

A lack of association between online pornography exposure, sexual functioning, and mental well-being

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Disclosures

This study received no direct funding and the authors have no potential conflicts of interest to declare.

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Abstract

To inform debate around potential influences of online pornography, we applied a contemporary media-effects model to examine the relationship between online sexually explicit material (oSEM) exposure and several psychosocial outcomes – including *sexual satisfaction*, *body satisfaction*, *sexist attitudes*, and *mental well-being*. *Perceived realism* of oSEM (the extent to which it is believed to be a realistic portrayal of sexual experience) was assessed as a potential mediator of exposure-outcome relationships. Furthermore, *family communication about sex and gender* were investigated as potential moderators of any indirect relationships (via perceived realism). Using a convenience sample of cisgender, heterosexual adults ($N = 252$) and a cross-sectional questionnaire design, we found no significant direct or indirect relationships between oSEM-use and the psychosocial outcomes in question; equivalence testing demonstrated that (for all outcomes other than body satisfaction) we could reject effect sizes (r_s) $> \pm.20$. Overall, findings do not favour a negative or positive relationship between oSEM and the psychosocial outcomes under examination – oSEM appeared to have a negligible role in individuals' current sexual functioning and mental well-being.

Keywords: pornography, sexuality, media effects, perceived realism,
family communication, online

With the advent of the internet, people now have unprecedented access to anonymous and affordable online sexual content (Cooper, 1998). Online sexually explicit material (oSEM) is freely available and extremely popular, with one oSEM-streaming website reporting 28.5 billion visits to its site in 2017 (PornHub, 2018). With this rapid rise in availability and consumption, there has been a resurgence in public and scholarly concern regarding the putative links between oSEM and a range of potential outcomes (including sexual satisfaction, sexist attitudes, body satisfaction and psychological health; Manning, 2006); as a result, an increasing body of research has been commissioned and dedicated to the exploration of harm and the negative influences of pornography (Horvath et al., 2013; Smith & Atwood, 2014). The assumptive focus on harms may circumscribe the findings of such studies (for example, selective measurement of problems/undesirable outcomes can preclude detection of beneficial effects; Döring, 2009).

Notwithstanding this, a small but increasing number of studies are beginning to identify possible beneficial outcomes of pornography-use (Horvath et al., 2013): Reporting positive self-perceived effects on sexual satisfaction and attitudes towards sex, gender, and sexualities (Hald & Malamuth, 2008; McKee, 2007; Rissel et al., 2017). Whilst these positive observations can be seen to redress a previous imbalance – and perhaps reflect a growing acceptance of pornography-use within some general populations (Carroll et al., 2008) – the field of oSEM research is increasingly characterised by splitting of scholars (and their findings) into negative or positive readings with limited critical consideration of the nature, directionality, or conditionality of observed associations (Willoughby, 2018).

Applying a Conceptual Model of Media Effects

Owens, Behun, Manning, and Reid (2012) have argued for the need to move beyond simple associations and start to examine possible mediating and moderating

variables – towards a more nuanced understanding of whether, when, and how any oSEM ‘effects’ may arise. Ignoring these variables can lead to biased estimations of effect-sizes and influence data represented in meta-analyses (Holbert & Stephenson, 2003). Theories of media effects – including the *Cultivation Hypothesis* (Gerbner, Gross, Morgan, & Signorelli, 1994), *Media Practice model* (Brown, 2000), and applications of *Social Cognitive Theory* (Bandura 1977, 2001) – attempt to clarify how an individual learns from, interacts with, and is affected by the media they are exposed to; as such, they hold promise for elucidating oSEM-use and its ‘effects’ or correlates. In the current study, we applied a recently-developed model of media effects – the *Differential Susceptibility to Media Effects Model* (DSMM; Valkenburg & Peter, 2013) – to guide variable selection and analysis. We chose the DSMM because it integrates existing media-effects theories to offer a conceptually-coherent and empirically-testable account of why some individuals are more susceptible to media effects than others (Piotrowski & Valkenburg, 2015) – with potential to inform how media effects can be enhanced or counteracted (Valkenburg & Peter, 2013). It is important to note that ‘susceptibility’ does not imply that media effects will be ‘negative’ or detrimental; rather, the notion of susceptibility refers to an individual’s propensity to be (cognitively, emotionally, attitudinally, and behaviourally) influenced by media – irrespective of how the consequences of this influence might be evaluated/whether ‘media effects’ are considered positive or negative. For example, the notion of differential susceptibility could apply to health-promoting media as readily as media modelling risky behaviours.

One of the central propositions of the DSMM is the notion of media effects being indirect: i.e., that individual response-states (such as cognitive appraisals of the media) mediate the relationship between media-exposure and effects. Perceived realism has been highlighted as a potentially important mediating variable, accounting for individual

differences in susceptibility to sexual media stimuli (Baams et al., 2015). The DSMM further proposes the role of conditional media effects or moderators, which serve to enhance or reduce the effects. These conditional effects depend on three classes of differential-susceptibility variables: dispositional (e.g., gender), developmental (e.g., life-stage), and social (e.g., familial context). The third proposition relevant to the current study purports that these differential-susceptibility variables (or moderating variables) can not only predict media-use but enhance or attenuate media-effects, by influencing how the individual responds to the media. This is comparable to a type of moderated mediation whereby the strength of the mediation effect on a variable is contingent on the level of the moderator (Preacher, Rucker, & Hayes, 2007). The DSMM also describes the transactional nature of media-use and effects as a reciprocal process, in which the media effect influences subsequent media use.

Perceived realism refers to the extent that the consumers believe the material depicted in the sexually explicit material (SEM) is a realistic portrayal of sexual relationships (Hald & Malamuth, 2008). Research has suggested that when individuals perceive media depictions of behaviour as realistic, they may be more likely to imitate that behaviour (Peter & Valkenburg, 2010). This is consistent with theoretical tenets of social cognitive theory, which suggests that (1) people can acquire models for thinking and acting through observing others (including media depictions of others), but (2) whether models are selected and applied (their persuasiveness for informing individual behaviour) depends on various factors, including (3) the perceived realism of the portrayed model – i.e., its perceived similarity or usefulness as a model for acting on the real world (Bandura, 2001).

Studies by Peter and Valkenburg (2006; 2010) demonstrated that increased exposure to oSEM increased the perceived realism of what they were viewing. This in

turn, resulted in more instrumental attitudes towards sex (as a means to personal physical pleasure, subjugating relational or affectionate aspects). These studies were some of the first to attempt to investigate the processes that underlie the potential effects of oSEM and suggest that perceived realism is an important concept which warrants additional research. Further consideration of the factors that predict the extent to which oSEM is perceived as realistic or not might help contribute to an advanced understanding of this mediating relationship.

The DSMM proposes that media effects can be enhanced or attenuated by individual difference and social-context variables (Valkenburg, Peter, & Walther, 2016). The contexts in which we exist are believed to not only modify the way in which we perceive media but influence the media we seek out. One dominant context is the family environment. Research suggests that a young person's ability to communicate with their parents about sexual topics can predict and influence their sexual development and subsequent behaviours (Richards, 2013). Richards (2013) reported that those who experienced higher levels of parent-child communication about sex report less risky behaviours and increased romantic relationship quality. If a young person is unable to speak to their parents about sex through embarrassment, fear, or not wanting to disclose their desire for sexual exploration (Fox & Izanu 1980), they might look to alternative sources for information, including oSEM. In the absence of other sources of information or communication about sex, individuals may be more likely to consider oSEM to be a realistic and definitive model of sexual relationships, and concomitantly, more susceptible to be influenced by oSEM.

The importance of family in the sexual socialisation of young people can also be understood within a sexual script framework. Family communication about sex might moderate the perceived reality of oSEM via its influence over the developing person's

sexual scripts. Communication about sex within families will be strongly influenced by a multitude of factors. This includes: the family's communication style, dominant cultural and familial discourses about sex, and the parent's own sexual scripts. These subsequently might have the power to influence the young person's sexual scripts and influence how they interact with the media they consume (Steele, 1999). This is hypothesised to subsequently influence their perceptions of realism when viewing oSEM. As described above, if young people are not able to freely talk about sex with their families, they might turn to oSEM as a source of information. This is likely as curiosity about sexual topics peaks in adolescence (Peter & Valkenburg, 2010). Early or more frequent use of oSEM might influence the development of that young person's sexual scripts (Štulhofer et al., 2010) making them more likely to be congruent with what the person might come across whilst viewing oSEM. This is then thought to increase the likelihood that they will perceive what they are viewing as realistic. However, if these scripts are developed and shaped within an environment where sexual topics are talked about freely and without shame, this might decrease the congruency of their scripts with what they view in sexual media and perhaps reduce the perceived realism of the media content.

Further to social (e.g., familial) environment, the DSMM posits that developmental and dispositional variables can account for individual differences in susceptibility to media effects. With respect to oSEM, age and gender warrant consideration as potential predictors of, and influences on responsiveness to, oSEM-use. For example, prior research has identified differences between males and females in their use of oSEM and its potential sequelae (Hald et al., 2012; Morgan, 2011; Wight, Tokunaga, Kraus, & Klann, 2017). It is possible to see how individual difference and social-context variables may interact in ways that could modify relationships to oSEM-use: For example, any influence of early family communication about sex is likely to alter

with age (e.g., as the early developmental environment becomes more distal, social networks are diversified, and direct sexual experiences are accrued). In the present study, we adjust for differences in age and gender when examining familial context as our focal moderator of interest – acknowledging that the DSMM posits potential influences of all these variables on whether/how individuals engage with and respond to oSEM.

Putative Psychosocial Outcomes of oSEM-use

The extant literature on oSEM ‘effects’ has explored a range of psychosocial outcome variables. For this study, we have chosen to focus on variables that (1) have previously been linked to oSEM-use and (2) are considered essential for individual and relational wellbeing (World Health Organisation; WHO, 2004). It is notable that, for all chosen variables, there is inconsistent evidence for the presence and valence of associations with oSEM-use (likely attributable to methodological variations between studies, including differences in study design, sampling, and operationalisation of variables).

Sexual satisfaction. Sexual satisfaction has been shown to be positively associated with life satisfaction, relationship intimacy, and partner communication about sex (Štulhofer, Buško, & Brouillard, 2011); it reflects positive sexual functioning, which is recognised as “a central aspect of being human” (WHO, 2002). As yet, the relationship between oSEM-use and sexual satisfaction is unclear. Some studies have suggested that viewing of sexual media reduces various dimensions of sexual satisfaction (Peter & Valkenburg, 2009). Other studies have revealed that when used in a mutual fashion, oSEM contributed to an “open erotic climate” (Daneback, Træen, & Månsson, 2009; Maddox, Rhoades, & Markman, 2009) and was associated positively with sexual satisfaction.

Sexist attitudes. It has been argued that sexist attitudes are associated with a range of negative outcomes, including hostility and discrimination towards women and acceptance of “rape myths” (Chapleau, Oswald, & Russell, 2007). Sexist attitudes towards men, although less frequently investigated, have similarly been associated with maintaining gender inequality and legitimising discrimination (Rollero & Fedi, 2012). Social cognitive theory (Bandura, 2001) postulates pornography’s influence in the development of these attitudes. Through the creation of role models and learning environments, gender stereotypes, sexual behaviours, and attitudes are “normalised, encouraged and reinforced” (Hald, Seaman, & Linz, 2012, pp. 10).

Research has examined the role of pornography in the acquisition and maintenance of these attitudes (Brown & L’Engle, 2009; Hald, Malamuth, & Lange, 2013). A core feminist critique of pornography details its contribution to the denigration of women and a distorted view of sexuality in which women are portrayed as merely sexual playthings (Dines, Jensen, & Russo, 1997). This view appears to lack empirical support with research demonstrating either inconsistent or weak associations between pornography use and sexist attitudes (Hald et al., 2013).

Body satisfaction. Within a Social Comparison framework (Festinger, 1954), body image has been found to be highly influential on an individual’s self-esteem, with unfavourable media comparisons having detrimental consequences (Gupta, 2011). Little research has investigated the specific influence of oSEM on body satisfaction (Peter & Valkenburg, 2014). This is surprising given the ubiquity of body dissatisfaction amongst the young adult population, the frequency with which adolescents and adults are accessing oSEM, and objectification theory accounts of how exposure to media focussed on bodily forms and functions may encourage people to self-objectify (as ‘things’ to be evaluated on the basis of appearance; Calogero, 2012). As with general media, content

analyses of oSEM identified the portrayal of male and female bodies as unrepresentative of the general population (McKee, Albury, & Lumby, 2008). Peter and Valkenburg (2014) found that increased exposure to oSEM increased men's dissatisfaction with their bodies, but observed no effects for females. This study was limited by its small effect sizes and the failure to reflect the broader varieties of body types depicted in oSEM.

Psychological well-being. Previous research has attempted to demonstrate how the consumption of pornography impacts on a range of emotional and behavioural indicators related to well-being. Weaver et al. (2011) reported an association between oSEM-use and higher depressive symptoms, diminished mental and physical health, and poorer quality of life. Other reviews (Owens et al., 2012; Horvath, et al., 2013) reported numerous psychosocial outcomes associated with pornography exposure but also concluded that more thorough research is needed to examine the mediating and moderating processes that may underlie relationships.

Aims of Investigation

The World Health Organisation has called attention to the importance of positive sexual health; "a state of physical, emotional, mental and social well-being in relation to sexuality" (WHO, 2002). Research in this field has placed an emphasis on attempting to understand what serves to threaten or enhance the population's sexual health. Much of the available social science literature has conceptualised oSEM as a threatening entity (Attwood, 2011; McKee, 2009); distorting and damaging our sexuality. We wished to examine this claim and investigate the relationship between oSEM-use and key indicators of individual and relational functioning: sexual satisfaction, sexist attitudes, body satisfaction, and mental well-being.

Framed by media effects theory (and the DSMM more specifically), our research also aimed to examine the role of perceived realism in mediating any relationship between

oSEM-use and the outcomes in question. We also wished to investigate further and determine whether family openness/communication about sex could moderate pathways via perceived realism – testing the DSMM notion that social-contextual factors can interact with media-use to influence media-responses (such as perceptions of realism) and their psychosocial sequelae (accounting for individual differences in susceptibility to media effects). The conceptual model under test is depicted in Figure 1.

[Figure 1 near here]

Given the above rationale, the questions we aimed to address were:

1. What is the relationship between (1) use of oSEM and (2) sexual satisfaction, sexist attitudes, body satisfaction, and mental well-being?
2. What is the role of perceived realism in mediating the relationship between oSEM-use and these outcomes?
3. If perceived realism has a mediating effect, is it moderated by family communication about sex?

Method

Ethical Approval

Ethical approval was granted by the appropriate departmental research ethics committee at the first author's host institution.

Participants

A mixed-gender sample of adults (aged 18 and above; $N = 290$) was recruited through advertisements around host universities and social media (Facebook and Twitter). We prospectively sought a minimum sample-size of 252, to obtain stable estimates of sample correlation coefficients (converging on population values; Schönbrodt & Perugini, 2013): Our planned analyses are predicated on multiple correlational analyses and ensuring the stability of estimated coefficients provides

foundational confidence for contingent modelling. Specifically, we powered our study to achieve a corridor of stability of $\pm .10$ for any coefficients $\geq .10^1$ (i.e., any associations of greater than negligible magnitude): enabling (80%) confidence that our estimated coefficients would be within $\pm .10$ of the true population value (i.e., only fluctuations of small magnitude would be tolerated). Prior to taking part, all participants were provided with information about the study and required to provide informed consent. Given the sensitive nature of some of the questions, participants were made aware of their right to withdraw at any point. They were asked to confirm they were over the age of 18. Although the researchers acknowledged that oSEM is widely accessed by individuals under this age, 18 is the current legal age in the UK for pornography consumption. There was no maximum age and participants of all gender identities and sexual orientations were invited to take part.

Procedure

We utilised an anonymous, cross-sectional, online survey design using a secure institutional survey platform to create and distribute the questionnaires. Participants completed several self-report measures embedded in the survey, the details of which are provided below.

Measures

Demographics. Relevant demographic information was collected from each participant. This included their age, gender, ethnicity, religious affiliation, level of education, marital status, and sexual experience.

¹ Informed by Cohen (1992) we characterised the absolute magnitude of correlation coefficients as $.10 =$ “small”, $.30 =$ “moderate”, and $.50 =$ “large”; with coefficients $< .10 =$ “negligible”

oSEM-use. We used the operationalised definition determined by Peter and Valkenburg (2006; 2010) in their research. Participants were asked how often in the last three months they had intentionally looked at: (1) Pictures with clearly exposed genitals, (2) Video (clips) with clearly exposed genitals, (3) Pictures in which people are having sex, (4) Video (clips) in which people are having sex. Participants responded on a seven-point Likert scale: 1 (never) to 7 (several times a day). This scale has demonstrated high internal consistency (Cronbach's $\alpha = .95$; Peter & Valkenburg, 2010) in a community sample of Dutch adolescents and young adults. Reliability analysis in the present study similarly demonstrated high internal consistency ($\alpha = .91$).

Additional questions regarding age at first oSEM-use, reasons for oSEM-use, the context in which it is viewed, and type of oSEM viewed (adapted from Hald, 2006) were included.

Perceived realism. Perceived realism was measured using items defined by Peter and Valkenburg (2010). The seven-item measure assessed the perceived social realism and perceived utility of oSEM to produce an overall measure of perceived realism. Participants rated their agreement with statements such as; "Sex on the internet is similar to sex in real life" and "By watching sex on the internet, you learn how to behave when having sex" using a five-point Likert scale (1 = fully disagree, 5 = fully agree). Higher scores indicate a higher perception that sex on the internet is a realistic portrayal of sex in real life. Peter and Valkenburg (2010) reported high internal consistency for overall perceived realism ($\alpha = .88$) in a community sample of Dutch adolescents and young adults. In the present study, reliability analysis revealed $\alpha = .85$.

Mental well-being. The Warwick-Edinburgh Mental Well-Being Scale (WEMWBS; Tennant et al., 2007) is a fourteen-item scale, developed to assess mental well-being. It assesses emotional features, for example "I've been feeling cheerful";

cognitive components, for example “I’ve been thinking clearly”; and psychological functioning, for example “I’ve been dealing with problems well”. The scale also identifies positive relational functioning as a key component of mental well-being, with items such as “I’ve been feeling close to other people.” Participants are asked to respond using a five-point Likert scale (1 = none of the time to 5 = all of the time). Higher scores suggest higher mental well-being. Original validation of the measure in a population-representative community-sample of Scottish adults (≥ 16 years in age) demonstrated good internal consistency ($\alpha = .91$). High internal consistency was observed in the present study ($\alpha = .90$).

Sexual satisfaction. The New Sexual Satisfaction Scale-Short Form (NSSS-S) assesses global sexual satisfaction and behaviours that contribute to sexual satisfaction; it was developed by Štulhofer, Buško, and Brouillard (2010) for use across all relationship statuses, sexual orientations, genders, and cultural backgrounds. The scale consists of twelve items and respondents are asked to state how satisfied they are from 1 = not at all satisfied, to 5 = extremely satisfied. Items include, “The quality of my orgasms” and “The balance between what I give and receive in sex.” Higher scores indicate higher sexual satisfaction. Good internal consistency for the scale was demonstrated ($\alpha = .90$ to $.93$) in original validation work with student and community samples in the US and Croatia. Similar internal consistency ($\alpha = .90$) was observed in the present study.

Body Areas Satisfaction Scale (BASS). The BASS is a nine-item subscale of the Multidimensional Body-Self Relations Questionnaire (MBSRP; Cash, 2000), assessing the individual’s dissatisfaction or satisfaction with eight distinct body parts (e.g., face, upper torso, genitals) and overall appearance. Individuals are asked to rate their satisfaction from 1 = very dissatisfied to 5 = very satisfied. High composite scores indicate the respondent is generally satisfied with the overall appearance of most of their

body areas (Cash, 2000). Internal consistencies of $\alpha = .82$ for men and $\alpha = .83$ for women have been reported for this measure, which was originally studied with a population-representative community-sample of US adults. In the current sample, high internal consistency was demonstrated ($\alpha = .86$).

Ambivalent Sexism Inventory (ASI) and Ambivalent Sexism toward Men Inventory (AMI) – short forms. The ASI (Glick & Fiske, 1996) and the AMI (Glick & Fiske, 1999) are commonly used measures of sexist attitudes toward both men and women. The short forms contain 12-items as opposed to the original 22-item ASI and 20-item AMI. Statements relate to men and women and their relationship in modern society (Hald, Malamuth, & Lange, 2013), examples of which include, “Women should be cherished and protected by men” (ASI Short Form) and “Men act like babies when they are sick” (AMI Short Form). Participants indicate their agreement with each statement on a 1 (strongly disagree) to 5 (strongly agree) scale. Higher scores indicate more sexist attitudes. Both forms were originally developed and studied with student and community samples in the US and demonstrated high internal consistency (ASI, $\alpha = .88$; AMI $\alpha = .83-.87$). The current study also demonstrated high internal consistency for both measures (ASI $\alpha = .87$; AMI, $\alpha = .84$).

Family Sex Communication Quotient (FSCQ). The 18-item measure developed by Warren and Neer (1986) assesses general family orientation to discussions about sexual topics between parents and children. Orientation is measured across three dimensions: comfort (the degree to which sex is openly discussed in the family), information (perception of the informative nature of the discussions) and value (the importance of the family in learning about sex). Participants respond on a five-point Likert scale from “Strongly Disagree” to “Strongly Agree” to items such as, “I feel free to ask my parents questions about sex” and “Much of what I know about sex comes from

family discussions”. Due to the retrospective nature of the study, and participants being over the age of 18, the tense of the questions was altered to reflect their experiences growing up; that is, “I feel” to “I felt”. The scores are summed to represent the FSCQ score with higher scores representing more frequent, valuable, and comfortable family communication about sexual topics. The FSCQ was originally developed and studied with a student sample in the US; the measure has consistently demonstrated high reliability, with $\alpha = .90$ on average (Warren, 2011). The present study similarly revealed high internal consistency ($\alpha = .93$).

Data analysis

We were interested in the interaction of these variables, specifically testing putative mediating and moderating relationships stated in the study’s research questions². The first stage (addressing research-question 1) was to examine the direct effects; whether

² In common with Hayes (2018) we use any causal language loosely (to maintain consistency with the tradition of moderated-mediation modelling) whilst acknowledging that there are non-causal explanations for observed associations. Statistics are not directly informative about causation: The selection and interpretation of variables as predictor, mediator, outcome, or moderator variables is based here on theoretical and logical bases (in particular, the DSMM framework). In the absence of time precedence, our cross-sectional design does not allow us to establish mediation: Rather, we rely on theoretical accounts of directionality (as posited by the DSMM) to test and interpret observed indirect relationships in terms of consistency with a mediational account (Kline, 2015). In actuality, any observed relationship between oSEM-use and outcomes of interest (e.g., sexual satisfaction) could reflect multiple possibilities (e.g., oSEM-use influences sexual satisfaction, sexual satisfaction influence oSEM-use, bidirectional influence, a third variable influences both oSEM-use and sexual satisfaction, or a spurious correlation) and is subject to measurement artefacts.

variable X (oSEM-use, as the theoretical ‘predictor’ of interest) is associated with the Y variables (psychosocial outcomes) using correlational analysis. Pearson’s correlational analyses were conducted to test associations between oSEM-use, perceived realism, and the psychosocial variables under investigation. Contextual (FSCQ scores), dispositional (gender), and developmental (age) variables were also included to determine their relationship (as potential differential-susceptibility variables, within the theoretical framework of the DSMM) with other variables of interest (see Table 4). Bootstrapping was applied to account for lack of normality in the sample. Holm-Bonferroni sequential correction was applied to account for multiple comparisons.

To more thoroughly address our first research question, we conducted equivalence testing of any non-significant relationships, using the two one-sided test procedure (TOST; Lakens 2017; Lakens et al. 2018). Equivalence testing can be used to test whether an observed effect is surprisingly small: Allowing us to reject population effects larger than prespecified equivalence bounds (i.e., a range of values that we consider to be so small as to be practically equivalent to zero). Thus, equivalence testing goes beyond traditional hypothesis-testing, which does not allow us to make strong conclusions about non-significant relationships. Here we specified a small effect size ($r \Delta L = - .20$, $\Delta U = + .20$) – smaller than the average published effect in a meta-meta-analysis of published studies on individual differences ($r = .21$; Richard, Bond, & Stokes-Zoota, 2003), and so small that only 4% of the variance in one variable could be explained in terms of the other – as our smallest effect size of interest (SESOI). A significant TOST result indicated that the observed association was statistically within equivalence bounds and we did not detect our SESOI. Conversely, a non-significant equivalence test indicated that data were inconclusive (i.e., the confidence interval encroached the equivalence bounds on one side of the test) – and meaningful associations ($r_s > \pm .20$) cannot be ruled out.

In addition to examining whether oSEM-use is associated with the different variables, we were also interested in the potential role of perceived realism in mediating any relationship between oSEM-use and these psychosocial outcomes. Finally, the analysis aimed to determine whether any indirect effects via perceived realism were moderated by family communication about sex. In this case, we examined whether an indirect effect (specifically, the pathway between oSEM-use and the perceived realism of oSEM) will vary in strength or direction conditional on the value of the moderating variable. Preacher and Hayes (2008) proposed a sophisticated and flexible framework for moderated mediation to analyse multiple interactions and test for indirect effects. The moderated mediation model depicted in Figure 1 allows for strong estimations of all direct and indirect effects and is shown to provide high power and adequate Type I error rates.

Following the DSMM, some demographic variables were expected to represent potentially-important dispositional (gender) or developmental (age) differences in susceptibility to (engaging with and responding to) oSEM; these variables were entered into models as covariates, to control for their likely influence on focal variables of interest.

Analysis of the data was conducted using the statistical programme IBM SPSS v22, implementing PROCESS macros for moderated-mediation analyses written by Preacher and Hayes (2008). The sampling distribution of the indirect effect is rarely symmetrical. Therefore, bootstrap confidence intervals were chosen as the preferred inferential method (Preacher, Rucker, & Hayes, 2007). For each parameter, robust standard errors and bias-corrected confidence intervals were computed, based on 1,000 bootstrap samples.

Results

290 individuals consented to take part. Of these, 272 completed the measures in full. The sample was weakly representative of gender and sexual minorities, so present results reflect data from 252 respondents who identified as cisgender, heterosexual men and women. The sociodemographic characteristics of the participants appeared to resemble similar samples (e.g. NATSAL; Mercer et al., 2013). Demographic data are presented in Table 1. Table 2 and Table 3 provide more specific demographic information relating to the sample's sexual history, experience and historical and current use of oSEM.

[Table 1, Table 2, and Table 3 near here]

oSEM-use

Overall, 85% of the total sample reported using oSEM at some point in their lifetime, and 79% reported use within the last three months.³ Historically, 27% of the sample reported that they had first viewed oSEM prior to their first sexual experience; 65% had a sexual experience before viewing oSEM for the first time, and 8% experienced both at a similar time. The majority (80%) of respondents reported an overall perception that sexual portrayals depicted in oSEM were relatively unrealistic.

Correlational analysis

[Table 4 near here]

Table 4 depicts planned correlational analyses. No significant zero-order correlations were found between (1) oSEM-use and (2) sexual satisfaction ($r = -.03$), mental well-being ($r = .07$), total ambivalent sexism ($r = .04$), total ambivalence towards men ($r = -.05$) and family communication about sex ($r = .04$). All coefficients were of negligible magnitude. A small, positive association was found between oSEM-use and

³oSEM-use was not correlated with being in a relationship ($-.07$) or sexual activity ($.02$), $ps \geq .27$

body satisfaction ($r = .13$) but the statistical significance of this relationship did not survive correction for multiple testing.

Similarly, a small positive association was found between oSEM exposure and perceived realism ($r = .11$) but this did not meet criteria for statistical significance. Perceived realism did demonstrate significant, positive correlations with total ambivalent sexism ($r = .19$), and total ambivalent sexism towards men ($r = .18$) – although coefficients were of small magnitude.

Statistically significant inter-relationships were observed among outcome variables of interest (and these relationships remained significant after adjusting for multiple testing). Mental well-being was found to be positively related to body satisfaction ($r = .46$) and sexual satisfaction ($r = .27$). Sexual satisfaction was found to be positively associated with body satisfaction ($r = .23$). Coefficients were of small-to-moderate magnitude. Ambivalent sexism and ambivalent sexism towards men were positively and significantly associated ($r = .70$) with large magnitude.

Equivalence testing. Given the non-significant correlations between oSEM-use and outcomes of interest (sexual satisfaction, sexist attitudes, body satisfaction, and mental well-being) equivalence testing was applied (enabling stronger inferences in relation to research question 1). Equivalence tests indicated that the observed effect sizes were statistically within equivalence bounds and smaller than our SESOI ($r \pm .20$) for relationships between oSEM-use and sexual satisfaction, sexist attitudes, and mental wellbeing ($ps < .018$). The (positive) relationship between oSEM-use and body satisfaction was not significantly within specified equivalence bounds, suggesting that data are inconclusive for this relationship.

Conditional Process Analysis

Here analyses addressed research question 2.

Indirect effects. There were no significant indirect relationships between oSEM-use and outcome variables through perceived realism.

Moderation of indirect effects. Question 3 addressed whether (1) family communication about sex and/or (2) gender moderated indirect ('mediating') relationships where present. In the absence of significant indirect effects, these moderation models were not tested.

Discussion

We examined the relationship between use of oSEM and body satisfaction, sexual satisfaction, mental well-being, and sexist attitudes. We investigated perceived realism as a potential mechanism by which oSEM-use could predict (and perhaps influence) these outcomes – and concurrently examined family communication about sex as a possible moderator of indirect associations via perceived realism. Relationships were examined cross-sectionally, precluding determination of directionality; however, we applied a developed theoretical account of media-effects (the DSMM framework) to model and test associations in terms of putative moderated-mediation processes.

Seventy-nine percent of the overall sample reported using a variety of types of oSEM over the preceding three-months. These figures appear broadly consistent with frequencies of oSEM-use reported in previous literature (Hald et al., 2012) but are towards the higher end of estimates. This may reflect the self-selecting recruitment design, as individuals who volunteer for this type of research may differ from those who do not on several dimensions. For example, Strassberg and Lowe (1995) revealed that volunteers compared to non-volunteers reported a more positive attitude toward sexuality, less sexual guilt, and that they were more sexually experienced.

No direct or indirect relationships were demonstrated between oSEM-use and the psychosocial outcome variables of interest. In our sample, there was little association

between oSEM-use and important evaluations of self (in terms of sexual and body satisfaction, and mental well-being) or others (in terms of sexist attitudes), despite posited links. Equivalence testing demonstrated that (for all outcomes other than body satisfaction) we could reject effect sizes (r s) more extreme than the equivalence bounds of $-.20$ and $.20$ – i.e., within the sampled population, relationships of substantive magnitude were largely ruled out.

Detection of negligible-to-weak direct relationships might be considered unusual given other research in the area, which tends to find or claim a variety of associations and effects (principally in a negative/adverse direction). At face value, present results portray a relatively neutral picture regarding the relationship between oSEM and a variety of outcomes. Yet a direct comparison with extant literature is problematic due to variations in methodologies, contexts, and sample characteristics.

Possible explanations for these differences might be found in the design of our research. Sex research can be particularly susceptible to the moral judgements and biases of the researchers and bound by social values (Pope, Voges, Kuhn, & Bloxsome, 2007). The current research purposely considered the wording of questions asked, and measures used, to minimise the potential for bias. Participants were asked to use their own definitions for the sexual behaviours they engage in to prevent the need for reducing multifaceted sexual behaviours into simplistic and inadequate definitions (Duffy, Dawson, & das Nair, 2016). The measures were chosen based on their validity and balance – recognising that some measures inherently construct and elicit responses to oSEM-use in negative terms (e.g. the Pornography Distress Scale; Bridges, Bergner, & McHinnis, 2003; Problematic use of Pornography Scale; Kor et al., 2014).

Our study applied a convenience sampling strategy, using social media platforms, which resulted in a snowballing effect. The obtained sample had a mean age of 30 years

and most of those sampled (approximately 70%) identified as women. Whilst there was a significant association between gender and oSEM-use (with oSEM being used to a greater extent in male respondents) we found that the (negligible) associations between oSEM-use and outcome variables of interest were similar across genders.

The mean age participants reported to have first accessed oSEM in this study was 18.6 years, an age somewhat older than reported elsewhere (e.g., average age of 14-17 years; Brown & L'Engle, 2009). The sample's later average age of first oSEM access might partially explain the study's lack of significant findings. Media effects research proposes that media effects are most influential in childhood and early adulthood (Valkenburg & Peter, 2013). In relation to pornography, research suggests early exposure has a stronger influence over the affective, cognitive and behavioural aspects of sexuality, especially if they are not yet well rooted (Štulhofer et al., 2010). It is noteworthy that our models of relationships between oSEM-use and outcomes of interest were similar when controlling versus not controlling for age (as a covariate).

A key focus of this research was to examine (1) whether perceived realism might account for individual differences in oSEM-outcome relationships and (2) whether familial communication about sex could moderate relationships between oSEM-use, perceived realism, and outcomes of interest. We observed a small, non-significant association between oSEM consumption and perceived realism of oSEM's portrayals of sexual activity. Specifically, the higher the frequency of oSEM-use, the more realistic the individual perceived oSEM to be. This finding is (somewhat) congruent with previous research which has established a positive association between oSEM-use and perceived realism (Peter & Valkenburg, 2010) – and not inconsistent with the Cultivation Hypothesis (Gerbner et al., 1976), which postulates a positive relationship between media

consumption and the extent to which its content is perceived to reflect real life. However, most of the sample perceived pornography to be more unrealistic than realistic.

The meaning of the association between perceived realism and sexist attitudes, as measured by the ASI and AMI, is a result with unclear origin. The finding suggests that those who perceive oSEM as more realistic are also more likely to hold more sexist attitudes towards both men and women, although we are not able to comment on the directionality of this relationship. A possible explanation according to the media practice model, may be that individuals, based on their existing attitudes, seek out congruent content in sexual media (Baams et al., 2015). That is, individuals who previously held more sexist attitudes, might be more inclined to seek out this type of theme within the oSEM they view, forming a type of circular feedback. This is as opposed to the prevailing assumption that oSEM will make its viewers more sexist in their attitudes. Exposure to this may subsequently influence the perceived reality of oSEM content (cultivation hypothesis; Gerbner, Gross, Morgan, & Signorelli., 1977).

An alternative explanation, corresponding with social cognitive theory (Bandura, 1977; 2001), may be that individuals, through their observation of sexual media that endorse gender non-egalitarian attitudes that are perceived as realistic, acquire their own models for these behaviours, roles, and attitudes (Baams et al., 2015). It is important to consider that oSEM is by no means the only medium by which sexist attitudes and behaviours are conveyed. Our study is unable to account for or control the various other pathways through which sexist attitudes and behaviours may be activated. It is also not able to account for specific individual differences that might contribute to their development.

We did not observe any significant indirect effects of oSEM-use on sexist attitudes, through perceived realism – and thus were not able to test the connected original

hypothesis that more open communication about sexual topics might moderate the relationship between oSEM-use and perceived realism. As such, the DSMM's proposition that media effects are conditional upon differential susceptibility variables (in the present case, family communication about sex – whilst controlling for age and gender as other potential [developmental and dispositional] differential susceptibility variables) was not verified.

Overall our findings in this sample diverge from prevalent sexual discourses around the impact of oSEM on a range of outcomes important for mental-well-being. We found no direct associations between oSEM-use and variables gauging body satisfaction, sexist attitudes, sexual satisfaction, and mental well-being – and equivalence testing ruled out substantive associations (exceptionally findings for the relationship between oSEM-use and body satisfaction were inconclusive).

Strengths and Limitations

The use of an online survey provided the scope for widespread recruitment and a large enough sample size so that the analysis was sufficiently powered. The anonymity of this recruitment method was particularly advantageous for recruiting individuals who may have felt uncomfortable or not wished to disclose their sexual behaviours in an interview setting. Nonetheless, this design also had disadvantages, including the lack of control over spread of recruitment or the environment in which participants completed the survey. The use of forced-choice measures did not allow for nuanced, in-depth responses.

The use of correlational analyses is commonly critiqued within research as they are often erroneously interpreted in terms of causal relationships (Kohut, Baer, & Watts, 2016). The current study has not implied such relationships and attempted to establish possible underlying mechanisms. According to the DSMM, boundless dispositional,

developmental, and social variables might account for differential susceptibility to media use, media response state, and media effects. This poses significant challenges for robust, conclusive research within the field.

A critical limitation lies within the epistemological debate of whether it is possible to precisely measure and examine the variables in question. For example, the applied measure of family communication about sex does not gauge the content/messages conveyed within such discussions (e.g., whether restrictive or permissive): Individuals could have very different experiences of family communication about sex (with potentially divergent implications for their use of oSEM) yet give similar scores; in this way, responses on a measure like the FSCQ could mask important variability, and limit interpretability when testing theories (such as the DSMM). In practice, the absence of indirect effects precluded testing of family communication as a moderating variable, but the potential difficulties with interpreting responses on this measure are indicative of broader issues/losses when attempting to operationalise concepts of interest. Examining communication about sexuality is a complex process and current instruments struggle to account for and assess factors that might influence if and when children talk to their parents. These factors might include communication style or how communications are embedded within the wider family processes and structure (Diiorio, Pluhar & Belcher, 2003). Recognition of these individual and systemic factors might allow for a more accurate interpretation of research findings and consequently permit a more accurate representation of sexual communication within families (Diiorio et al., 2003).

Concepts such as sexuality are arguably too nuanced to capture in quantifiable terms. Quantitative methods are believed by some to fail to capture the complex political, social, and cultural constructions of sexuality (Atwood, 2005). Including a qualitative

component may have helped to capture how oSEM is experienced by the individual, providing additional context to the quantitative data.

Cross-sectional designs rely on the averaging of effects within groups. This may be a significant limitation within this study and sex research in general as individual sexual experiences and behaviours are widely heterogeneous.

Clinical implications and future research

With the ubiquity of oSEM and extent to which the population are regularly accessing its content, our findings have some interesting and perhaps controversial implications – although their applicability beyond the present sample is questionable and requires further testing. Inconsistent with previous research, our results did not demonstrate any direct negative associations between oSEM-use and psychosocial functioning and mental well-being. These results arguably provide some evidence that the correlates of normative oSEM-use may not be as pervasive or significant as some literature would have us believe. For this sample, there was little evidence of direct associations with undesirable outcomes, which could suggest that oSEM had little bearing over the sexual functioning and mental well-being of the individuals who took part – although we did observe some indirect relationships that indicate the value of investigating oSEM-wellbeing links in a more nuanced and theoretically-informed manner (attending to posited conditional and secondary pathways).

Sexual discourses are increasingly expressed in terms of a ‘therapeutic culture’ with a focus on promoting sexuality as a source of personal fulfilment (Plummer, 1995 as cited in Atwood, 2006). Within adult populations, normative use of oSEM is beginning to reveal beneficial effects. Within clinical settings, researchers have started to investigate therapeutic uses of pornography for couples and individuals with sexual dysfunction (Robinson, Manthei, Scheltema, Rick, & Koznar, 1999). Continuing to understand the

positive uses and influences of oSEM through research may further challenge the cultural discourses focused on harm, and potentially contribute to healthier and more fulfilling sex lives. If evidence suggests that these stimuli are not inherently/unconditionally harmful, there may be more scope to explore potential beneficial applications or adjunctive uses within clinical settings.

Future research would benefit from the use of longitudinal designs to enhance our awareness of the extensive environmental and personal determinants that might underlie these relationships. The importance of maturation and sexual experience is increasingly recognised (Peter & Valkenburg, 2010) both of which are more likely to be captured by such designs, rather than relying on retrospective recall. Longitudinal methods are believed to be the only design which allows developmental patterns of individual change to be truly understood (Peterson & Hyde, 2009). Through tracking oSEM-use and a range of psychosocial outcomes over time, these designs may contribute to a more comprehensive understanding of the antecedents and consequences of oSEM-use.

Finally, there is comparatively little research examining differences and trends in pornography-use amongst individuals of different gender and sexual identities (Morse, 2015). The current research focussed on cisgender heterosexual populations and was unrepresentative of those with minority gender and sexual identities. These categories are increasingly diverse and fluid (Pakkan, 2015) and it is unclear whether this is reflected in diversification of pornography categories and themes. Future research might consider the inclusion of these diverse groups to provide a more comprehensive and relevant picture of oSEM-use and its correlates.

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Table 1. General demographic information

Characteristic	<i>n</i>	(%)
Age (valid <i>n</i> = 252): Mean 30.6 (SD 9.3; range 18–70)		
Gender (valid <i>n</i> = 252)		
Male	73	29.0
Female	179	71.0
Religious affiliation (valid <i>n</i> = 252)		
No religion	166	65.9
Christian	72	28.6
Other affiliation	10	4.0
Prefer not to say	4	1.6
Ethnic group (valid <i>n</i> = 252)		
White	228	90.5
Other	21	8.3
Prefer not to say	3	1.2
Qualifications (valid <i>n</i> = 252)		
None	4	1.6
Secondary	21	8.3
Tertiary (including further and higher education)	226	89.7
Prefer not to say	1	0.4
Relationship status (valid <i>n</i> = 252)		
Single	52	20.6
Dating	18	7.1
Exclusive relationship/Cohabiting/Married	172	68.3
Other	10	4.0

Note. Due to rounding, percentages do not total 100%

Table 2. Sexual demographics of sample

Sexual Behaviour	<i>n</i>	(%)
Age when first masturbated (valid <i>n</i> = 252)		
Never	13	5.2
≤17	187	74.2
≥18	37	14.7
Prefer not to say	12	4.8
Frequency of masturbation (valid <i>n</i> = 237)		
Less than once a month	49	20.7
Once a month	36	15.2
Once a week	54	22.8
Multiple times per week	93	39.2
Prefer not to say	5	2.1
Age of first sexual experience (valid <i>n</i> = 250)		
Never	5	2.0
≤15	97	38.8
16–20	128	51.2
≥21	15	6.0
Prefer not to say	5	2.0
Number of sexual partners (valid <i>n</i> = 242)		
1–6	102	42.1
7–20	94	38.8
≥21	44	18.1
Prefer not to say	2	0.8
Frequency of sexual acts (valid <i>n</i> = 242)		
A couple of times a year or less	32	13.2
2 times per month or less	71	29.3
1 to 3 time per week	112	46.3
4 times or more per week	23	9.5
Prefer not to say	4	1.7

Table 3. Reported oSEM-use

oSEM-use and preference	<i>n</i>	(%)
oSEM-use in last 3 months (valid <i>n</i> = 247)		
None	82	33.2
Less than once a month	40	16.2
1 to 3 times per month	46	18.6
Once a week	29	11.7
Several times per week or more	50	20.2
Age at first use (valid <i>n</i> = 243)		
Never used oSEM	38	15.6
≤17	104	42.8
18-25	77	31.7
≥26	24	9.8
Reasons for oSEM-use* (valid <i>n</i> = 251)		
Masturbation (solitary)	156	62.2
Curiosity	71	28.3
Sexual arousal with others (foreplay)	69	27.5
Boredom	58	23.1
To develop sexual skills/confidence	28	11.2
Other (including relaxation and mood enhancement)	8	3.2
Source of information/education	23	9.2
Perceived realism of oSEM (valid <i>n</i> = 251)		
Unrealistic	60	23.8
Somewhat unrealistic	141	56.3
Somewhat realistic	45	18.1
Realistic	5	1.8

*Participants were able to endorse multiple response so the frequency may not total 100%

Table 4. Correlations between oSEM-use, perceived realism, psychosocial outcomes, family sex communication, and demographic covariates

	Mean (SD)	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. oSEM-use	9.39 (5.24)	.11 [-.03, .25]	.17* [.04, .27]	-.03 [-.14, .09]	.07 [-.06, .20]	.04 [-.10, .18]	-.05 [-.17, .09]	.05 [-.07, .17]	.61* [.52, .70]	-.12 [-.24, .01]
2. Perceived realism	16.66 (4.36)		-.01 [-.13, .12]	-.04 [-.16, .10]	-.06 [-.18, .07]	.18** [.03, .31]	.17* [.02, .30]	.03 [-.10, .16]	.07 [-.06, .20]	-.05 [-.19, .10]
3. Body satisfaction	24.82 (5.81)			.23** [.08, .36]	.46** [.33, .58]	.07 [-.07, .21]	.00 [-.14, .15]	.04 [-.09, .19]	.26** [.15, .37]	.05 [-.10, .19]
4. Sexual satisfaction	44.88 (9.66)				.27** [.13, .40]	-.06 [-.19, .05]	-.11 [-.23, .02]	-.02 [-.14, .09]	-.03 [-.15, .08]	-.01 [-.16, .13]
5. Mental well-being	43.89 (8.01)					-.12 [-.23, .00]	-.06 [-.19, .07]	.06 [-.07, .17]	.07 [-.05, .20]	-.01 [-.15, .12]
6. Total ambivalent Sexism	2.57 (0.61)						.70** [.63, .78]	-.01 [-.13, .11]	.16* [.03, .27]	.13 [-.02, .22]
7. Total ambivalence toward men	2.42 (0.60)							-.05 [-.18, .09]	-.04 [-.16, .10]	.16* [.05, .25]
8. FSCQ	47.37 (13.17)								.04 [-.08, .18]	-.09 [-.14, .14]
9. Male gender										-.02 [-.12, .11]
10. Age	30.60 (9.34)									

* Correlation is significant based on 95% CIs; ** Correlation remains significant at Holm-Bonferroni adjusted alpha criterion. Bias corrected and accelerated bootstrap 95% CIs (based on 1,000 bootstrap samples) are reported in square brackets. FSCQ = Family Sex Communication Quotient. For dummy-coded male gender: 1 = male, 0 = female.

Figure 1. Illustration of a moderated mediation model [Mapping to conceptual variables in the Differential Susceptibility to Media Effects Model is indicated in square brackets]

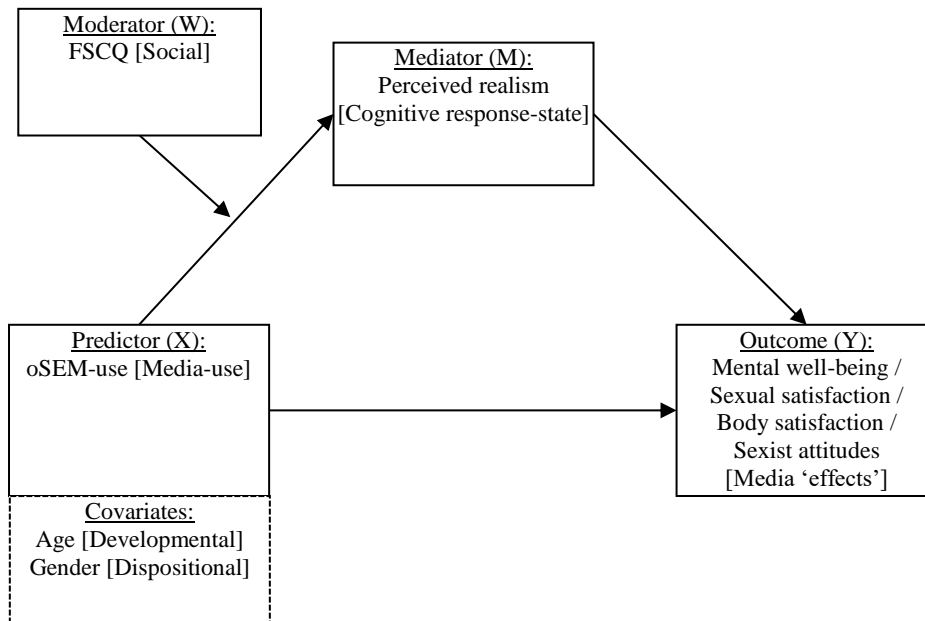


Figure captions

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