



## Does exposure to sexually explicit Internet material increase body dissatisfaction? A longitudinal study



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### ABSTRACT

Research on the consequences of exposure to sexually explicit Internet material (SEIM) has neglected body dissatisfaction as a potential outcome. Additionally, research on body dissatisfaction has ignored exposure to SEIM as a potential predictor. Within a social comparison framework, we studied whether exposure to SEIM predicted overall body dissatisfaction, as well as dissatisfaction with one's stomach size, penis size (for males), and breast size (for women). Based on a two-wave panel survey held among a nationally representative sample of 1879 Dutch respondents we found that more frequent exposure to SEIM increased males' dissatisfaction with their body in general and their stomach in particular. However, more frequent exposure to SEIM did not increase males' dissatisfaction with their penis size. Among females, SEIM was generally unrelated to body dissatisfaction. The effects of exposure to SEIM on the various dimensions of body dissatisfaction differed neither by age nor by sexual orientation.

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### 1. Introduction

Research has shown that a considerable number of adolescents and adults watch sexually explicit Internet material (SEIM; e.g., Hald & Mulya, 2013; Peter & Valkenburg, 2011a; Traeen, Nilsen, & Stigum, 2006; Wolak, Mitchell, & Finkelhor, 2007; Wright, 2013a, 2013b). In this context, researchers have increasingly focused on the implications and consequences of exposure to such material. By now, evidence has accumulated that exposure to SEIM is related to more permissive sexual attitudes, less progressive gender role beliefs (e.g., Brown & L'Engle, 2009; Peter & Valkenburg, 2009a, 2010a), reduced sexual satisfaction (Peter & Valkenburg, 2009b; Stulhofer, Busko, & Landpriet, 2010), earlier sexual experiences (among adolescents, Brown & L'Engle, 2009), and more sexual risk behavior (among adult men, Peter & Valkenburg, 2011b; Wright & Randall, 2012; among adult women: Wright & Arroyo, 2013). Along with research on the effects of sexually explicit material in traditional media (for meta-analyses, see Allen, D'Alessio, & Brezgel, 1995; Allen, Emmers, Gebhardt, & Giery, 1995), existing research thus suggests that exposure to sexually explicit material is associated with a variety of sexual cognitions, emotions, and behaviors.

Against this backdrop, it is interesting that no study to date has investigated whether exposure to SEIM affects people's body satisfaction, one exploratory study notwithstanding (Duggan &

McCreary, 2004). Evidence has accumulated that non-explicit media images of unrealistically thin bodies increase body dissatisfaction, notably among women (for recent meta-analyses and reviews, see Grabe, Ward, & Hyde, 2008; Harrison, 2009; Levine & Harrison, 2009; Lopez-Guimera, Levine, Sanchez-Carracedo, & Fauquet, 2010; Myers & Crowther, 2009; Want, 2009). At the same time, content analyses of sexually explicit material have pointed out that the portrayal of both female and male bodies in such material is hardly representative of female and male bodies in the general population (Cowan & Campbell, 1994; McKee, Albury, & Lumby, 2008). For example, a content analysis of best-selling pornographic videos and DVD's in Australia (McKee et al., 2008) has shown that only 5% of the actors were overweight. The majority of female actors (65%) were slim, and one in five male actors was muscular. In addition, more than 80% of the female actors had average (39%) or large breasts (42%), with 29% rated as clearly having had breast surgery. Only three percent of the male actors had small penises and 55% had penises that were clearly longer and/or thicker than the average penis. As a result, it seems plausible to hypothesize that sexually explicit material, with its unconcealed presentation of genitalia and other body parts, may affect individuals' body satisfaction.

The present study is an initial test of this hypothesis. Based on a two-wave panel study, we will investigate whether exposure to SEIM predicts individuals' overall body satisfaction as well as their satisfaction with various body parts, such as their penis and breasts. In addition, we will study whether a potential impact of SEIM on body satisfaction depends on individual differences, such

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as age and sexual orientation. Because satisfaction with one's penis or breast size, as well as sexual orientation, are difficult to compare between males and females, we will investigate the potential impact of SEIM on the various aspects of body dissatisfaction separately for males and females. This decision is also supported by evidence that males and females seem to focus on different parts of their bodies when they are dissatisfied with their body (e.g., Ricciardelli & McCabe, 2003; Tiggemann, 2004). Following a definition by Peter and Valkenburg (2011a), SEIM refers in this study to professionally produced or user-generated pictures or videos (clips) on or from the Internet that are intended to arouse the viewer. These videos and pictures depict sexual activities, such as masturbation and oral sex, as well as anal and vaginal penetration, in an unconcealed way, often with a close-up on genitals. The mere depiction of nudity, as it is typical of magazines such as *Playboy*, is not part of this definition. Although we deal with a potential undesirable outcome of exposure to SEIM, we do not imply that exposure to SEIM is per se something negative or morally wrong.

### 1.1. Impact of SEIM on body satisfaction

In order to understand the effects of media on body-related issues, various theoretical frameworks have been used, notably social cognitive theory, cultivation theory, self-discrepancy theory, and social comparison theory (for reviews, see e.g., Harrison, 2009; Levine & Harrison, 2009). We chose social comparison theory as a theoretical framework in this study because a recent review and meta-analyses of research on the issue concur that social comparison is a key process underlying the effects of media on people's body satisfaction (Lopez-Guimera et al., 2010; Myers & Crowther, 2009; Want, 2009). Moreover, social comparison theory accommodates our focus on body satisfaction more easily than other theoretical frameworks, which rather deal with behavior (i.e., social cognitive theory), particular worldviews and cultural values (i.e., cultivation), and emotional responses, such as agitation or dejection (i.e., self-discrepancy theory, Harrison, 2009; Levine & Harrison, 2009).

According to social comparison theory (e.g., Buunk & Gibbons, 2007; Festinger, 1954; Suls, Martin, & Wheeler, 2002), people are motivated to assess their position in life by collecting relevant information about particular self-related comparison dimensions (e.g., intelligence, health, appearance). One way of gaining such self-knowledge is to engage in social comparison, that is, "any process in which individuals relate their own characteristics to those of others" (Buunk & Gibbons, 2007, p. 16). Social comparisons inform people about their position relative to others regarding particular comparison dimensions and, as a result, may trigger emotional responses (for a review, see Smith, 2000). One of these responses can be an increased or reduced satisfaction with the particular comparison dimension (e.g., Myers & Crowther, 2009).

For the application of social comparison theory to the potential influence of SEIM on body satisfaction at least two refinements of the original tenets of the theory are important. First, people do not only compare themselves with similar others as classic social comparison theory states (Festinger, 1954), but also with dissimilar others. Evidence has accumulated that, when body-related attributes are involved, social comparisons with dissimilar others occur almost as frequently as comparisons with similar others (e.g., Jones, 2001; Strahan, Wilson, Cressman, & Buote, 2006). This modification of early social comparison theory is especially important against the backdrop that sexually explicit material is often seen as featuring characters whose bodies typically do not reflect the population average (McKee et al., 2008).

Second, social comparisons do not necessarily occur intentionally (Wood, 1989), but can arise spontaneously and automatically,

without individuals even being aware of making them (e.g., Buunk, Taylor, Dakof, Collins, & VanYperen, 1990; Mussweiler, Ruter, & Epstude, 2004; Want, 2009). As a result, individuals may engage in social comparisons when the comparison target has a bad reputation (e.g., Mussweiler et al., 2004) or when the consequences of the social comparison are negative (Gilbert, Giesler, & Morris, 1995). Social comparisons of this kind are particularly likely when the comparison target is statistically or normatively distinct (Mullen, 1991; Strahan et al., 2006). This extension of social comparison theory is important because pornographic actors and actresses typically have a bad reputation (Williams, 1999), are frequently not average (Cowan & Campbell, 1994; McKee et al., 2008), and comparisons with their bodies and body parts may not necessarily elicit positive consequences (Duggan & McCreary, 2004). In sum, the two refinements of social comparison theory render it plausible to assume that individuals compare their own bodies with bodies they see in SEIM.

Apart from predicting the possibility that individuals engage in social comparisons with actors and actresses in SEIM, social comparison theory helps understanding the potentially negative outcome of this comparison. Of crucial importance is how the comparison targets perform in the comparison dimension, that is, which features the bodies and body parts of the actors and actresses in sexually explicit material possess. As outlined above, the few existing content analyses of sexually explicit material agree that, overall, the bodies and body parts in such material deviate from what is common in general populations (Cowan & Campbell, 1994; McKee et al., 2008). By and large, male actors have larger-than-average penises and are more muscular, while actresses are slimmer and have bigger breasts than average women. This pattern has also been confirmed in a recent exploratory content analysis of 100 sexually explicit videos on the five pornographic Internet sites that are most popular in the Netherlands where the current study was done (Klaassen, 2011).

Within a social comparison framework, the findings of content analyses of sexually explicit material suggest that many users of this material may be likely to engage in an upward comparison with the characters and their bodies and body parts. Generally, when individuals compare themselves with others in an upward fashion, they may become aware of a discrepancy between their own and a comparison target's standing on a particular comparison attribute. This perceived discrepancy may result in dissatisfaction (e.g., Suls et al., 2002). By definition, sexually explicit material focuses on genitals and breasts, often with close-ups (Williams, 1999). Thus, when people compare their own genitals and breasts with those featured in sexually explicit material, they may notice a discrepancy and, consequently, become dissatisfied with their own genitals and breasts. In line with other authors (Lever, Frederick, & Peplau, 2006), we thus hypothesized:

**H1.** More frequent exposure to SEIM will predict greater dissatisfaction with one's penis size among men and one's breast size among women.

When making social comparisons, individuals center not only on the focal dimension under evaluation, but also on surrounding dimensions (e.g., Goethals & Darley, 1977; Wood, 1989). Thus, when people compare themselves with actors and actresses in pornographic material, they may not only focus on their genitals and breasts, but also on other body parts and their body in general. Therefore, in this study we also deal with overall body satisfaction and, as a "surrounding" specific body part, people's satisfaction with their stomach. We chose satisfaction with one's stomach because several studies have revealed that a flat stomach is considered an important part of body appeal and, consequently, often a source of concern, both among males and females (e.g.,

Borzucka-Sitkiewicz & Sas-Nowosielski, 2008; Phillips et al., 2006; Thomsen, Bower, & Barnes, 2004). Moreover, the ideal of a flat stomach seems to correspond with the frequent occurrence of slim women and muscular men, as well as with the lack of overweight characters, in sexually explicit material (McKee et al., 2008). As a result, we hypothesized:

**H2.** More frequent exposure to SEIM will predict a greater dissatisfaction with one's stomach.

**H3.** More frequent exposure to SEIM will predict a greater dissatisfaction with one's body.

### 1.2. Individual differences in the impact of SEIM on body satisfaction

Both media effects and social comparison scholars have increasingly pointed to individual difference variables as important moderators of the impact of either media content or social comparisons (e.g., Buunk & Gibbons, 2007; Malamuth & Huppel, 2005; Oliver & Krakowiak, 2009; Wheeler, 2000). For example, media effects researchers have shown that the effects of sexually explicit material depend on users' individual characteristics, such as hypermasculinity, sexual experience, life dullness, confidence in media, religiosity, and education (Kingston, Malamuth, Fedoroff, & Marshall, 2009; Peter & Valkenburg, 2009b; Wright, 2013b; Wright & Arroyo, 2013). Similarly, social comparison scholars have demonstrated that individual difference variables determine the extent to which upward comparisons have negative consequences (for reviews, see Smith, 2000; Wheeler, 2000).

An important role in the impact of social comparisons on people is played by the extent to which comparison dimensions are relevant to an individual (Major, Testa, & Bylsma, 1991; Smith, 2000; Tesser, 1991). When the dimensions of social comparisons are more relevant to an individual, they generally elicit stronger effects. For our study, this means that individual difference variables that render the dimensions in which people compare themselves with characters in SEIM more relevant will boost the influence that this comparison has on individuals. Specifically, it can be expected that individuals for whom the various comparison dimensions are more relevant will be more dissatisfied with their penis (breast) size, stomach, and their entire body than individuals for whom this comparison is less relevant.

Two individual difference variables that may determine the relevance of the comparison with bodies and body parts in SEIM may be people's age and their sexual orientation. Several meta-analyses have indicated that the relation between social comparison and body image is more distinct among younger people than among older people (Groesz, Levine, & Murnen, 2002; Lopez-Guimera et al., 2010; Myers & Crowther, 2009; however, see also Want, 2009). Research has also shown that young people find their body image more important than older people do (e.g., Davison & McCabe, 2006; McCabe, Ricciardelli, & Holt, 2010; Ricciardelli & McCabe, 2003), with the importance of the body image decreasing over the life span (for a review, see Tiggemann, 2004) both among males and females (Woertman & van den Brink, 2008). More specifically, studies have suggested that many young people want a flat stomach (Phillips et al., 2006; Thomsen et al., 2004). Evidence has also accumulated that young females put high emphasis on well-shaped, medium-sized breasts (e.g., Forbes & Frederick, 2008; Frederick, Peplau, & Lever, 2008; Overstreet, Quinn, & Agocha, 2010). Interestingly, the importance of penis size across the life span has never been investigated. However, the centrality of penis size in defining masculinity (Kilmartin, 2000) along with the general uncertainties that surround male adolescents' genital

development (Ryan, Millstein, & Irwin, 1996) suggest that penis size may be more important among younger males than among older males. As a result, we hypothesized:

**H4.** The expected effect of SEIM on overall body satisfaction, as well as on satisfaction with the stomach and with penis/breast size, will be stronger among younger people than among older people.

Sexual orientation may determine the relevance of the comparison with bodies and body parts in SEIM among males because gay men generally seem to emphasize physical attractiveness and body image more strongly than heterosexual men do (Peplau et al., 2009; Yelland & Tiggemann, 2003). Although research has found that gay men are more dissatisfied with their body than heterosexual men are (Beren, Hayden, Wilfley, & Grilo, 1996; Peplau et al., 2009), no studies to date have compared the body image importance between heterosexual and gay men. However, studies have shown that greater body dissatisfaction is linked with greater body image importance (Thompson, Dinnel, & Dill, 2003; Woertman & van den Brink, 2008). Moreover, research done separately among heterosexual and gay men tentatively suggests that body appearance, as well as penis size, may be slightly more important for gay men than for heterosexual men (Martins, Tiggemann, & Churchett, 2008; Tiggemann, Martins, & Churchett, 2008). Finally, an exploratory study has suggested that the use of pornography is associated more strongly with body concern among gay men than among heterosexual men (Duggan & McCreary, 2004). As a result, we predicted:

**H5.** The expected effect of SEIM on overall body satisfaction, as well as on satisfaction with the stomach and with penis size, will be stronger among gay men than among heterosexual men.

Although research has shown that lesbian and heterosexual women tend to be equally (dis)satisfied with their bodies (Beren et al., 1996; Koff, Lucas, Migliorini, & Grossmith, 2010; Peplau et al., 2009), studies on whether lesbian and heterosexual women differ in body image importance are still missing. However, because greater body dissatisfaction is associated with greater body image importance also among women (Thompson et al., 2003; Woertman & van den Brink, 2008), the relevance of the comparison with actresses in SEIM may be largely the same among lesbian and heterosexual women. The literature thus suggests that differences between lesbian and heterosexual women in the effect of SEIM on body dissatisfaction or on satisfaction with the stomach and breast size are unlikely and we abstained from making a prediction.

## 2. Method

This investigation is based on a two-wave panel study whose first wave took place in September 2009 and whose second wave took place in March 2010. The data used in the present investigation come from a representative sample of 1879 Dutch respondents. We gathered the data in the LISS panel (Longitudinal Internet studies for the Social Sciences). The LISS panel is an online access panel of 5000 nationally representative Dutch households and is administered by Centerdata at the University of Tilburg in the Netherlands. To create a nationally representative panel, Statistics Netherlands had originally drawn a probability sample of households from the population register. When households in the original sample did not have a computer and/or Internet connection, they received a free computer and/or Internet connection to be able to participate in the online access panel. For sensitive questions, online surveys have been shown to have advantages compared with other survey modes (Mustanski, 2001).

Institutional approval of the study was obtained before the study started. Parents had to provide consent for adolescents' participation. In both waves, we made sure that participants were aware of the sensitive nature of some questions and notified them about the confidentiality of their answers. All participants had to give informed consent before starting. After completing the questionnaire, participants received a voucher worth 5 Euros.

In the original two-wave panel study, upon which the present investigation is based, 4692 respondents completed the survey in the first wave (57% response rate), and 3802 respondents participated again in the second wave (attrition rate 19%). Further analyses revealed that those who participated in both waves did not differ in any of the focal concepts of this study from those who participated only in wave 1, with one exception. Respondents who took part in both waves were slightly older ( $M = 46.67$ ,  $SD = 17.92$ ) than those who dropped out ( $M = 43.34$ ,  $SD = 16.79$ ),  $t(4,688) = 5.06$ ,  $p < .001$ .

Two particularities of our original study need further attention. First, the original study included an experiment in which only half of the respondents answered, in a random assignment procedure, the questions about exposure to SEIM in the first wave. Due to this experiment and the aforementioned attrition, the number of respondents suitable for the present study reduced to 1879 respondents. Table 1 shows the descriptives of the key variables of this study for the sub-sample that was used in the study and the sub-sample that was excluded. Expectedly, the sub-sample with the respondents who had answered the questions on exposure to SEIM in the first wave ("sub-sample used" in Table 1) did not differ from the sub-sample with those respondents who had not answered these questions ("sub-sample not used" in Table 1), as Table 1 shows.

Second, the original study included in wave 1 an additional experiment (with random assignment) on the influence of a positive or neutral question context on answers to questions about exposure to SEIM. Further analyses revealed that respondents from the two conditions in this experiment did not differ. Moreover, question context did not affect the reported exposure to SEIM in any way. Finally, to double-check whether this experiment might affect the results in this paper we ran all analyses once with a control for experimental condition and once without. The results were exactly the same. In sum, the experiments in the original two-wave panel study did not reduce the suitability of the sample for our purposes.

## 2.1. Participants

Of the 1879 respondents in the sub-sample used for this study, 53% were female and 47% were male. Their age ranged from 12 to

87 years of age ( $M = 46.57$ ,  $SD = 18.04$ ). Given the sensitive nature of some measures, respondents younger than 12 years of age were not allowed to participate. Eight percent of the respondents had a university degree and 22% had a degree from a university of applied science (*hogeschool*). For 13% of the participants, the highest educational degree at the time of the survey was elementary school. The remaining participants had some kind of high school degree. Sixty-three percent lived in urban or rather urban areas and 37% in rather rural areas. Of all participants, 52% were in the workforce. In terms of their sexual orientation, 94% described themselves as exclusively heterosexual.

## 2.2. Measures

### 2.2.1. Exposure to SEIM

Participants indicated how often, in the 6 months prior to the survey, they had looked at pictures or video clips in which people had sexual intercourse. This is the focal independent variable. Because we were interested in the potentially moderating impact of sexual orientation, we also asked specifically about people's exposure to pictures or video clips in which women had sex with women and in which men had sex with men. Participants were informed that the items focus on sexually explicit, pornographic content on or from the Internet in which sexual activities were clearly visible (as opposed to merely suggested). The response categories were 1 (*never*), 2 (*less than once a month*), 3 (*1–3 times a month*), 4 (*once a week*), 5 (*several times a week*), 6 (*every day*), 7 (*several times a day*), and a residual category (*I rather do not want to answer this question*). We excluded the few respondents (less than 1.1%) from further analysis who had chosen the residual category.

### 2.2.2. Body dissatisfaction

We used items from the body dissatisfaction subscale of the Eating Disorder Inventory (Garner, Olmstead, & Polivy, 1983), a reliable and valid instrument that is very frequently employed in studies on the issue. We selected the item "I feel satisfied with the shape of my body" to operationalize satisfaction with the body overall. To measure satisfaction with one's stomach, we selected the item "I think that my stomach is too big." We chose this item because people are usually concerned that their stomach is too big and wish for a flatter stomach (e.g., Borzucka-Sitkiewicz & Sas-Nowosielski, 2008; Phillips et al., 2006; Thomsen et al., 2004). Because satisfaction with penis size and breast size is not part of the body dissatisfaction subscale, we created one item each for penis and breast size. The items were "I think that my penis is too small" and "I think that my breasts are too small." We created these two items because males typically indicate that they would

**Table 1**  
Descriptives of the key variables.

	Sub-sample used				Sub-sample not used			
	Mean (SD) or %	Median	Skew (SE)	Range	Mean (SD) or %	Median	Skew (SE)	Range
Age	46.6 (18.04)	48	-.14 (.06)	75	46.8 (17.81)	49	-.18 (.06)	77
Female	53%		-.11 (.06)		52%		-.10 (.06)	
Excl. heterosexual	94%		-3.82 (.06)		94%		-3.77 (.06)	
Exposure SEIM (t1)	1.66 (1.16)	1	1.90 (.06)	6	N/A	N/A	N/A	N/A
DS penis (breast) size (t1)	2.15 (.97)	2	.96 (.06)	4	2.16 (.93)	2	.96 (.06)	4
DS penis (breast) size (t2)	2.15 (.93)	2	.96 (.06)	4	2.16 (.94)	2	.90 (.06)	4
DS stomach size (t1)	3.04 (1.22)	3	-.09 (.06)	4	3.15 (1.20)	3	-.21 (.06)	4
DS stomach size (t2)	3.00 (1.20)	3	-.07 (.06)	4	3.05 (1.21)	3	-.12 (.06)	4
DS body (t1)	2.60 (1.02)	3	.28 (.06)	4	2.65 (1.02)	3	.29 (.06)	4
DS body (t2)	2.61 (.99)	3	.30 (.06)	4	2.59 (1.00)	3	.34 (.06)	4

Note: DS = Dissatisfaction. For the dichotomous variables gender and sexual orientation only percentages for female and exclusively heterosexual are reported along with the skew. Exposure to SEIM at t1 was only assessed in the sub-sample that was used for the analyses in this paper. The two sub-samples did not differ statistically in any of the reported descriptives above as *t*-tests and chi-square tests (for gender and sexual orientation) revealed. The figures for DS penis (breast) size at t1 and t2 refer to males and females jointly. For descriptives split up for gender, see the bottom of Table 2.

like to have a bigger penis (Lever et al., 2006; Tiggemann et al., 2008), while many females would like to have bigger breasts (Forbes & Frederick, 2008; Frederick et al., 2008). Response categories ranged from 1 (*fully disagree*) to 5 (*fully agree*) and included a residual category (*I rather do not want to answer this question*). For the measure for overall body dissatisfaction (“I feel satisfied with the shape of my body”), we recoded the response categories such that higher values indicated greater body dissatisfaction. Respondents who chose the residual category (maximum 4.4% across the various items in the two waves) had to be eliminated from the analysis.

As outlined above, the current investigation was part of a multiple-purpose study. As a consequence, the possibility for elaborate multiple-item measures was limited. However, methodological evidence from different fields has accumulated that, for one-dimensional concepts, single-item measures can be as valid and reliable as multiple-item measures (e.g., Cook & Perri, 2004; Robins, Hendin, & Trzesniewski, 2001; Woods & Hampson, 2005). This applies particularly when people’s satisfaction with various aspects of their lives is measured (e.g., Nagy, 2002; Wanous, Reichers, & Hudy, 1997; Zimmerman et al., 2006). Finally, studies that used single-item measures for body satisfaction have produced results similar to studies that used multiple-item measures (e.g., Frederick et al., 2008; Lever et al., 2006). Given that satisfaction with one’s stomach and satisfaction with one’s penis/breast size are one-dimensional concepts, our single-item measures may be acceptable. For the more complex concept of body satisfaction, we tested whether a multiple-item measure would elicit different results than the results presented below. We created this measure with the body satisfaction and stomach satisfaction item mentioned above and an item that is not relevant to the focus of this paper, “I think my buttocks are too big.” The three items loaded on one factor and had a satisfactory internal consistency. None of the results obtained with this multiple-item measure of body satisfaction deviated from the findings obtained with the single-item measure. Therefore, we are confident that the results presented in this paper are valid and robust although they may be based on suboptimal measures.

### 2.2.3. Gender and age

The operationalization of gender and age was straightforward. Gender was coded 0 for males and 1 for females.

### 2.2.4. Sexual orientation

We geared our operationalization of participants’ sexual orientation toward the H-scale developed by Kinsey, Pomeroy, and Martin (1948). We asked participants whether they felt sexually attracted 1 (*only to males*); 2 (*mainly to males, but also to females*); 3 (*equally to males and females*), 4 (*mainly to females, but also to males*), and 5 (*only to females*). Because of the very small number of exclusively gay (3%) and lesbian (2.5%) respondents, we recoded the scale, separately for males and females, into a dichotomous variable with the categories 0 (*not exclusively heterosexual*) and 1 (*exclusively heterosexual*). Ninety-four percent of the sample were exclusively heterosexual.

## 2.3. Data analysis

We tested our hypotheses, separately for males and females, with autoregressive regression models with exposure to SEIM at time 1 as the key predictor and the various measures of body (part) dissatisfaction at time 2 as the key outcomes. In addition, as is typical for autoregressive models, the body dissatisfaction measure at time 2 (i.e., the outcome variable) was regressed not only on the key predictor variable (i.e., exposure to SEIM at time 1), but also on its value measured at time 1 (i.e., the control variable). The control for levels

of the outcome variable at a preceding point of time is generally considered a strong prevention against a spurious effect of the predictor on the outcome variable (e.g., Cole & Maxwell, 2003).

Because some of our measures, notably exposure to SEIM, were not normally distributed (see Table 1), various assumptions of parametric statistics may be violated. In order to avoid type-1 errors, we tested the statistical significance of our findings additionally with bootstrapping. Bootstrapping is not based on the assumptions of parametric statistics and is often used to check the robustness of results obtained with traditional techniques (Efron & Tibshirani, 1993). We accepted a finding only as statistically significant when both the results based on parametric statistics and those based on bootstrapping were consistent. Finally, we also ran all analyses of this paper with log-transformations for exposure to SEIM and the outcome variable whenever this variable was skewed. With one exception (see Section 3.2), none of the analyses with log-transformed variables differed from the analyses with non-transformed variables.

## 3. Results

In our various hypotheses we predicted that, with more frequent exposure to SEIM, individuals would be less satisfied with their overall body, the size of their stomach, as well as with the size of their penis (breasts), and that this influence would depend on age and sexual orientation. For a better understanding of the hypothesis tests, some descriptive statistics may be instructive. The bottom of Table 2 shows the means and standard deviations of the focal variables separately for males and females. On average, females were exposed to SEIM less often than men, but exposure to SEIM was generally rather low. Females were more dissatisfied with their stomach than were males, albeit at a low level. Similarly, females were less satisfied with the shape of their body than males. The majority of females disagreed that their breasts were too small. Likewise, the majority of males did not find their penis too small.

Table 2 also presents, in the upper diagonal and in bold, the zero-order correlations between the focal variables of our hypotheses for females, and in the lower diagonal the zero-order correlations for males. Among females, exposure to SEIM was related neither to overall body dissatisfaction nor to dissatisfaction with one’s stomach. However, females who exposed themselves to SEIM more frequently were more likely to consider their breasts too small compared with women who used SEIM less frequently. Among males, more frequent exposure to SEIM was associated with greater overall body dissatisfaction. Similarly, males who exposed themselves to SEIM more often were more likely to perceive their stomach as too big. Exposure to SEIM was unrelated to satisfaction with penis size. The zero-order correlations thus suggested some influences of SEIM, notably among males. For a rigorous test of our hypotheses, we ran autoregressive multiple regressions.

The results of the autoregressive multiple regressions are presented in Table 3, separately for males and females and for the various models (see first column). Due to space constraints, the parameters for the control variable (i.e., outcome variable at time 1) are not displayed. Hypothesis 1 stated that more frequent exposure to SEIM would result in greater dissatisfaction with one’s penis size among men and one’s breast size among women. The third column for Model A in Table 3 shows that more frequent exposure to SEIM was not associated with males’ satisfaction with their penis size. Thus, men who exposed themselves to SEIM more often were not more likely to perceive their penis as too small than were men who exposed themselves to SEIM less often. Among females, no influence of exposure to SEIM occurred as the third column for Model D in Table 3 indicates. The positive zero-order

**Table 2**  
Zero-order correlations between the key variables.

	1	2	3	4	5	6
1 = SEIM (t1)	–	<b>.01</b>	<b>.06</b>	<b>.09**</b>	<b>–.21***</b>	<b>–.10**</b>
2 = Body DS (t2)	.14***	–	<b>.55**</b>	<b>–.02</b>	<b>–.01</b>	<b>.03</b>
3 = Stomach DS (t2)	.10**	.42***	–	<b>–.07*</b>	<b>.02</b>	<b>.00</b>
4 = Penis [breast] DS (t2)	.04	.20***	.24***	–	<b>–.26***</b>	<b>–.00</b>
5 = Age	<b>–.23***</b>	<b>–.05</b>	<b>.09**</b>	.04	–	<b>.08*</b>
6 = Sexual orientation (exclusively heterosexual = 1)	<b>–.20***</b>	.01	<b>–.01</b>	<b>–.06</b>	.06	–
<i>M (SD) Males</i>	2.15 <sup>a</sup> (1.43)	2.42 <sup>a</sup> (0.93)	2.78 <sup>a</sup> (1.17)	2.12 (0.88)	–	–
<i>M (SD) Females</i>	1.22 <sup>a</sup> (0.58)	2.79 <sup>a</sup> (1.01)	3.20 <sup>a</sup> (1.01)	2.19 (0.98)	–	–

Note: DS = Dissatisfaction. Zero order correlations for females are presented in the upper diagonal and printed bold. Zero-order correlations for males are presented in the lower diagonal.

Means with the same superscript differ at  $p < .001$  (two-tailed) between males and females. As dissatisfaction with breast size and dissatisfaction with penis size is incommensurable, we did not calculate the statistical difference between the two means (see column 4).

\*  $p < .05$ .

\*\*  $p < .01$ .

\*\*\*  $p < .001$  (two-tailed).

**Table 3**  
Autoregressive regression models.

Model	Predictor variables in model	Outcome: penis (breast) size dissatisfaction (t2)	Outcome: stomach size dissatisfaction (t2)	Outcome: body dissatisfaction (t2)
<i>Males</i>				
A ( $N_{\min} = 798$ )	SEIM (t1) $R^2$	–.002 (.019) .27	.046 (.021)* .47	.049 (.020)* .25
B ( $N_{\min} = 798$ )	SEIM (t1) Age Age $\times$ SEIM $R^2$	.002 (.051) .001 (.003) .000 (.001) .27	.071 (.056) .002 (.003)* .000 (.001) .47	.102 (.053) .002 (.003) –.001 (.001) .25
C ( $N_{\min} = 789$ )	SEIM (t1) Sexual orientation (exclusively heterosexual = 1) Sexual orientation $\times$ SEIM (t1) $R^2$	–.006 (.020) .287 (.272) –.028 (.074) .27	.046 (.022)* .266 (.299) –.057 (.082) .47	.060 (.021)* .120 (.285) .070 (.079) .25
<i>Females</i>				
D ( $N_{\min} = 940$ )	SEIM (t1) $R^2$	.066 (.043) .44	.057 (.047) .51	–.004 (.046) .36
E ( $N_{\min} = 940$ )	SEIM (t1) Age Age $\times$ SEIM $R^2$	.122 (.108) –.002 (.004) –.002 (.003) .44	.117 (.117) .001 (.004) –.002 (.003) .51	–.043 (.115) .001 (.004) .001 (.003) .36
F ( $N_{\min} = 929$ )	SEIM (t1) Sexual orientation (exclusively heterosexual = 1) Sexual orientation $\times$ SEIM (t1) $R^2$	.044 (.046) –.210 (.204) .124 (.126) .44	.046 (.051) –.212 (.229) .098 (.142) .51	–.025 (.049) –.070 (.225) .125 (.138) .36

Note: All models included the outcome variable at time 1 (t1) as a control variable, which is not displayed in the table. Cell entries are unstandardized multiple regression coefficients, with standard errors in parentheses.

\*  $p < .05$  (two-tailed).

correlation between exposure to SEIM and the perception of one's breasts as too small thus disappeared in the autoregressive regression models. **Hypothesis 1** was not supported.

**Hypothesis 2** predicted that more frequent exposure to SEIM would result in a greater dissatisfaction with one's stomach. As the fourth column for Model A in **Table 3** shows, males were more likely to perceive their stomach as too big when they exposed themselves to SEIM more frequently. This result was also confirmed by bootstrapping. The bootstrapped bias-corrected accelerated 95% confidence interval (Bt bca 95% CI) did not include zero, ranging from .006 to .089 (not shown in **Table 3**). For females, no influence of exposure to SEIM on satisfaction with their stomach size emerged, as the fourth column for Model D in **Table 2** indicates. **Hypothesis 2** was thus supported for males, but not for females.

**Hypothesis 3** stated that males and females who exposed themselves to SEIM more often would be more dissatisfied with their body. This expectation held for males as the fifth column for Model A in **Table 3** shows. Bootstrapping confirmed this result, with the Bt bca 95% CI ranging from .008 to .091 (not shown in **Table 3**). For females, however, no significant influence emerged (see column 5 for model D in **Table 3**). In conclusion, **Hypothesis 3** was supported for males, but not for females.

### 3.1. Moderating influence of age and sexual orientation

In **Hypothesis 4**, we expected that younger people would be more susceptible to the impact of SEIM on the various measures of body satisfaction than older people. As Models B and E in **Table 3** indicate, neither among males nor among females did any

significant interaction effect between age and exposure to SEIM occur for any of the measures of body satisfaction. This suggests that the effects found for males were equally strong among younger and older people. Similarly, the findings show that the absence of effects found for females held both for younger and older females. In sum, [Hypothesis 4](#) was not supported.

[Hypothesis 5](#) predicted that the effects of SEIM on the different measures of body satisfaction would be more distinct among non-heterosexual males than among exclusively heterosexual males. Model C in [Table 3](#) also shows that none of the effects found for males were further moderated by sexual orientation. Sexual orientation and exposure to SEIM did not interact significantly in their effect on the various measures of body satisfaction. Non-exclusively heterosexual males were thus as strongly influenced by SEIM as exclusively heterosexual males. [Hypothesis 5](#) was not supported. Among females, the pattern of (non-) effects did not differ between non-exclusively heterosexual females and exclusively heterosexual females (see Model F in [Table 3](#)).

A difference between non-heterosexual and heterosexual individuals may only show when SEIM refers to gay-oriented material for the non-exclusively heterosexual male sample and to lesbian-oriented material for the non-exclusively heterosexual female sample. Therefore, we reran Model A (for the non-exclusively heterosexual males only) and Model C with SEIM that featured men having sex with men as a predictor. Likewise, we reran Model D (for the non-exclusively heterosexual females only) and Model F with SEIM that featured women having sex with women as a predictor. In none of these analyses did an effect of SEIM occur (analyses not shown in [Table 3](#)).

### 3.2. Additional analysis

Although we were mainly interested in the effects of SEIM on the various aspects of body satisfaction, we also tested whether people may have selectively exposed themselves to SEIM depending on their satisfaction with their overall body, the size of their stomach, and the size of their penis (breasts). To test this selective-exposure hypothesis, we analyzed with separate autoregressive models whether the various satisfaction measures at time 1 (i.e., the predictor) and exposure to SEIM at time 1 (i.e., the control variable) predicted exposure to SEIM at time 2 (i.e., the outcome). No evidence of selective exposure emerged. Initially women's dissatisfaction with the size of their breasts seemed to predict greater exposure to SEIM,  $B = .033$ ,  $SE = .015$ ,  $p = .033$ . However, the 95% CI ranged from  $-.005$  to  $.076$ , thus including zero, and the regression analysis with log-transformed variables also did not elicit a statistically significant influence,  $B = .032$ ,  $SE = .019$ ,  $p = .088$ . Therefore, we did not accept this effect as statistically significant. For the two significant effects of SEIM on male's satisfaction with their stomach size and their overall body satisfaction, these findings imply that the relationship between these variables was unidirectional rather than reciprocal.

## 4. Discussion

To date, little is known about the extent to which exposure to SEIM affects people's satisfaction with their body in general and specific body parts in particular. Within a social comparison framework, this study investigated whether exposure to SEIM predicted satisfaction with the body, the stomach, as well as with penis and breast size. Moreover, we tested whether the effects of SEIM on body satisfaction differed by age and sexual orientation. We found that males' exposure to SEIM was related to greater dissatisfaction with their body and the stomach, while it was not related to satisfaction with their penis size. Among females, SEIM had no

influence at all. The basic pattern of findings did not depend on people's age and sexual orientation. These partly unexpected findings have several theoretical and practical implications.

Generally, our finding that males' exposure to SEIM was related to greater dissatisfaction with their body and stomach is in line with the literature that has shown that spontaneous social comparisons often have negative consequences (e.g., [Mussweiler et al., 2004](#); [Want, 2009](#)). The finding thus suggests that sexually explicit material should be added to our thinking about media images as a source of male body dissatisfaction. To date, research has largely focused on body images on television and in magazines (for a review, see [Lopez-Guimera et al., 2010](#)), but has ignored sexually explicit material (for the only exception, see [Duggan & McCreary, 2004](#)). However, given an increasing interest in understanding the antecedents of males' dissatisfaction with their bodies and their body parts (e.g., [Robinson & Harvey, 2003](#); [Tiggemann et al., 2008](#)) and evidence that sexually provocative images affect men's body image ([Aubrey & Taylor, 2009](#); [Lavine, Sweeney, & Wagner, 1999](#)), SEIM may deserve more attention in future research. For example, content analyses have shown that a considerable number of male pornographic actors are muscular ([McKee et al., 2008](#)). At the same time, men consider muscularity both important for their physical attractiveness and a source of concern ([Tiggemann et al., 2008](#)). In line with the social comparison theory framework outlined in the theory section, it seems promising to investigate this link further.

The finding that exposure to SEIM was related only to males' dissatisfaction with their body and stomach, but not to their penis size, seems at odds with studies that have shown that people's perceived control over a comparison dimension moderates the impact of upward comparisons on dissatisfaction (e.g., [Major et al., 1991](#); [Testa & Major, 1990](#)). Upward comparison typically results in dissatisfaction when people perceive that they have little control over a comparison dimension and in self-enhancement when they perceive to have control over a comparison dimension. Assuming that males have less control over the size of their penis than the size and shape of their stomach and other body parts, such as chest, shoulders, and arms, an upward comparison should have consequently resulted in a different pattern than the one we found. In our view, the only possibility to solve this problem is to assess, in future research, people's perceptions of their control over body-related comparison dimensions. Given the consistent evidence of media's impact on body dissatisfaction (e.g., [Grabe et al., 2008](#); [Lopez-Guimera et al., 2010](#); [Want, 2009](#)), it may be that people may feel less in control of changing their bodies than assumed.

In addition to inspiring research on people's perceived control over their bodies, our findings on the differential effects of exposure to SEIM on aspects of males' body satisfaction may also be interesting for research on cognitive correction processes in social comparisons. Evidence has accumulated that individuals may "undo" the negative effects of spontaneous social comparisons (e.g., [Gilbert et al., 1995](#); [Want, 2009](#)). For example, people can correct the outcomes of social comparisons by using experiences and knowledge about why information obtained in social comparisons may be biased ([Wegener & Petty, 1995](#)). Consequently, when people consider information from social comparisons biased, they may not accept the consequence of these comparisons as a valid outcome, thus undoing it.

Against the backdrop of correction models of social comparison and evidence that spontaneous social comparisons do affect people ([Gilbert et al., 1995](#)), it may be that males were initially indeed influenced in their satisfaction with their penis size when comparing themselves with actors in SEIM. However, based on their knowledge that pornographic actors may be selected because of their unrealistic penis sizes, males may consider the information

obtained in this social comparison biased. As a result, the effects of the social comparison process may have been corrected. In contrast, males may be less likely to have knowledge about the biased nature of male bodies and stomachs in SEIM because male bodies and stomachs are not as obviously linked with SEIM as men's penises are. As a result, males may not have corrected the information from these social comparisons, which eventually may have reduced their satisfaction with their bodies and their stomachs.

In the context of our study's contribution to existing theory, it needs to be emphasized that our findings are suggestive of social comparison processes, but do not demonstrate them unequivocally. Our evidence-based assumption that social comparisons may occur unintentionally, or even automatically, when comparison targets are not representative may be a promising avenue for future research, especially when it is linked to selective exposure theory and to the impact that the salience of social comparisons may have on the outcomes of these comparisons (e.g., Want, 2009). However, it may also be fruitful to test whether exposure to SEIM evokes discrepancies between individuals' own bodies and the bodies they encounter in SEIM. According to self-discrepancy theory (Higgins, 1987), such discrepancies may mediate the effect of SEIM on body satisfaction. Similarly, it is an important theoretical question of whether body dissatisfaction may result from observing the positive attributes and outcomes associated with bodies and body parts in SEIM, as suggested by social cognitive theory (Bandura, 2001). Finally, it may be worth studying whether SEIM increases the chronic accessibility of masculinity schemata as proposed in priming theory (e.g., Berkowitz, 1984). Sexually provocative images of women have been found to prime masculinity schemata (Aubrey & Taylor, 2009; Lavine et al., 1999). It seems possible that SEIM not only makes men compare themselves with male actors, but also raises the awareness of a male-appropriate appearance ideal through the depiction of female bodies and body parts.

We found that females were not influenced by SEIM in the various aspects of body satisfaction studied while men partly were. Several reasons for this gender difference are conceivable. First, women rarely exposed themselves to SEIM. As a consequence, effects were difficult to find. Second, women typically hold more critical attitudes toward sexually explicit material than men do (e.g., Oliver & Hyde, 1993; Traeen et al., 2006). At the same time, women usually report less arousal and engagement with sexually explicit material than men do (e.g., Janssen, Carpenter, & Graham, 2003; Mosher & Maclan, 1994). Women's more critical attitudes and lower engagement with the material may have triggered, also among them, the correction processes that were described above for the missing effect of SEIM on males' satisfaction with their penis size (for recent findings on the impact of critical attitudes, see Wright, 2013b; Wright & Arroyo, 2013).

A third reason why women's satisfaction with various aspects of their body was not influenced by SEIM may have to do with their habituation to idealized media presentations of the female body. Media generally present women more often with idealized bodies than they present men with idealized bodies (e.g., Levine & Harrison, 2009). Possibly, the female bodies represented in SEIM may not live up to the standards set in other media and women therefore discard pornographic actresses as comparison targets. Finally, we may not have found effects of SEIM on women's body satisfaction because we did not study their satisfaction with the look of their vagina. This potential influence has recently been discussed in the literature (Schick, Calabrese, Rima, & Zucker, 2010; Schick, Rima, & Calabrese, 2011). We abstained to study the effect of SEIM on women's satisfaction with how their vagina looks as pre-tests revealed that many women considered a question about their vagina too intimate. Moreover, to our knowledge no content analysis exists that has systematically investigated the depiction of

vaginas in pornographic material. Still, studying this issue based on a proper content analysis of SEIM may be an interesting task for future researchers in order to advance our knowledge about whether women's body satisfaction is affected by SEIM.

#### 4.1. The missing moderating influence of age and sexual orientation

Social comparison theory suggests that the relevance of the comparison dimension moderates how strongly the comparison affects the individual (Major et al., 1991; Smith, 2000; Tesser, 1991). Although age and sexual orientation can be assumed to determine the relevance of a comparison with characters in SEIM, the impact of SEIM on the various measures of body dissatisfaction were the same among younger and older people, as well as among exclusively heterosexual and non-exclusively heterosexual people. One possible explanation is that, within the various groups, the importance of the comparison dimensions (i.e., body, stomach, penis/breast size) differs more than findings from previous research suggest. Given the important role that body image importance plays in recent research (Davison & McCabe, 2006; McCabe et al., 2010; Tiggemann, 2004), future researchers should directly assess the importance of the body and of body parts to test whether these importance ratings may render people more or less susceptible to the effects of SEIM.

The finding of equally strong effects among older and younger people, as well as among exclusively heterosexual and non-exclusively heterosexual people, may have some important implications also outside the context of social comparison theory. Due to their still developing sexual selves and reduced sexual experiences, young people – and particularly adolescents – are often considered particularly susceptible to potential effects of SEIM (Thornburgh & Lin, 2002). SEIM does affect adolescents' sexual attitudes, beliefs, and behavior (Brown & L'Engle, 2009; Peter & Valkenburg, 2009a, 2009b, 2010b). However, evidence has emerged that sometimes adolescents are not more strongly, or even less, influenced by such material than adults (Peter & Valkenburg, 2011b, 2011c). Our results dovetail with these recent findings and suggest that susceptibility to SEIM may not be determined by age, but rather by personality and social context factors. Similarly, our findings suggest that sexual orientation may be too crude a concept to distinguish individual susceptibility to SEIM. More promising concepts may be the extent to which one's peers are appearance-discriminating and value physical attractiveness and body-related self-discrepancies (e.g., Harrison, Taylor, & Marske, 2006).

#### 4.2. Limitations

Given the scarcity of studies on the relation between SEIM and body satisfaction, our study could not draw on insights from earlier research. As a result, it has several limitations. First, the effect sizes we found were small. This merges with other research on the impact of SEIM (e.g., Peter & Valkenburg, 2010a, 2010b) and may partly result from the extremely skewed distribution and the generally low levels of our predictor variable, exposure to SEIM. Apart from this statistical explanation, however, it may be that our operationalization of exposure to SEIM may not have sufficiently captured the types of SEIM in which unrealistic bodies are typically presented. Some scholars have observed that the representation of bodies in pornographic material as a whole may be more diverse, and more realistic, than the representation of bodies in fashion magazines (McKee et al., 2008). Therefore, future research may distinguish between different types of pornography (e.g., pornography featuring "porn stars" and thus more unrealistic bodies vs. pornography featuring "amateurs" and thus more realistic bodies).

A second shortcoming of our study refers to the use of single-item measures for our key concepts. Although we are confident that the measurement of satisfaction with penis, breast and stomach size has produced valid results, we urge future researchers to replicate our study with an elaborate, multiple-item measure for overall body satisfaction. A third shortcoming of our study is that the causal relations are not of the same internal validity as those found in experiments. However, experimental research that exposes minors to pornographic material is ethically impossible. As a consequence, we were not able to conduct experiments, but future researchers may want to consider this option with (young) adults as participants. Finally, similar to any single-country study, our study may suffer from a country bias. Femininity and masculinity are differently constructed in the Netherlands than, for example, in the US (Hofstede, 1998), and this difference may have affected our findings. Replications of our study in cultures with different notions of femininity and masculinity are desirable.

In conclusion, our study is one of the first to show that SEIM may affect the extent to which people are satisfied with their body and body parts. However, our investigation also suggests that this impact is limited to males, rather small, and may be different than is commonly assumed. Although we clearly need more research on the issue, our findings point to the possibility that the seemingly obvious link between exposure to SEIM and dissatisfaction with penis or breast size may be a myth. In this context, research on the implications of SEIM may find a more fruitful task in studying a potential impact of SEIM on males' satisfaction with the upper torso (chest, arms, and shoulders) and, more generally, their drive for muscularity. Additionally, researchers may want to extend the scope of potential influences of SEIM to include concepts such as social physique anxiety as well as body improvement or body change behavior. In this way, we may get an encompassing view on the link between exposure to SEIM and body dissatisfaction.

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