which something observed in SEIM occurs in the real world) and the perceived plausibility of the content of SEIM (i.e., the extent to which something perceived in SEIM could exist in the real world).

In contrast to our expectations, adolescents' instrumental sexual attitudes affected their use of SEIM only between W1 and W2. We did not find over-time reciprocal influences between the use of SEIM and instrumental attitudes as predicted, for instance, by M. D. Slater's (2007) reinforcing-spirals framework. Moreover, the expected effect of perceived realism on the use of SEIM did not emerge. Two reasons may account for these unexpected findings. First, sexual attitudes and the perceived features of SEIM may not predict the use of SEIM as well as other, more personality-oriented variables. Several studies on the antecedents of SEIM have indeed shown that the best predictors of adolescents' use of SEIM seem to be gender and personality characteristics, such as sensation seeking and life satisfaction (Brown & L'Engle, 2009; Flood, 2007; Peter & Valkenburg, 2006a; Wolak et al., 2007). Second, both selective exposure and uses and gratifications theory presuppose unrestricted and easy access to media content. Whereas SEIM is available to adolescents, access to it is still not as easy as access to mainstream television content. Thus, it is possible that theoretically plausible selective exposure and uses and gratifications processes may be counteracted by the particular nature and accessibility of SEIM.

Research on the underlying processes of the effects of SEIM may benefit from a closer look at the impact of exposure to SEIM on perceived realism. If, as assumed in the representativeness heuristic (Kahneman & Tversky, 1972), adolescents compare the sexual portrayals in SEIM with their sexual scripts and if the perceived similarity between the two points to an influence of SEIM on sexual scripts, then our result tentatively suggests that SEIM may influence adolescents' sexual scripts. Our study does not provide direct evidence of the impact of SEIM on adolescents' sexual scripts. However, the consistently positive effect of SEIM on perceived social realism and perceived utility—in the absence of any impact of social realism and utility on exposure—hints at this possibility.

Our findings may also be relevant to theoretical discussions about the consequences of the use of sexually explicit material. Several scholars have emphasized that sexually explicit material merely evokes sexual fantasies (for a review, see Linz & Malamuth, 1993). These fantasies may arouse people but are not acted out because users of sexually explicit material are able to recognize the exaggerated, fantasy-driven character of the content. We by no means reject the notion that, for many people, sexually explicit material may solely trigger sexual fantasies that do not have any real-life consequences. Moreover, this study can only demonstrate that the perceived realism of SEIM affects sexual attitudes, while it is silent about potential behavioral effects. Finally, as the means in Table 1 show, more frequent exposure to SEIM did not lead to perceptions of SEIM as more realistic but rather as less unrealistic.

Having said that, however, we believe that a general claim that sexually explicit material remains confined to the realm of sexual fantasies may not only suffer from an adult bias but may also be problematic in the light of this study and related research (Hald & Malamuth, 2008; Peter & Valkenburg, 2006b). If all adolescents were able to distinguish between the exaggerated, fictional character of SEIM and real-life sex, the perceived social realism and the perceived utility of SEIM would be a constant. As a result, no relation between exposure to SEIM, sexual attitudes, and the perceived social realism of SEIM should occur. However, in line with previous research (Peter & Valkenburg, 2006b), our study has found considerable associations between exposure to SEIM, sexual attitudes, and the perceived realism of SEIM. More specifically, our study extends earlier research by showing that exposure to SEIM increases its perceived utility—the extent to which adolescents regard SEIM as valuable information about sex that may help them to learn how to behave when having sex. If SEIM only stimulated sexual fantasies, this influence should not have occurred. Thus, the general pattern in our results suggests that general assumptions about the mere fantasy character of SEIM may not adequately represent the processes that underlie the effects of SEIM on adolescents.

By focusing on instrumental attitudes toward sex, we do not imply that adolescents who hold such attitudes toward sex are morally wrong. We do agree with other scholars that intimate, affectionate, and committed relationships may greatly help adolescents to learn, and engage in, responsible sexual behavior (e.g., Brown, 2002; Romeo & Kelley, 2009). In our view, however, more instrumental attitudes toward sex need to be seen also in the context of sex and sexuality as a socially, culturally, and historically contingent phenomenon (e.g., Ford & Beach, 1951; Foucault, 1976/1990; Gagnon & Simon, 1973). As a result, more instrumental attitudes can also be interpreted as a sociosexual change in which access to the Internet and, thereby, SEIM seems to play an important role. For example, in the Netherlands, where this study was done, the proportion of adolescents who find casual sex acceptable rose from 16% in 1995 to 25% in 2005 (Rutgers Nisso Group, 2005). In the same period, adolescents' home Internet access increased from 4% in 1997 (Valkenburg, 1997) to 97% in 2005 (Duimel & De Haan, 2007). Our study was done after the dramatic increase in adolescents' access to the Internet and only covers a period of 1 year, focusing on the use of SEIM. Consequently, the study does not provide decisive evidence that adolescents' increased Internet access leads to more casual sexual attitudes. However, our findings along with the striking parallel between Internet access and more casual sexual attitudes may offer sufficient reason to formulate a casualization hypothesis for future research: In countries where adolescents' Internet access is currently still developing, sexual attitudes will become more casual as adolescents' use of SEIM increases.

In our view, it is important that adolescents are educated about the specific portrayal of sex in SEIM. This need for education about SEIM is also emphasized by our finding that some adolescents perceive SEIM as a valuable source of information about sex. Only if these adolescents are (made) aware of the fact that SEIM represents one very specific notion of sex will they be able to put the content of SEIM in perspective. On a broader level, it may also be necessary to rethink adolescents' sex education. If adolescents regard SEIM a useful source for sexual information, they apparently discover in SEIM the sexual information they are unable to find elsewhere. If they are unable to find this sexual information elsewhere, it may be that existing sex education does not address adolescents' curiosity and questions about sex sufficiently. Our results do not permit the conclusion that

SEIM has become a de facto sex educator of youth. Nevertheless, it suggests that, if teachers and parents want to remain influential in adolescents' sexual socialization, they will have to answer adolescents' questions about sex in a way that keeps adolescents from consulting SEIM for sexual advice.

Our study has some limitations that may reduce the generalizability of its results. First, due to the impossibility of conducting experiments involving SEIM and adolescents, we chose a nonexperimental longitudinal design for our study. The internal validity of this design is inferior to experimental designs. The causal claims made need to be seen within these confines. Second, the effects we found are small. This is in line with other media effects research. Moreover, the small effect sizes may partly also derive from the sensitive character of the questions and the resulting highly skewed data distributions. Third, we opted for a 6-month interval between our waves for pragmatic rather than for theoretical reasons. Unfortunately, theories about the time lags necessary for media effects to occur are few and difficult to apply to the topic of this study. Fourth, the influences found seem to have occurred without further moderation by individual-difference variables. However, based on consistent evidence from research by Malamuth and colleagues (e.g., Malamuth & Huppin, 2005), it is unlikely that the effects of SEIM are the same for all adolescents. Therefore, future research should more strongly take an individual-difference approach to the effects of SEIM, paying special attention to adolescents' maturation as a moderating influence. Finally, our study was done in the Netherlands, a country known for its pragmatic and liberal approach to teenage sexuality. Studies in other cultural contexts may offer interesting insights about the culturally sensitive character of our findings.

In conclusion, this study merges with other recent longitudinal research (Brown & L'Engle, 2009) in that it shows that SEIM affects adolescents' sexual attitudes. Extending other research, it also demonstrates that the influence of SEIM on adolescents' sexual attitudes is most likely not direct but mediated by cognitions, such as the perceived realism of SEIM. Given recent evidence of affective mediators of the impact of SEIM on adolescents' sexual cognitions (Peter & Valkenburg, 2008a, 2009a), studies are needed that combine these insights into integrative cognition-affect models. Such models, along with appropriate theory development, may not only advance our understanding of the impact of SEIM on adolescents' sexual socialization but may also improve our knowledge about media effects in general.

Acknowledgment

The authors would like to thank the anonymous reviewers for their insightful comments on an earlier draft of this article.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the authorship and/or publication of this article.

Funding

The authors disclosed receipt of the following financial support for the research and/or authorship of this article: The Netherlands Organisation for Scientific Research (NWO) provided funding for this study.

Notes

1. We also tested all models with exposure to sexually explicit Internet material (SEIM) as a manifest construct. The results of these analyses did not deviate meaningfully from the results presented in this article.
2. There are good reasons to assume that the indirect effect of SEIM on instrumental attitudes via perceived social realism and utility may differ depending on adolescents' gender and sexual experience. Research suggests that male adolescents and adolescents with no or limited sexual experience may be especially likely to perceive SEIM as more socially realistic and useful than female adolescents and adolescents with more sexual experience (Peter & Valkenburg, 2006b, 2008a, 2009b). We tested this moderating influence of gender on the influence of SEIM (W1) on perceived social realism and utility (W2) with a multiple-group analysis. In that analysis, we tested a model in which the path from SEIM (W1) on perceived social realism (or utility; W2) was constrained to be equal among male and female adolescents against a model in which this path was allowed to vary. Neither for perceived social realism nor for perceived utility as a mediator did the fit of the two models differ significantly. Thus, adolescents' gender did not affect the indirect effect exerted by SEIM on instrumental attitudes via the perceived social realism or perceived utility of SEIM. To test a moderating effect of sexual experience on the impact of SEIM (W1) on perceived social realism and utility (W2), we followed a procedure developed by Mathieu, Tannenbaum, and Salas (1992). Sexual experience had no moderating impact when perceived social realism was the mediator, $B = .021$, $SE = 0.044$, ns (bc 95% CI: $-.073/.108$). When perceived utility was the mediator, the significant effect found on the basis of normal theory, $B = .109$, $SE = 0.050$, $p < .05$, did not stand the test of bootstrapping, with the bc 95% CI being between $-.004$ and $.224$. In sum, there was no robust evidence that the indirect effect of SEIM on instrumental attitudes via perceived realism differed depending on adolescents' sexual experience.

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
- Arnett, J. J. (2000). Emerging adulthood: A theory of development from the late teens through the twenties. *American Psychologist*, *55*, 469-480.
- 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., Woodard, U., & Hafer, C. L. (1999). Intellectual ability and reactions to pornography. *Journal of Sex Research*, *36*, 283-291.
- 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. (2002). Mass media influences on sexuality. *Journal of Sex Research, 39*, 42-45.
- Brown, J. D., & L'Engle, K. L. (2009). X-rated: Sexual attitudes and behaviors associated with U.S. early adolescents' exposure to sexually explicit media. *Communication Research, 36*, 129-151.
- Busselle, R. W. (2001). Television exposure, perceived realism, and exemplar accessibility in the social judgment process. *Media Psychology, 3*, 43-67.
- Busselle, R. W., & Greenberg, B. S. (2000). The nature of television realism judgments: A reevaluation of their conceptualization and measurement. *Mass Communication & Society, 3*, 249-268.
- Busselle, R. W., Ryabovolova, A., & Wilson, B. (2004). Ruining a good story: Cultivation, perceived realism and narrative. *Communications, 29*, 365-378.
- 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., & Campbell, R. R. (1994). Racism and sexism in interracial pornography: A content-analysis. *Psychology of Women Quarterly, 18*, 323-338.
- Cowan, G., Lee, C., Levy, D., & Snyder, D. (1988). Dominance and inequality in X-rated videocassettes. *Psychology of Women Quarterly, 12*, 299-311.
- Dorr, A., Kovacic, P., & Doubleday, C. (1990). Age and content influences on children's perceptions of the realism of television families. *Journal of Broadcasting & Electronic Media, 34*, 377-397.
- Duimel, M., & De Haan, J. (2007). *Nieuwe links in het gezin* [New links in the family]. The Hague, Netherlands: SCP.
- Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Belmont, CA: Thomson Wadsworth.
- Efron, B., & Tibshirani, R. J. (1993). *An introduction to the bootstrap*. Boca Raton, FL: Chapman & Hall.
- Eggermont, S. (2006). Television viewing and adolescents' judgment of sexual request scripts: A latent growth curve analysis in early and middle adolescence. *Sex Roles, 55*, 457-468.
- Elliott, W. R., & Slater, D. (1980). Exposure, experience and perceived TV reality for adolescents. *Journalism Quarterly, 57*, 409-414.
- 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.
- Faulstich, W. (2000). Probleme der Pornographie-Debatte [Problems of the pornography debate]. In W. Faulstich (Ed.), *Medienkulturen* (pp. 139-144). Munich, Germany: Fink.
- Festinger, L. (1957). *A theory of cognitive dissonance*. Evanston, IL: Row Peterson.
- Fisher, W. A., & Barak, A. (1991). Pornography, erotica, and behavior: More questions than answers. *International Journal of Law and Psychiatry, 14*, 65-83.
- Flood, M. (2007). Exposure to pornography among youth in Australia. *Journal of Sociology, 43*, 45-60.
- Ford, C. S., & Beach, F. A. (1951). *Patterns of sexual behavior*. New York: Harper & Brothers.
- Foucault, M. (1990). *The history of sexuality*. London: Penguin. (Original work published 1976).
- Gagnon, J. H., & Simon, W. (1973). *Sexual conduct: The social sources of human sexuality*. Chicago: Aldine.
- Greenberg, B. S. (1973). Gratifications of television viewing and their correlates for British children. In J. G. Blumler & E. Katz (Eds.), *The use of mass communications: Current perspectives on gratifications research* (pp. 71-92). Beverly Hills, CA: Sage.

- 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). Cresskill, NJ: Hampton Press.
- Greenberg, B. S., Neuendorf, K., Buerkel-Rothfuss, N., & Henderson, L. (1982). The soaps: What's on and who cares? *Journal of Broadcasting*, 26, 519-535.
- Hald, G. M., & Malamuth, N. M. (2008). Self-perceived effects of pornography consumption. *Archives of Sexual Behavior*, 37, 614-625.
- Hart, W., Albarracin, D., Eagly, A. H., Brechan, I., Lindberg, M. J., & Merrill, L. (2009). Feeling validated versus being correct: A meta-analysis of selective exposure to information. *Psychological Bulletin*, 135, 555-588.
- Heider, F. (1946). Attitudes and cognitive organization. *Journal of Psychology*, 21, 107-112.
- Hendrick, S., & Hendrick, C. (1987). Multidimensionality of sexual attitudes. *Journal of Sex Research*, 23, 502-526.
- Huesmann, L. R., Eron, L. D., Klein, R., Brice, P., & Fischer, P. (1983). Mitigating the imitation of aggressive behaviors by changing children's attitudes about media violence. *Journal of Personality and Social Psychology*, 44, 899-910.
- Huston, A. C., Wartella, E. A., & Donnerstein, E. (1998). *Measuring the effects of sexual content in the media: A report to the Kaiser Family Foundation*. Menlo Park, CA: Kaiser Family Foundation.
- 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.
- Kahneman, D., & Tversky, A. (1972). Subjective probability: A judgment of representativeness. *Cognitive Psychology*, 3, 430-454.
- Knobloch-Westerwick, S., & Meng, J. B. (2009). Looking the other way: Selective exposure to attitude-consistent and counterattitudinal political information. *Communication Research*, 36, 426-448.
- Konijn, E. A., Bijvank, M. N., & Bushman, B. J. (2007). I wish I were a warrior: The role of wishful identification in the effects of violent video games on aggression in adolescent boys. *Developmental Psychology*, 43, 1038-1044.
- Linz, D. G., & Malamuth, N. M. (1993). *Pornography*. Newbury Park, CA: Sage.
- 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 & Electronic Media*, 49, 221-237.
- Malamuth, N. M., & Huppini, M. (2005). Pornography and teenagers: The importance of individual differences. *Adolescent Medicine*, 16, 315-326.
- 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.
- Money, J. (1986). *Lovemaps*. New York: Irvington.
- Mustanski, B. S. (2001). Getting wired: Exploiting the Internet for the collection of sexually valid data. *Journal of Sex Research*, 38, 292-301.
- Nabi, R. L., Stitt, C. R., Halford, J., & Finnerty, K. L. (2006). Emotional and cognitive predictors of the enjoyment of reality-based and fictional television programming: An elaboration of the uses and gratifications perspective. *Media Psychology*, 8, 421-447.
- 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.

- Osgood, C. E., & Tannenbaum, P. H. (1955). The principle of congruity in the prediction of attitude change. *Psychological Review*, *62*, 42-55.
- Palmgreen, P., Wenner, L. A., & Rosengren, K. E. (1985). Uses and gratifications research: The past ten years. In K. E. Rosengren, L. A. Wenner, & P. Palmgreen (Eds.), *Media gratifications research* (pp. 11-37). Beverly Hills, CA: Sage.
- Perse, E. M. (1986). Soap opera viewing patterns of college students and cultivation. *Journal of Broadcasting & Electronic Media*, *30*, 175-193.
- Peter, J. (2004). Our long "return to the concept of powerful mass media": A cross-national comparative investigation of the effects of consonant media coverage. *International Journal of Public Opinion Research*, *16*, 144-168.
- 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.
- Peter, J., & Valkenburg, P. M. (2009a). Adolescents' exposure to sexually explicit Internet material and notions of women as sex objects: Assessing causality and underlying mechanisms. *Journal of Communication*, *59*, 407-433.
- Peter, J., & Valkenburg, P. M. (2009b). Adolescents' exposure to sexually explicit Internet material and sexual satisfaction: A longitudinal study. *Human Communication Research*, *35*, 171-194.
- Potter, W. J. (1986). Perceived reality and the cultivation hypothesis. *Journal of Broadcasting & Electronic Media*, *30*, 159-174.
- Potter, W. J. (1988). Perceived reality in television effects research. *Journal of Broadcasting & Electronic Media*, *32*, 23-41.
- 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.
- Rivadeneira, R., & Ward, L. M. (2005). From Ally McBeal to Sábado Gigante: Contributions of television viewing to the gender role attitudes of Latino adolescents. *Journal of Adolescent Research*, *20*, 453-475.
- Romeo, K. E., & Kelley, M. A. (2009). Incorporating human sexuality content into a positive youth development framework: Implications for community prevention. *Children and Youth Services Review*, *31*, 1001-1009.
- Rose, S., & Frieze, I. H. (1993). Young singles contemporary dating scripts. *Sex Roles*, *28*, 449-509.
- Rosenberg, M. J. (1956). Cognitive structure and attitudinal affect. *Journal of Abnormal and Social Psychology*, *53*, 367-372.
- 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.

- Rubin, A. M. (2002). The uses-and-gratifications perspective of media effects. In J. Bryant & D. Zillmann (Eds.), *Media effects: Advances in theory and research* (2nd ed., pp. 525-548). Mahwah, NJ: Erlbaum.
- Rubin, A. M., Perse, E. M., & Taylor, D. M. (1988). A methodological examination of cultivation. *Communication Research*, 15, 107-134.
- Rubin, A. M., West, D. V., & Mitchell, W. S. (2001). Differences in aggression, attitudes toward women, and distrust as reflected in popular music preferences. *Media Psychology*, 3, 25-42.
- Ruggiero, T. E. (2000). Uses and gratifications theory in the 21st century. *Mass Communication & Society*, 3, 3-37.
- Russell, D. W., Kahn, J. H., Spoth, R., & Altmaier, E. M. (1998). Analyzing data from experimental studies: A latent variable structural equation modeling approach. *Journal of Counseling Psychology*, 45, 18-29.
- Rutgers Nisso Group. (2005). *Seks onder je 25e* [Sex under 25]. Retrieved August 29, 2005, from <http://www.seksonderje25e.nl/resultaten>
- 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.
- Simon, W., & Gagnon, J. H. (1986). Sexual scripts: Permanence and change. *Archives of Sexual Behavior*, 15, 97-120.
- Slater, D., & Elliott, W. R. (1982). Television's influence on social reality. *Quarterly Journal of Speech*, 68, 69-79.
- 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.
- Stoller, R. J. (1979). *Sexual excitement. Dynamics of erotic life*. New York: Pantheon.
- Strasburger, V. C. (2004). Children, adolescents, and the media. *Current Problems in Pediatric and Adolescent Health Care*, 34, 54-113.
- Stulhofer, A., Busko, V., & Landpriet, I. (2010). Pornography, sexual socialization, and satisfaction among men. *Archives of Sexual Behavior*, 39, 168-178.
- Thornburgh, D., & Lin, H. S. (2002). *Youth, pornography, and the Internet*. Washington, DC: National Academy Press.
- Tolman, D. L., Kim, J. L., Schooler, D., & Sorsoli, C. L. (2007). Rethinking the associations between television viewing and adolescent sexuality development: Bringing gender into focus. *Journal of Adolescent Health*, 40, 84.e89-84.e16.
- Valkenburg, P. M. (1997). *Vierkante ogen: Opgroeien met TV en PC* [Squared eyes: Growing up with TV and PC]. Amsterdam: Balans.
- Ward, L. M., & Rivadeneyra, R. (1999). Contributions of entertainment television to adolescents' sexual attitudes and expectations: The role of viewing amount versus viewer involvement. *Journal of Sex Research*, 36, 237-249.
- 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.
- Wright, J. C., Huston, A. C., Reitz, A. L., & Piemyat, S. (1994). Young children's perceptions of television reality: Determinants and developmental differences. *Developmental Psychology*, 30, 229-239.

- Zillmann, D. (2000). Influence of unrestrained access to erotica on adolescents' and young adults' disposition toward sexuality. *Journal of Adolescent Health, 27S*, 41-44.
- 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.

Bios

Jochen Peter (PhD, University of Amsterdam, Netherlands) is an associate professor in the Amsterdam School of Communication Research (ASCoR) at the University of Amsterdam. His research interests focus on the social consequences of the Internet.

Patti M. Valkenburg (PhD, Leiden University, Netherlands) is a professor in the Amsterdam School of Communication Research (ASCoR) at the University of Amsterdam. Her research interests include children's likes and dislikes in entertainment and the effects of media on the cognitive, affective, and social development of children and adolescents.