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Exploring Associations Between Exposure to Sexy Online Self-Presentations and Adolescents' Sexual Attitudes and Behavior

Johanna M. F. van Oosten · Jochen Peter · Inge Boot

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Abstract Previous research suggests that adolescents' social network site use is related to their sexual development. However, the associations between adolescents' exposure to sexy self-presentations of others on social network sites and their sexual attitudes and experience have not yet been empirically supported. This study investigated reciprocal longitudinal relationships between adolescents' exposure to others' sexy self-presentations on social network sites and their sexual attitudes (i.e., sexual objectification of girls and instrumental attitudes towards sex) and sexual experience. We further tested whether these associations depended on adolescents' age and gender. Results from a representative two-wave panel study among 1,636 Dutch adolescents (aged 13–17, 51.5 % female) showed that exposure to sexy online self-presentations of others predicted changes in adolescents' experience with oral sex and intercourse 6 months later, but did not influence their sexual attitudes. Adolescents' instrumental attitudes towards sex, in turn, did predict their exposure to others' sexy online self-presentations. Sexual objectification increased such exposure for younger adolescents, but decreased exposure for older adolescents. In addition, adolescents' experience with genital touching as well as oral sex (only for adolescents aged 13–15) predicted their exposure to sexy self-presentations of others. These findings tentatively suggest that the influence on adolescents' sexual attitudes previously found for sexual media content may not hold for sexy self-presentations on social network sites. However, exposure to sexy self-

presentations on social network sites is motivated by adolescents' sexual attitudes and behavior, especially among young adolescents.

Keywords Adolescence · Teenagers · Media effects · Social media · Social network sites

Introduction

The past decades have seen an increasing amount of research on the influence of sexual media content on adolescents' sexuality. For instance, previous research has shown that adolescents' stereotypical sexual beliefs and sexual behavior are associated with frequent exposure to sexual content on TV (Brown and Bobkowski 2011; Shafer et al. 2013) and pornography (for a review, see: Owens et al. 2012). However, it seems that one important type of sexual media content has been overlooked. With the rise of online communication and social network sites, adolescents have become able to create and distribute sexual content themselves (Brown and Bobkowski 2011; Livingstone 2008; Shafer et al. 2013; Subrahmanyam et al. 2006). Adolescents have been shown to post pictures of themselves in sexually suggestive poses or sexy clothing on social network sites (Ringrose 2010; Ringrose and Eriksson Barajas 2011). We call this type of online content, which is the focus of the present study, sexy online self-presentations.

The prevalence of sexual content on social network sites seems to be substantial. For instance, about a quarter of the profiles on the social network site MySpace contains references to sexual activity, including sexually suggestive pictures (Moreno et al. 2009). With regard to sexy online self-presentations specifically, one study found that of 200

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Facebook profiles, 25 % included semi-nude or sexually provocative photos (Peluchette and Karl 2009). A content analysis of MySpace profiles showed that 5.4 % percent of adolescents posted pictures of themselves posing in swimsuits or underwear (Hinduja and Patchin 2008). Girls, in particular, seem to present themselves in sexy ways on social network sites, with for instance 20 % of social network site profile pictures containing body display (i.e., pictures in swimwear, lingerie, nudity or revealing clothing, Hall et al. 2012). Given the substantial amount of sexy self-presentations on social network sites, adolescents may encounter such self-presentations when looking for sexual content online. In fact, it has been argued that, similar to TV and sexually explicit internet material, adolescents may use social network sites for sexual exploration (e.g., Subrahmanyam et al. 2006; Valkenburg and Peter 2011).

Adolescents form all sorts of connections on social network sites, with best friends, but also with celebrities they adore (Boyd 2007). Exposure to sexy self-presentations can thus include sexy self-presentations by close friends, by more distant connections, or by celebrities. However, the main purpose for adolescents is to produce content and share it with their peers (e.g., Barker 2009; Gross 2004; Lenhart and Madden 2007). As a result, when online friends present themselves in sexy ways on social network sites, they arguably may play the most important role as providers of sexual information (Shafer et al. 2013). In fact, social network sites have been called a “super peer”, promoting certain norms and behaviors among adolescents (Moreno et al. 2009).

Scholars have thus suggested that sexy online self-presentations, notably by peers, can reinforce or refute the sexual information provided by other media genres (Collins et al. 2011; Shafer et al. 2013). For instance, it has been argued that adolescents reproduce gender stereotypes based in advertising and other media content with the pictures that they post on social network sites (e.g., Hirdman 2007; Tortajada-Giménez et al. 2013). Girls’ sexy self-presentations on social network sites, in particular, seem to resonate with the prevalence of female sexualized bodies in traditional media (Hall et al. 2012; Manago et al. 2008; Ringrose 2010, 2011). However, when adolescents take over messages from celebrity culture in their self-presentations (e.g., being attractive and part of a party scene), they can also be harshly judged for being too public (e.g., having too many friends and posting too much information, Bailey et al. 2013). Even though the feedback and comments that social network site users receive on their profiles in general tend to be mainly positive (Valkenburg et al. 2006), comments on sexy self-presentations or sexy self-disclosure on social network sites can be both positive (e.g., “nice pic”, “good looking” or “Hello Sexy”) or rude and degrading (e.g., “fat slag”, “bitch”, or

“whore”; Ringrose 2011, p. 106). This implies that sexy self-presentations of others on social network sites may reinforce sexual messages from other sexual media content, and thus reinforce the influence of such content on adolescents’ attitudes and behavior. At the same time, this influence may be further reinforced but also refuted by the feedback that adolescents receive on such self-presentations from peers.

Empirical research on the relationship between looking at sexy online self-presentations of others and adolescents’ sexuality is still lacking. More specifically, we do not know whether such content reinforces or refutes sexual messages from traditional media and, as a result, can affect sexual stereotypical attitudes and sexual behavior among adolescents. Furthermore, adolescents’ already existing sexual attitudes and sexual experience may also motivate them to selectively expose themselves to sexual content (Shafer et al. 2013; Steele and Brown 1995; Steele 1999). However, it is unclear to date whether selective exposure to sexual content also includes exposure to others’ sexy self-presentations on social network sites.

Finally, the association between media use and attitudes and behaviors has been said to depend on viewers’ “lived experience” (e.g., Steele 1999; Steele and Brown 1995). This means that adolescents’ selection of particular media content, and its application to their own lives, should be seen in the context of personal factors, such as gender and developmental level (Steele 1999). With regard to social network site use, there is some evidence that the way in which adolescents engage in sexual self-disclosure on social network sites depends on adolescents’ personality and offline experiences (e.g., Ringrose 2010, 2011; Ringrose and Eriksson Barajas 2011). Similarly, adolescents’ exposure to sexy self-presentations of others, as well as how they are influenced by such exposure, may depend on personal factors. However, research on such individual differences is still lacking.

Given our lack of knowledge of how adolescents’ exposure to sexy self-presentations of others on social network sites is linked to their sexual attitudes and experience, the present study had three aims. The first aim of this study was to investigate whether adolescents’ exposure to sexy online self-presentations of others on social network sites predicts their sexual attitudes as well as their sexual experience. More specifically, we focused on two sexual attitudes that may be relevant to sexy online self-presentations, notably acceptance of sexual objectification of girls (i.e., the reduction of girls to their sexual appeal in terms of their outer appearance and seeing girls as sexual playthings, Peter and Valkenburg 2007), and instrumental attitudes towards sex (i.e., 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 and Hendrick 1987). The second aim of this study was to investigate whether adolescents' sexual attitudes and experience predicts selective exposure to others' sexy self-presentations. The third aim of this study was to investigate whether exposure to sexy online self-presentations of others and its association with sexual attitudes and sexual experience depend on adolescents' gender and age.

Sexy Online Self-Presentations and the Media Practice Model

One theoretical framework that can explain possible associations between exposure to sexy online self-presentations of others and adolescents' sexual attitudes and sexual experience is the Media Practice Model (Brown 2000; Steele 1999; Steele and Brown 1995). The Media Practice Model is a particularly relevant model for studying relationships between sexy self-presentations on social network sites and adolescents' sexuality, as it was developed to describe adolescents' sexual media use and its implications (Shafer et al. 2013). The Media Practice Model puts adolescents' sexual media use in a social context, more so than other—more cognitive—media effects theories (e.g., Social Cognitive Theory, Bandura 2001). According to this model, media influence takes place in a cyclical and dynamic process of media selection, interpretation, application and identity formation. In this process, adolescents are active media users that make their own choices about the media content they select, when and how they interact with it and how they apply the content to their own behavior and identity. Furthermore, the Media Practice Model posits that media influence does not occur in isolation, but is dependent on how the content is seen in light of adolescents' everyday experiences and social environment (Steele and Brown 1995).

The Media Practice Model has four main assumptions that make this model especially suitable to investigate adolescents' exposure to sexy self-presentations on social network sites. First, the Media Practice Model assumes that media consumers are active, even to the extent that they produce media content themselves. Second, it posits that friends and peers are important for generating, sharing, and interpreting media content. Third, the selection and use of sexual media are motivated by the adolescent's sexual development. Fourth, sexual media effects are a cyclical process, such that selected sexual content reinforces already existing attitudes and behaviors that subsequently increase sexual media use and further effects (Shafer et al. 2013; Steele 1999). Together, the four assumptions predict reciprocal relationships between exposure to sexy self-presentations of others—notably peers—on social network sites and sexual attitudes and sexual experience.

Sexy Online Self-Presentations and Adolescents' Sexual Attitudes and Sexual Experience

Two sexual attitudes that may be particularly relevant to sexy online self-presentations are sexual objectification of girls and instrumental attitudes towards sex. Sexual objectification of girls has been related to adolescents' exposure to sexually explicit internet material (Peter and Valkenburg 2007, 2009), sexual TV content (Ward 2002; Ward and Friedman 2006), and adolescents' preference for music genres high in sexual content (Ter Bogt et al. 2010). These associations have been explained by the strong focus on girls' bodies in sexual media content (Peter and Valkenburg 2007). In the same vein, when others are scantily dressed and pose sexually on social network sites, the focus may be mostly on their bodies. Such a focus may be particularly placed on girls' bodies given their higher levels of sexy self-presentations (e.g., Hall et al. 2012). In addition, because girls are generally more likely to be sexually objectified than boys (Swim et al. 2001), we thus expected that looking at sexy self-presentations of others may result in sexual objectification, notably the sexual objectification of girls.

Exposure to others' sexy self-presentation on social network sites may also be related to notions of sex as something purely physical, which are already frequently portrayed in the media. Previous research has shown that heavy TV viewing, and involvement while viewing, is associated with recreational attitudes towards sex (Ward 2002; Ward and Friedman 2006). Similarly, exposure to sexually explicit material has been shown to increase adolescents' instrumental attitudes towards sex (Peter and Valkenburg 2010). Given the physical nature of sexy self-presentations, as well as the playful culture that surrounds sexualized content on social network sites prescribing that being sexy is fun and cool (e.g., Ringrose 2010, 2011), exposure to sexy online self-presentations of others may be related to adolescents' instrumental attitudes towards sex.

There is reason to believe that exposure to sexy online self-presentations of others is also associated with adolescents' sexual experience. For instance, previous research has shown that viewing sexual content on television is related to adolescents' sexual experience (Brown and Bobkowski 2011; Ward and Friedman 2006) and an earlier onset of sexual activity (for an overview, see Shafer et al. 2013). Similarly, several studies have shown that the use of sexually explicit material is related to an earlier initiation of both oral sex and sexual intercourse (for a review, see Owens et al. 2012). Finally, it has been argued that sexual references on social network sites may help cultivate the idea that sex is glamorous or risk free, and may thus encourage sexual initiation (Moreno et al. 2009). As a result, looking at others who present themselves in a sexy

way on social network sites may reinforce messages that adolescents already receive from other sexual media content, that is, that behaving sexually is a socially expected, or possibly socially demanded, aspect of adolescence (Ward 2002, 2003).

In addition to the “media effects” perspective described above, it also seems likely that adolescents’ sexual attitudes and experience influence their exposure to sexy self-presentations of others. With regard to the selection of sexualized content, the Media Practice Model posits that adolescents select content that is in line with their sexual attitudes and experience (Steele 1999; Steele and Brown 1995). Similarly, selective exposure theory posits that people are more likely to expose themselves to media content that is congruent and to avoid media content that is incongruent with their attitudes and behavior (e.g., Dillman Carpentier et al. 2003; Knobloch et al. 2005). Moreover, adolescents have been said to engage in self-socialization, which means they choose media materials that best suit their interests and experiences (Arnett 1995). In fact, previous research has shown that the use of sexually explicit material was predicted by viewers’ acceptance of girls as sex objects (at least for boys; Peter and Valkenburg 2009) and instrumental attitudes towards sex (Peter and Valkenburg 2010). In this context, it seems likely that, when adolescents hold sexual attitudes that match others’ sexy self-presentations on social network sites and have more sexual experience, they look at sexy self-presentations on social network sites. We, therefore, expected reciprocal relationships between exposure to sexy self-presentations of others and adolescents’ sexual attitudes and sexual experience.

The Influence of Age and Gender

One characterizing aspect of the Media Practice Model is the notion that media effects do not occur in isolation, but instead are the result of a dynamic process between the media content and the everyday experiences of adolescents (i.e., “lived experience”, Steele and Brown 1995). The type of media content that adolescents select, and how and whether they apply it to their own lives (i.e., incorporate it in their attitudes and behavior), thus depends on personal characteristics, such as gender and age but also developmental level, race, class, and countless other socializing factors including religiosity and peer culture (Steele and Brown 1995; Steele 1999). With regard to social network sites, previous research has shown distinct gender differences in the use of such sites (Thelwall 2008). Specifically, girls are more likely than boys to engage in sexualized self-presentations on social network sites (Hall et al. 2012; Manago et al. 2008; Thiel-Stern 2009). Boys, in turn, are

more likely than girls to use social network sites to learn about the social world (Barker 2009). Moreover, boys communicate more explicitly about sex in online environments than girls do (Subrahmanyam and Greenfield 2008; Subrahmanyam et al. 2006).

Online sexual communication has also been shown to depend on age. Internet users aged 18 years and older make more explicitly sexual comments than those aged 17 years and younger (Subrahmanyam et al. 2006). This is likely the result of the different sexual developmental stages that adolescents go through as they get older. Whereas young adolescents (i.e., 13–14 year olds) are mostly focused on their sexually maturing bodies, many older adolescents (i.e., 17–18 year olds) are engaged in romantic relationships and have sexual intercourse (Hubert et al. 1998). In the present study, we thus chose to focus on gender and age as proxies for adolescents’ “lived experience”, as these seem particularly relevant to adolescents’ social network site use and may thus influence exposure to others’ sexy online self-presentations and its association with sexual attitudes and behaviors.

The Present Study

Previous research on adolescents’ social network site use has suggested that online friends can play an important role as providers of sexual information on social network sites and can reinforce or refute sexual messages from sexual media content in traditional media outlets (Shafer et al. 2013). However, it is still unknown whether exposure to sexual content on social network sites, in the form of other’s sexy self-presentations, is related to adolescents’ sexual attitudes and behavior. Therefore, this study longitudinally investigated reciprocal relationships between exposure to sexy online self-presentations of others and adolescent’ sexual attitudes (i.e., sexual objectification of girls, instrumental attitudes towards sex) and sexual experience. Regarding the prediction of sexual attitudes and sexual experience by exposure to others’ sexy online self-presentations, we hypothesized that exposure to sexy online self-presentations of others predicts greater acceptance of sexual objectification of girls (H1a), stronger instrumental attitudes towards sex (H1b), and more sexual experience (H1c) over time.

We also expected that adolescents’ sexual attitudes and behavior would predict selective exposure to sexy self-presentations of others on social network sites. We therefore hypothesized that adolescents’ sexual attitudes (i.e., sexual objectification of girls [H2a], instrumental attitudes towards sex [H2b]), and their sexual experience (H2c) predict greater exposure to sexy online self-presentations of others over time.

Previous research has also suggested that adolescents' social network site use depends on their "lived experience", notably their gender and age. However, as previous studies have mostly focused on age and gender differences in online communication and how adolescents use social network sites, not much is known about how gender and age differences may influence the relationship between looking at sexy online self-presentations of others and sexual attitudes and behavior specifically. We therefore abstained from formulating hypotheses and posed the following research questions instead. Does the relationship between exposure to sexy online self-presentations of others and the aforementioned sexual attitudes and sexual experience differ between boys and girls (RQ1)? Does the relationship between exposure to sexy online self-presentations of others and the aforementioned sexual attitudes and sexual experience differ by age (RQ2)?

In addition to the moderation analyses of gender and age that we performed to address RQ1 and RQ2, we controlled for several other socializing factors that may influence the association between exposure to sexy self-presentations of others and sexual attitudes and sexual experience, as they are considered important variables in adolescents' lived experience (i.e., SES, religiosity, sexual orientation, Steele and Brown 1995; Steele 1999). We also controlled for adolescents' own sexy self-presentations and peer norms regarding casual sexual behavior because adolescents' exposure and experience are likely confounded: Adolescents who are more sexually outgoing and have friends who accept loose sexual behavior will more likely be exposed to sexy self-presentations of their friends (Moreno et al. 2010).

Methods

Sample

We analyzed data from a longitudinal survey that was fielded in May/June 2013 and November/December 2013 by Veldkamp, a Dutch survey institute. Veldkamp had originally sampled 2,137 adolescents randomly from a pool of people that are representative for the Dutch population (response rate in the first wave was 78 %, the response rate in the second wave was 83 %, resulting in an attrition of 17 % between the first and the second wave) that is also continuously updated on the basis of random sampling from the Dutch population. This sampling frame avoids snowballing effects and self-selection biases, which plague many online access panels.

From the original sample, only the data for adolescents who had indicated that they used social network sites could be meaningfully analyzed. This resulted in a final sample of 1,636 participants. However, 50 participants of this final

sample that used social network sites in the first wave reported that they were not using social network sites at wave 2, resulting in missing variables for the second wave. Hypotheses 2a–c were therefore tested with a reduced sample of 1,586 participants. An inspection of these "dropout" cases showed that adolescents with lower frequencies of exposure to others' sexy self-presentation in wave 1, were more likely to report that they were not using social network sites in wave 2. Also, heterosexual adolescents were more likely to indicate that they were not using social network sites in wave 2 compared to gay or lesbian adolescents. To see whether this drop-out would change the basic pattern of results, we also tested hypotheses 1a–c with and without these missing cases in the sample. The main pattern of results did not differ between these different analyses.

The sample of 1,636 adolescents had an age range of 13–17 ($M = 15.00$, $SD = 1.41$). The amount of male and female participants in the sample was about equal (51.5 % female). Of the sample, 93.2 % was heterosexual. The SES of our sample was rather high; the majority (43.8 %) of the participants were part of the second highest level of SES, and 11.4 % were part of the highest level of SES. The lowest and second lowest SES level included 23.5 and 21.3 % of our sample, respectively.

Procedure

Ethical approval from the university to which the authors belong, active consent of the adolescents' parents, as well as informed consent of the adolescents, were obtained before the start of the study. Respondents were asked to complete an online questionnaire on sexual issues and the media at home. For sensitive issues, such as sexuality, online surveys have been shown to be superior to other survey modes (Mustanski 2001). Respondents were notified that they could stop at any time they wished and that the principal investigators could not trace identifying information. The survey contained other variables not of interest for the current study and took about 20 min to complete. After completing the survey, the respondents received a voucher worth five Euros for participation.

Measures

Exposure to Sexy Online Self-Presentations of Others

To measure exposure to sexy online self-presentations of others, respondents were asked how often, in the past 6 months, they had looked at pictures on social network sites (e.g., Facebook, Instagram) of others in which these others presented themselves (a) with a sexy gaze, (b) with a sexy appearance, (c) scantily dressed (e.g., bathing suit or

Table 1 Psychometric properties of the measure of exposure to sexy self-presentations

How often, in the past 6 months, have you looked at pictures on social network sites (e.g., Facebook, Instagram) of others in which these others presented themselves...	Wave 1		Wave 2	
	Cronbach's α if item deleted	Factor loading	Cronbach's α if item deleted	Factor loading
... with a sexy gaze	.93	.94	.93	.94
... with a sexy appearance	.92	.96	.93	.95
... scantily dressed (e.g., bathing suit or underwear)	.95	.90	.95	.90
... in a sexy posture	.94	.93	.93	.94

underwear), and (d) in a sexy posture. The items were based on previous literature describing adolescents' sexy self-presentations. For instance, a seductive or sexy gaze is one of the most frequent behaviors on adolescents' profile pictures on social network sites (Kapidzic and Herring 2014). Pictures in which adolescents have a sexy appearance or are scantily dressed are often mentioned in studies on sexy self-presentations (e.g., Crescenzi et al. 2013; Hall et al. 2012; Moreno et al. 2009; Peluchette and Karl 2009). Finally, the item of a sexy posture was based on previous operationalizations of sexy self-presentations on social network sites as images suggesting sexual acts (Moreno et al. 2010) or poses suggesting sexual readiness (Crescenzi et al. 2013; Hall et al. 2012).

Response options ranged from 1 (*always*) to 7 (*never*). Items were recoded such that higher scores indicated more frequent exposure to sexy online self-presentations of others. The items loaded on one factor (using factor analysis with varimax rotation), with an explained variance of 87 % and showed good internal consistency (Cronbach's alpha .95) in both waves (see Table 1 for more detailed psychometric properties of the scale). The items were therefore averaged to form the variable "exposure to sexy online self-presentations of others" ($M = 3.06, SD = 1.48$ in wave 1; $M = 3.17, SD = 1.44$ in wave 2). To validate the measure of exposure to sexy online self-presentations of others, it was correlated with a measure of looking at sexually explicit pictures and movie fragments online (cf. Peter and Valkenburg 2006, 2007, 2009), Pearson's $r = .31, p < .001$, as well as with sensation seeking (a personality characteristic that has been related to exposure to sexually explicit pictures and movie fragments online, Peter and Valkenburg 2006), Pearson's $r = .33, p < .001$.

Sexual Objectification of Girls

We based our measure on the five items used to measure sexual objectification of women in previous research on the relationship between the use of sexually explicit internet material and sexual objectification of women (cf. Peter and Valkenburg 2007, 2009). An example item is: "There is nothing wrong with boys being primarily interested in a

girls' body." Response options ranged from 1 (*totally agree*) to 7 (*totally disagree*). Items were recoded such that higher scores indicated more sexual objectification of girls. A factor analysis with varimax rotation showed that the items loaded on one factor with an explained variance of 54 % or higher, and formed a reliable scale (Cronbach's alpha $>.78$) in both waves. The items were therefore averaged to tap "sexual objectification of girls" ($M = 3.10, SD = 1.23$ in wave 1; $M = 3.02, SD = 1.26$ in wave 2).

Instrumental Attitudes Towards Sex

We used the four items with the highest factor loadings from the scale developed by Hendrick and Hendrick (1987). An example item is: "The main goal of sex is that you yourself have a good time." Response options ranged from 1 (*totally agree*) to 7 (*totally disagree*), and were reverse-coded. Cronbach's alpha was .83 or higher, and the items loaded on one factor (using factor analysis with varimax rotation), with an explained variance of 67 % or higher in both waves, and were therefore averaged to form the variable "instrumental attitudes towards sex" ($M = 2.80, SD = 1.33$ in wave 1; $M = 2.72, SD = 1.35$ in wave 2).

Sexual Experience

Respondents were asked to answer, with "yes" (coded 1) or "no" (coded 0), whether they had experience with the following sexual behaviors: (a) touching each others' genitals, (b) giving or receiving oral sex, and (c) vaginal intercourse (penis inside the vagina). Adolescents who had indicated that they were gay, lesbian or undecided about their sexual orientation answered a question about "having sex" rather than "vaginal intercourse" to avoid a heterosexual bias. Each of the items was used as a separate variable in our analyses. In our total sample, about a third had experience with genital touching (27.4 % in wave 1, 34.6 % in wave 2), 14.8 % had engaged in oral sex in wave 1 and 18.5 % in wave 2, and 16 % had engaged in sexual

Table 2 Means and standard deviations of the variables by gender and age

	Gender		Age (at wave 1)				
	Boys	Girls	13	14	15	16	17
	<i>M</i> (<i>SD</i>)/%						
<i>Variables wave 1</i>							
Exposure to others' sexy self-presentations	2.94 (1.49)	3.17 (1.47)	2.45 (1.35)	2.84 (1.54)	3.17 (1.45)	3.45 (1.42)	3.41 (1.42)
Sexual objectification of girls	3.49 (1.24)	2.73 (1.10)	3.08 (1.26)	3.13 (1.31)	3.11 (1.22)	3.10 (1.16)	3.07 (1.19)
Instrumental attitudes towards sex	3.09 (1.34)	2.53 (1.26)	2.86 (1.37)	2.83 (1.37)	2.79 (1.25)	2.78 (1.29)	2.76 (1.38)
Genital touching	27.0 %	27.9 %	5.3 %	14.2 %	22.3 %	42.3 %	54.2 %
Oral sex	14.6 %	15.0 %	1.6 %	3.7 %	11.3 %	23.9 %	34.5 %
Sexual intercourse	14.2 %	17.7 %	1.3 %	4.3 %	10.0 %	23.6 %	42.0 %
<i>Control variables</i>							
Own sexy self-presentations	1.26 (.60)	1.45 (.75)	1.32 (.71)	1.31 (.70)	1.38 (.70)	1.40 (.68)	1.38 (.64)
Religiosity	2.57 (1.84)	2.81 (1.99)	2.72 (1.87)	2.61 (1.97)	2.69 (1.95)	2.73 (1.92)	2.75 (1.90)
Peer norms	3.40 (1.74)	2.73 (1.63)	2.58 (1.70)	2.88 (1.69)	2.96 (1.61)	3.31 (1.72)	3.56 (1.71)
Sexual orientation (heterosexual)	94.3 %	92.0 %	94.4 %	92.9 %	92.2 %	93.6 %	92.8 %
Highest SES	11.1 %	11.8 %	10.9 %	12.5 %	8.5 %	14.1 %	11.0 %
Lowest SES	22.8 %	24.1 %	21.3 %	23.9 %	22.9 %	23.9 %	25.4 %
<i>Variables wave 2</i>							
Exposure to others' sexy self-presentations	3.12 (1.48)	3.22 (1.41)	2.71 (1.49)	3.00 (1.50)	3.25 (1.37)	3.45 (1.40)	3.43 (1.33)
Sexual objectification of girls	3.43 (1.26)	2.64 (1.13)	2.99 (1.27)	3.10 (1.34)	2.94 (1.19)	3.00 (1.22)	3.07 (1.25)
Instrumental attitudes towards sex	3.02 (1.35)	2.45 (1.27)	2.79 (1.47)	2.79 (1.34)	2.65 (1.26)	2.61 (1.27)	2.77 (1.36)
Genital touching	35.5 %	33.7 %	10.9 %	20.7 %	31.7 %	48.5 %	62.4 %
Oral sex	17.5 %	19.4 %	3.1 %	8.0 %	16.3 %	25.8 %	40.1 %
Sexual intercourse	18.1 %	22.7 %	2.2 %	6.3 %	16.3 %	31.0 %	48.0 %

intercourse in wave 1 and 20.5 % in wave 2 (percentages by age and gender can be found in Table 2).

Control Variables

Socio-economic status (SES) was based on the education level and occupation of the parents of the participants and was operationalized as four categories ranging from 1 (*high SES*) to 4 (*low SES*). Sexual orientation was measured by asking participants whether they were mostly attracted to people of the opposite gender, equally attracted to people of the opposite as the same gender, mostly attracted to people of the same gender or undecided. Based on the answers, participants were either categorized as gay/lesbian or undecided (coded 0) or heterosexual (coded 1). Religiosity was measured by having participants indicate whether they agreed with the statements “I am religious” and “my religion is important to me” on a scale from 1 (*totally disagree*) to 7 (*totally agree*). The items were highly correlated, $r = .91$, and thus averaged to form the “religiosity” variable ($M = 2.70$, $SD = 1.92$). Engagement in sexy self-presentations was measured with similar items as the

“exposure to sexy self-presentations of others” measure, but this time the questions referred to the pictures that participants post themselves. The items formed a reliable scale (Cronbach's $\alpha = .85$) and were averaged to form the variable “sexy self-presentations” ($M = 1.36$, $SD = 0.69$). Peer norms regarding (casual) sex behavior were measured by asking participants to indicate whether their friends thought it was acceptable to have casual sexual contacts, on a scale from 1 (*totally unacceptable*) to 7 (*totally acceptable*) ($M = 3.06$, $SD = 1.72$).

Data Analysis

To test hypotheses H1a–b, which predicted an influence of exposure to sexy online self-presentations of others on acceptance of sexual objectification of girls (H1a) and instrumental attitudes towards sex (H1b), we conducted two OLS regression analyses. In these analyses, exposure to sexy online self-presentations of others, gender, age, the control variables and the dependent variables (either sexual objectification of girls or instrumental attitudes towards sex) at wave 1 were entered as predictors in a first step.

Either sexual objectification of girls at wave 2 or instrumental attitudes towards sex at wave 2, were analyzed as the dependent variable. To test hypothesis H1c, we tested three separate binary logistic regression analyses with each of the sexual behaviors (i.e., genital touching, oral sex, and sexual intercourse) as dichotomous dependent variables and sexy online self-presentations of others, gender, age, the control variables and the particular sexual behavior at wave 1 as predictors.

To test hypotheses 2a–c, which predicted an influence of sexual attitudes (i.e., sexual objectification of girls [H2a], instrumental attitudes towards sex [H2b]) and sexual experience (H2c) on exposure to sexy online self-presentations of others, we conducted separate OLS regression analyses. In these analyses, the independent variables (i.e., sexual objectification of girls, instrumental attitudes towards sex, or each of the sexual experience items), gender, age, sexy online self-presentations of others at wave 1 and the control variables were entered as predictors in a first step. Exposure to sexy online self-presentations of others at wave 2 was entered as the dependent variable.

In all analyses, two-way interactions between the independent variables and gender, and between the independent variables and age, were entered in a second step in order to test the moderation effects of gender and age. Descriptives of the variables by gender and age are shown in Table 2. Post-hoc probing of the two-way interactions was done by using simple slope analyses (Preacher et al. 2006).

To account for the violation of the normality assumption for the variables under study, we used the bootstrap method (Efron and Tibshirani 1993). This nonparametric approach estimates values of interest without making assumptions about the sampling distribution of the statistics, and therefore produces more accurate results if normality assumptions are violated. We estimated 95 % bias-corrected confidence intervals (95 % BCI) on the basis of 1,000 bootstrapping samples ($N = 1,636$ or $N = 1,586$). When the 95 % BCI does not include zero, the effect can be assumed to differ significantly from zero, and is therefore considered a statistically significant effect.

Results

Hypotheses 1a and 1b stated that exposure to sexy online self-presentations of others predicted adolescents' sexual attitudes (i.e., sexual objectification of girls [H1a] and instrumental attitudes towards sex [H1b]). Regression analyses, controlling for age, gender, the effect of the dependent variable at wave 1 and the control variables, showed that exposure to sexy online self-presentations of others (wave 1) did not predict sexual objectification of girls (wave 2), $\beta = -0.04$, $B = -0.03$, $SE = 0.02$, $p = .12$

(95 % BCI: $-0.07/0.01$), nor instrumental attitudes towards sex (wave 2), $\beta = -0.02$, $B = -0.02$, $SE = 0.02$, $p = .41$ (95 % BCI: $-0.06/0.03$). Hypotheses 1a and 1b were thus not supported.

Hypothesis 1c stated that exposure to sexy online self-presentations of others predicted adolescents' sexual experience. The results of our binary logistic regression analyses are shown in Table 3. As can be seen by the statistically significant odds ratios, adolescents' exposure to others' sexy self-presentations increased the probability of adolescents' experience with oral sex or sexual intercourse 6 months later. More specifically, an increase of one unit in adolescents' exposure to others' sexy self-presentations results in an increase of 1.15 in the probability that adolescents will have engaged in oral sex and an increase of 1.18 in the probability that adolescents will have engaged sexual intercourse at wave 2. Hypothesis 1c was thus supported for adolescents' experience with oral sex and sexual intercourse, but not for their experience with genital touching.

Hypotheses 2a to c in turn stated that adolescents' sexual attitudes (i.e., sexual objectification of girls [H2a], instrumental attitudes towards sex [H2b]), and their sexual experience (H2c) predicted exposure to sexy self-presentations of others. In contrast to hypothesis 2a, exposure to sexy self-presentations of others (wave 2) was not predicted by adolescents' acceptance of sexual objectification of girls (wave 1), $\beta = 0.02$, $B = 0.02$, $SE = 0.03$, $p = .50$ (95 % BCI: $-0.04/0.08$). In line with hypothesis 2b, having instrumental attitudes towards sex (wave 1) did predict exposure to sexy self-presentations of others (wave 2), $\beta = 0.06$, $B = 0.05$, $SE = 0.02$, $p = .02$ (95 % BCI: $0.01/0.11$). Having experience with genital touching (wave 1) predicted greater exposure to sexy self-presentations of others (wave 2), $\beta = 0.07$, $B = 0.23$, $SE = 0.07$, $p = .002$ (95 % BCI: $0.09/0.38$). However, exposure to others' sexy self-presentations (wave 2) was not predicted by experience with oral sex (wave 1), $\beta = 0.03$, $B = 0.14$, $SE = 0.09$, $p = .12$ (95 % BCI: $-0.04/0.29$), nor by experience with sexual intercourse (wave 1), $\beta = 0.04$, $B = 0.17$, $SE = 0.09$, $p = .06$ (95 % BCI: $-0.01/0.34$). Hypothesis 2c was thus partly supported.

Research questions 1 and 2 asked whether the relationship between exposure to sexy online self-presentations of others and sexual attitudes and sexual experience, differed between boys and girls or with age, respectively. Although gender seemed to moderate the prediction of sexual objectification of girls (wave 2) by exposure to sexy self-presentations of others (wave 1), the moderation effect was not significant with bootstrapping, $\beta = -0.04$, $B = -0.07$, $SE = 0.04$, $p = .047$, (95 % BCI: $-0.14/0.01$). Neither age nor gender moderated predictions of adolescents' instrumental attitudes towards sex (wave 2) and sexual

Table 3 Logistic regression predicting adolescents' sexual experience by exposure to sexy self-presentations of others

	Touching genitals (w2)		Oral sex (w2)		Intercourse (w2)	
	Odds ratio	95 % CI	Odds ratio	95 % CI	Odds ratio	95 % CI
<i>Block 1</i>						
SSPO	1.07	0.96/1.20	1.15*	1.02/1.31	1.18*	1.03/1.35
<i>Covariates</i>						
Sex Exp. (w1)	0.04***	0.03/0.06	0.04***	0.03/0.07	0.02***	0.01/0.03
Gender	1.28	0.94/1.73	0.93	0.65/1.31	0.83	0.56/1.21
Age	1.46***	1.31/1.63	1.51***	1.32/1.73	1.74***	1.50/2.02
SES	0.97	0.83/1.12	0.96	0.80/1.13	1.07	0.89/1.29
Religiosity	0.87**	0.81/0.94	0.93	0.85/1.02	0.86**	0.78/0.95
SSP	1.20	0.95/1.50	1.17	0.92/1.49	0.93	0.70/1.23
Sex. Orient.	1.22	0.70/2.14	1.63	0.89/2.96	0.86	0.41/1.78
Peer norms	1.11*	1.02/1.22	1.07	0.97/1.19	1.03	0.92/1.16
<i>Nagelkerke R²</i>	.57		.50		.61	
χ^2 (9, <i>N</i> = 1.636)	871.91, <i>p</i> < .001		595.47, <i>p</i> < .001		804.86, <i>p</i> < .001	
<i>Block 2</i>						
SSPO × age	1.01	0.94/1.09	0.94	0.86/1.03	0.99	0.90/1.09
SSPO × gender	1.06	0.87/1.30	0.94	0.75/1.18	0.79	0.61/1.02
<i>Nagelkerke R²</i>	.57		.50		.61	
χ^2 (2, <i>N</i> = 1.636)	0.50, <i>p</i> = .78		1.93, <i>p</i> = .38		3.50, <i>p</i> = .17	

SSPO sexy self-presentations of others, Sex Exp. sexual experience, Sex. Orient. sexual orientation

* *p* < .05; ** *p* < .01; *** *p* < .001

Table 4 Prediction of exposure to sexy self-presentations of others from sexual objectification of girls and oral sex experience by age

Age	Sexual objectification of girls		Oral sex experience	
	B (SE)	95 % CI	B (SE)	95 % CI
13	0.12 (0.04)**	0.04/0.20	0.71 (0.26)**	0.20/1.22
14	0.07 (0.03)*	0.01/0.13	0.52 (0.19)**	0.16/0.89
15	0.01 (0.03)	−0.04/0.07	0.34 (0.12)**	0.10/0.58
16	−0.04 (0.03)	−0.10/0.02	0.15 (0.09)	−0.02/0.33
17	−0.09 (0.04)*	−0.18/−0.01	−0.04 (0.12)	−0.26/0.19

* *p* < .05; ** *p* < .01

experience (wave 2) by exposure to sexy self-presentations of others (wave 1). However, age (but not gender) moderated the prediction of selective exposure to others' sexy self-presentations (wave 2) by sexual objectification (wave 1), $\beta = -0.15$, $B = -0.05$, $SE = 0.02$, $p = .001$ (95 % BCI: $-0.09/-0.02$), and by experience with oral sex (wave 1), $\beta = -0.20$, $B = -0.18$, $SE = 0.08$, $p = .02$ (95 % BCI: $-0.35/-0.03$). As can be seen by the post hoc analyses in Table 4, sexual objectification and experience with oral sex seemed to only positively predict exposure to sexy self-presentations of others for younger adolescents. For older adolescents (aged 17), those who sexually objectified girls were less likely to look at sexy self-presentation of others.

Discussion

The aim of the present study was to relate adolescents' sexual attitudes and sexual experience to an understudied type of sexual media content, that is, sexy self-presentations of others on social network sites. Sexy self-presentations, in the form of posting pictures on social network sites that show sexually suggestive posing and body display (e.g., Hall et al. 2012; Moreno et al. 2009), have become increasingly popular on social network sites. Because social network sites may function as a "super peer" for adolescents, and thus promote certain norms and behaviors among them (Moreno et al. 2009), it has been suggested that sexy self-presentations may be similar to other sexual media genres in their

impact on adolescents' sexual attitudes and behavior (Collins et al. 2011; Shafer et al. 2013).

We found that exposure to others' sexy self-presentations on social network sites did not predict changes in sexual attitudes (i.e., sexual objectification of girls and instrumental attitudes towards sex). This was unexpected, as these attitudes had been associated with adolescents' use of sexual TV content or sexually explicit internet material in previous research (i.e., Peter and Valkenburg 2007, 2009, 2010; Ward 2002; Ward and Friedman 2006). However, more frequent exposure to others' sexy self-presentations on social network sites increased the likelihood that adolescents engaged in oral sex or sexual intercourse 6 months later. Moreover, adolescents who held instrumental attitudes towards sex and had experience with genital touching, and younger adolescents who were more likely to sexually objectify girls and had experience with oral sex, were more likely to expose themselves to sexy self-presentations of others 6 months later. In contrast, older adolescents who sexually objectified girls were less likely to look at sexy self-presentation of others.

These findings thus suggest that research on the use of sexual media distinguish between exposure to traditionally produced sexual media content and user-generated sexual content on social network sites. Moreover, more attention needs to be paid to selective exposure to sexual content on social network sites and how this may be influenced by adolescents' sexual development.

Implications for Research on Adolescents' Exposure to Sexy Self-Presentations on Social Network Sites

Our study suggests that sexual content on social network sites in the form of sexy self-presentations does not have the same influence on sexual attitudes that has previously been established for other types of sexual media content. However, it does seem to predict changes in adolescents' sexual experience. At least two explanations are conceivable for the absence of an influence of sexy self-presentations on sexual attitudes. First, a potential impact of sexy self-presentations on social network sites is reduced by negative comments that those who present themselves in a sexy way may receive. For instance, even though being attractive and sexy is important on social network sites, presenting oneself as too sexy has been said to elicit rude comments (e.g., "slut", Ringrose 2010, 2011). A second explanation may be that, on social network sites, adolescents often engage with people they already know offline. As a result, they may encounter messages that they already receive offline from their friends (Collins et al. 2011). Exposure to sexy self-presentations on social network sites may therefore not have any additional impact on their already existing sexual attitudes.

Stereotypical sexual attitudes and greater sexual experience made it more likely that adolescents expose themselves to sexy self-presentations of others on social network sites. This finding is generally in line with selective exposure theory (e.g., Dillman Carpentier et al. 2003; Knobloch et al. 2005). With regard to the attitudes measured in this study, it seems likely that—at least younger—adolescents who already tend to sexually objectify girls are particularly drawn to others' sexy self-presentations because such self-presentations are mostly focused on a person's body. Similarly, adolescents who think that sex is "just a game" or "just for fun," are more likely to look at sexy self-presentations of others because such pictures reinforce these ideas about sex.

The overall patterns of our findings seem to initially support at least three of the four assumptions of the Media Practice Model (Shafer et al. 2013; Steele 1999) when applied to adolescents' sexy self-presentations on social network sites. First, the fact that adolescents did look at sexy self-presentations of other adolescents proves that sexually suggestive pictures were shown on social network sites. This supports the assumption made in the Media Practice Model that adolescents themselves are active producers of sexual media content. Second, the fact that sexy self-presentations took place on social network sites, where adolescents typically keep in touch with their friends (Barker 2009; Gross 2004; Lenhart and Madden 2007), is in line with the notion outlined in the Media Practice Model that friends are important for generating and sharing sexual media content. Third, our finding that adolescents' sexual attitudes and sexual experience predicted exposure to sexy self-presentations of others supports the assumption made in the Media Practice Model that the selection and use of sexual media are motivated by the adolescent's sexual development. Adolescents' sexual attitudes and sexual experience may be characteristic of high sexual interest, leading them to explore sexual content by others on social network sites. However, we did not find support for the fourth assumption of the Media Practice Model that sexual media effects are a cyclical process because sexy self-presentations of others did not reinforce adolescents' sexual attitudes. A simple explanation may be that our two-wave panel design is not appropriate for detecting such a cyclical process, which may develop only over a longer period of time. Future longitudinal research should therefore investigate whether and when these cyclical processes between exposure to user-generated sexual content on social network sites and sexual attitudes occur.

Sexy Online Self-Presentations of Others and Adolescents' Lived Experience

In line with the Media Practice Model (Steele and Brown 1995; Steele 1999), this study investigated the relationship

between exposure to sexy online self-presentations of others and sexual attitudes and sexual experience in the light of adolescents' "lived experience," notably their gender and age. Only the selective exposure effects depended on age. More specifically, sexual objectification of girls and experience with oral sex predicted exposure to sexy self-presentations of others solely for younger adolescents. Young adolescents may look at sexy self-presentations of others on social network sites to satisfy the sexual curiosity that emerges in adolescence (e.g., Savin-Williams and Diamond 2004). Previously, age differences had been found for watching sexually orientated content on TV, which was also most profound for young adolescents (Kim et al. 2006). Sexy self-presentations on social network sites may simply be another form of sexual content for young adolescents, in addition to sexually oriented television content.

The lack of a selective exposure effect for older adolescents may be explained by the possibility of them having outgrown the sexual content on social network sites. Older adolescents may use explicit material on the internet, or engage in sexual behavior in real life, to satisfy their sexual curiosity. In fact, research has shown that, compared to younger counterparts, older adolescents use sexually explicit internet material more frequently (Wolak et al. 2007), engage in more sexual behavior (Delucia et al. 2007), and have had more sexual partners (Tubman et al. 1996). This may also explain why older adolescents who are more likely to sexually objectify girls were actually less likely to expose themselves to sexy self-presentations of others on social network sites: When selecting media content that matches their sexual attitudes, these adolescents may be more likely to turn to sexually explicit internet material.

We did not find any gender differences in selective exposure to sexy self-presentations of others, nor in the effects of this exposure. This is surprising given the gender differences found for social network site use in general or for adolescents' own sexual self-disclosure (e.g., Subrahmanyam and Greenfield 2008; Subrahmanyam et al. 2006). It seems that when focusing on gender differences, the use of social network sites and its impact on adolescents need to be distinguished. Even though boys and girls differ in their sexy self-presentations and their exposure to others' sexy self-presentations (see Table 2), their sexual behavior may be equally impacted once they are exposed to others' sexy self-presentations. Similarly, when adolescents already hold certain sexual attitudes, or when they engage in certain types of sexual behavior, this may affect their selective exposure to others' sexy self-presentations in similar ways, regardless of their gender. One possible explanation for this comparable selective exposure effect may be that the mild nature of the sexual content on social

network sites is just as acceptable for girls as for boys. This distinguishes sexy self-presentations on social network sites from more explicit sexual online content, which has been shown to be less accepted by adolescent girls than by boys (e.g., Cameron et al. 2005; Hågström-Nordin et al. 2009).

Limitations

One limitation of the present study concerns our measure of exposure to sexy self-presentations of others. Our measure did not allow us to determine whether "exposure" referred to actively seeking out these images or merely coming across them when looking at social network site profiles of others. Given the explorative character of this study, our measure should be considered a first step in increasing our knowledge about the effects of (exposure to) sexy self-presentations on social network sites. Future research should more thoroughly investigate the specific types of engagement that adolescents have with sexual content on social network sites (e.g., passively watching versus getting aroused by this content; identification with friends who present themselves in a sexy way). These types of engagement are worthy of investigation especially because the Media Practice Model posits that adolescents are likely to engage in media content if they identify with the characters in the content and find the content credible. Such engagement, in turn, increases the chances that sexual messages from the media content are adopted and applied to adolescents' own sexual behavior (Steele 1999; Shafer et al. 2013).

Another, and related, limitation of the present study is that we did not investigate the comments that may accompany sexy pictures on social network sites. The present study focused on sexy self-presentations in the form of pictures because posting pictures is one of the most frequent activities on social network sites (Lenhart and Madden 2007). However, one unique characteristic of social network sites is that users can provide feedback and comment on pictures. The reinforcement of sexual messages from mainstream media may occur mainly in the combination of sexualized pictures and positive comments on social network sites. Future research should therefore focus on both sexualized pictures and their comments on social network sites to better understand how such content could reinforce or refute sexual messages from mainstream media.

Conclusion

This study has shed new light on the ramifications of adolescents' sexual media use. In our digital age, self- or other-generated content on social network sites may play

an important role in adolescents' sexual development. We found that young adolescents with strong stereotypical sexual attitudes and greater experience with pre-coital behavior were more likely to look at sexy self-presentations of others on social network sites. Although such exposure did not reinforce adolescents' sexual attitudes, it predicted an increase in oral sex and sexual intercourse. Although the effects of exposure to other-generated sexual content on social network sites clearly need more research attention, this study is a first step toward understanding the use and impact of sexual content on social network sites on adolescents.

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Author contributions JvO developed the questionnaire, conducted the analyses and wrote the manuscript. JP developed the questionnaire, initiated and coordinated the design and data-collection of the study, co-interpreted the data analyses, and provided feedback and advise on the manuscript. IB developed the questionnaire and was part of the data-collection procedure. All authors read and approved the final manuscript.

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