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ORIGINAL PAPER

"Bareback" Pornography Consumption and Safe-Sex Intentions of Men Having Sex with Men

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Abstract Men having sex with men (MSM) commonly consume "bareback" pornography, which includes scenes of unprotected anal intercourse. Prior research on human imitative behavior suggests that these media might counteract efforts to promote safe-sex behaviors. To date, no studies have demonstrated a causal link between bareback pornography consumption and reduced safe-sex intentions. Study 1 utilized a correlational design conducted as an online survey. Study 2 was set in an actual MSM sex club, using a 2 × 2 mixed-factorial design to compare type of pornography (unprotected vs. protected anal intercourse) and age of actors (younger vs. older). As the main dependent variable in both studies, participants self-reported their inclinations toward unprotected versus protected intercourse, using a 100-point sliding scale (1 = *unprotected*, 100 = *protected*). In Study 1, more attention to unprotected sex acts on actual DVD film covers predicted lower safe-sex intentions, as compared to other elements of the film cover. In Study 2, safe-sex intentions after viewing unprotected-sex films were lower than after viewing protected-sex films. The results provide novel and ecologically valid evidence that "bareback" pornography consumption impacts viewer's inclinations toward sexual risk-taking by lowering their intentions to use protected sex measures. Suggestions are given as to how these findings can be utilized for purposes of intervention and prevention of STI and HIV infections.

Keywords AIDS · Men who have sex with men · Pornography · Safe sex · Bareback sex · Imitation

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Introduction

Early research on situational factors and thought processes associated with unprotected anal intercourse (UAI) among men having sex with men (MSM) did not reveal pornography consumption as an influence (Gold & Skinner, 1996). This picture has changed recently, both for heterosexual (Häggström-Nordin, Hanson, & Tydén, 2005; Tydén & Rogala, 2004) and MSM populations (Weinberg, Williams, Kleiner, & Irizarry, 2010). Gay male pornography depicting UAI, often termed "bareback" pornography, is an especially crucial factor counteracting safe-sex promotion aimed at MSM in Western countries, according to scientists (Green, 2004; Hurley, 2009; Silvera, Stein, Hagarty, & Marmor, 2009), activists (AIDS Healthcare Foundation, 2010), and the media (Johnson, 2010). Although some have debated the numeric or factual prevalence of bareback pornography (Grudzen et al., 2009; Silvera et al., 2009), which is likely difficult to assess, there is an acknowledgment of the general increase in prevalence since the 1990s (Dean, 2009).

Independent of the actual share of bareback pornography in the pornography market, a continuous assumption exists that bareback pornography consumption can impact consumers' safe-sex behaviors and their subsequent potential to acquire STIs and HIV (Silvera et al., 2009; Wilkerson et al., 2012; Wolak, Mitchell, & Finkelhor, 2007). The consumption of bareback pornography is a common behavioral characteristic of MSM (Halkitis, Parsons, & Wilton, 2003; Silvera et al., 2009). Previous research showed a correlation between bareback pornography

consumption and unprotected sex among a large sample of French MSM (Adams & de Wit, 2010), but emphasized the necessity of replication and causal testing. The present research seeks to replicate earlier findings (Adams & de Wit, 2010; Silvera et al., 2009) and expand them to a more ecologically valid context. Further, and most importantly, we aimed to supply novel evidence for a causal link between bareback pornography consumption and unprotected sex among MSM.

Pornography consumption has immediate and long-term effects on its consumers (Hald & Malamuth, 2007; Häggström-Nordin et al., 2005; Tyden & Rogala, 2004; Weinberg et al., 2010; Wilkerson et al., 2012). Research has already established stable effects of pornography upon other outcome variables, most notably with regard to sexual aggression (Vega & Malamuth, 2000). Explanations for sexual risk-taking cannot simply be adopted from studies on sexual aggression, however, as these are two very different types of behavior. Sexual aggression is a conscious, intentional behavior that fulfills sexual needs and motives. Sexual risk-taking can also serve sexual needs and motives, but additionally encompasses a large component of non-intentional behavior. In other words, it is easier to have unprotected sex, namely to neglect condoms during anal intercourse, than it is to have protected or "safe" sex (Ouellette & Wood, 1998).

Researchers have developed complex theoretical models in order to explain influences of pornography consumption on behavior (Byrne, 1976; Fisher & Barak, 2001; Wilkerson et al., 2012). Without directly criticizing the explanatory value of such models, we can question whether these approaches overlook simpler accounts of human behavior. A parsimonious account can be found in studies of human imitation, also called mimicry, particularly when acts depicted in pornography are identical to an immediately relevant behavior of the viewer.

Human Imitative Behavior

Imitation of behavior is common in human interaction and serves a social learning function (Bandura, 1977). Research has demonstrated that individuals consciously or unconsciously imitate the use of words that others employ (Cappella & Planalp, 1981; Giles & Coupland, 1991), yawning (Provine, 1986), laughing (Hawk, Fischer, & van Kleef, 2012), and other expressive behaviors, such as body postures, gestures, and facial expressions (Richardson, Dale, & Tomlinson, 2009).

Imitation is related to positive social interaction: The more individuals like another, the more they imitate the other (Bernieri, 1988; Chartrand & Bargh, 1999; LaFrance, 1979; McIntosh, Reichmann-Decker, Winkielman, & Wilbarger, 2006; Stel et al., 2010). This link between mimicry and social bonding may also explain why imitation enhances complex behaviors, such as helping and prosocial acts (van Baaren, Holland, Kawakami, & van Knippenberg, 2004; van Baaren, Holland, Steenaert, & van Knippenberg, 2003). Applied to the social bonding nature of sexual interaction, we argue that feeling sexually attracted to, or aroused by, a person or stimulus may lead to heightened imitation of related behavior. Interestingly, imitation does not only occur among acquaintances, but also among complete strangers (Chartrand & Bargh, 1999; for a review, see Chartrand & Lakin, 2013). As an alternative explanation to the social bonding approach, the predicted imitation effects can result from "overlearning" certain behavioral responses to a stimulus. Automatic imitation can likewise be based on the frequent exposure to, or repetition of, successful behavioral sequences (Chartrand & Lakin, 2013). Thus, frequent exposure to UAI may lead to the setting of a behavioral standard that is then the basis for imitation. It is noteworthy that both explanations would predict the same outcome effect. It is not the goal of this research to disentangle both explanations, but to show the causal imitative effect of UAI upon viewers' own sexual behavior.

Recent research has specified that imitation may not always be desirable. Individuals also imitate complex behaviors (i.e., sequences of behaviors, not just simple movements) that pose health risks, have negative social connotations, and/or are targets of prohibition campaigns, such as alcohol or nicotine consumption. In other words, people drink and smoke more when they are exposed to someone engaging in those acts (Engels, Hermanns, van Baaren, Hollenstein, & Bot, 2009; Lochbuehler, Peters, Scholte, & Engels, 2010). Thus, there is evidence that people also imitate behaviors with a negative valence or that create feelings of dissonance. The source for these behaviors can be actual (known or unknown) interaction partners (Harakeh, Engels, van Baaren, & Scholte, 2007; Larsen, Engels, Granic, & Overbeek, 2009). Relevant for the context investigated here, accounts of imitation have also been reported for media stimuli, such as videos (Lakin & Chatrand, 2003). Given this vast body of research, there is ample evidence to assume that the type of sexual behavior depicted in films can lead to viewers' imitating that sexual behavior, both on an immediate, micro-level and also for a longer period after exposure.

Current Research

In two experiments, we tested the hypothesis that the type of pornography consumed, namely depictions of protected anal intercourse (PAI) versus unprotected anal intercourse (UAI), has an imitative impact on sexual-risk-taking intentions of MSM. In Study 1, we tested whether the differential amount of attention given to visual cues of unprotected vs. protected sex on the film covers of pornography DVDs predicted general sexual risk-taking intentions, i.e., to have "safe" sex. We chose to measure attention to aspects of film covers here, since it comes close to situations of film selection of MSM, either in a store or online, in which film covers are compared and serve as the primary source of decision making (i.e., to buy, to rent, or to download it).

Research on safe-sex interventions for MSM has underlined the necessity of studying behavior on-location, where the (un)

desired sexual acts are being performed (Ko et al., 2008). To examine influences that might counteract interventions, it would seem equally important to seek out such settings for studies on sexual risk-taking. Conducting research on the imitation effects of pornography and related health risks in ecologically valid contexts, similar to studies on alcohol consumption in so-called "bar labs" (Ko et al., 2008; Larsen, Engels, Souren, Granic, & Overbeek, 2010), can help to avoid biases stemming from artificial (most likely non-arousing) laboratory contexts. Therefore, we conducted Study 2 in a naturalistic viewing environment, namely, a gay sex club, where pornographic films are typically played and sex can subsequently occur. We experimentally manipulated the type of pornography viewed by participants and subsequently assessed their safe-sex intentions.

Study 1

The relation of pornography consumption and sexual risk-taking has, so far, only been explored on an abstract level (Adams & de Wit, 2010; Silvera et al., 2009). Previous research has, for example, relied upon "frequency of use" questions to determine pornography consumption. We extended these findings by assessing attention to pornographic stimuli instead of general consumption parameters. We decided to do so because this comes quite close to the natural sequence of behavior. After the decision to watch pornography, a film has to be selected. Selection is based on the film covers, which usually include title and still photos of the sexual acts to be expected. Thus, film covers are the first step in a viewer's decision-making process regarding which type of pornography to consume. In line with our imitation account, we expected more sexual risk-taking intentions following more attention to depictions of unprotected sex, but not following depictions of protected sex and general sexual stimuli.

Method

Participants

A total of 220 Dutch speaking MSM (non-student population, $M = 43$ years, range = 18–67) completed all tasks in an online study (http://www.qualtrics.com). Participants completed a larger set of questionnaires on MSM behavior that were not germane to the focus of this study.

Measures

Pornography Type

Four covers photos of recent gay male pornography productions ("Boiler" [Mills, 2009], "BareLoaded#4" [Foolks, 2008], "100 % pur jus" [Moussu, 2010], "BerlinPrivat 6" [Andreas, 2006]) were presented, two of them depicting sexual acts ("BareLoaded#4", UAI; and "BerlinPrivat6", PAI) and two of them body shots (Boiler and 100 % pur jus, including one erected male genital in the latter). Actors presented on the covers were of Caucasian ethnic background (broadly defined, from blond Nordic to Mediterranean types) with the sole exception of one dark-skinned actor on the Boiler film cover. Cover photos were divided into interest zones (e.g., head, body, genitals, sexual acts, PAI, UAI). These divisions were not visible to the participants, who clicked with the mouse on those parts of the photos that attracted their attention most. Such a hot spot/heat map attention measure is a standard non-eye-tracking measure of attention (Berger, Winkels, Lischke, & Höppner, 2012) and a feature of any standard questionnaire program (e.g., qualtrics.com). For the analysis, two attention scores were aggregated (i.e., all clicks into the relevant interest zones were first added up per film cover and then for all covers) and later z-standardized. One score contained all clicks for interest zones showing "unprotected sexual acts" (e.g., a male genital being inserted into an anus without a condom on) and the other score contained the remaining visual information (referred to as "sexual stimuli" and including PAI, oral sex, kissing, body parts, etc.). It is noteworthy that the "sexual stimuli" were also potentially arousing; they contained erected genitals, for example, and not only non-sexual images of body parts such as the face, hand, or chest.

Dependent Variables

As part of the questions at the end of the questionnaire, participants were asked to indicate on a continuous measure (slider scale) their general inclinations toward having (un)protected sex. The anchor for unprotected sex was positioned on the left side and for protected sex on the right side. The slider position was measured in increments from 1 for "unprotected" to 100 for "protected," with the increments not visible to the participants.

Furthermore, participants were asked to indicate their general preferences for bareback pornography on a 4-item Likert type scale (1 = "Do not agree" to 5 = "Do fully agree") ($\alpha = .87$).

We also assessed participant age, annual household income (6 incremental steps of 15.000€, 1 for 0–15.000€ to 6 for 75.000€), completed level of education (7 levels, from mandatory schooling to university-level academic training), frequency of STI testing (per year), and HIV serostatus (positive or negative) as sociodemographic variables. Two participants did not disclose their serostatus.

Procedure

The design of the study was a one-factorial, within-subjects design that assessed the type of pornography information (two levels: unprotected sexual acts, sexual stimuli) displayed on the covers of pornographic videos.

Participants learned about the survey via mailing lists and flyers. They indicated their age on the first page of the questionnaire. Potentially underage participants were forwarded to the final page and could not partake in the survey. Participants aged 18 years and over received information about the study and its content (specifically, that pornographic material was included). After indicating informed consent, they began with the questionnaire. The film covers were presented in random order and participants used mouse clicks to indicate the areas that attracted their attention most. At a later stage of the questionnaire, participants reported on their pornography preference and their sexual risk-taking intentions. After completing the questionnaire, participants were thanked, debriefed, and given the option to enter their email address in a separate database to receive more detailed results and to partake in a raffle for a gift voucher worth €50. The study was approved by the University of Amsterdam IRB (2010-SP-1273).

Results

In an array of four pornographic films, equivalent to a consumer choice situation, we first examined whether attention given to unprotected sex cues predicted participants' own general sexual risk-taking intentions. The aggregated, *z*-standardized attention data (unprotected sexual acts and sexual stimuli scores across all four films) were used as predictors in a multiple regression with safe-sex intentions as the dependent variable. We also controlled for age, income, HIV status, STI testing frequency, education, and previous bareback pornography preference (see Table 1 for means and Table 2 for regression coefficients). In the first step, age, income, education, STI testing frequency, and HIV status (coded −1 for positive and 1 for negative) were included to predict safe-sex intentions. Only HIV status was a predictor, $\beta = -.51$, $p = .0001$, while all others were not (overall $R^2 = .29$). In the second step, bareback pornography preferences were added. Again, only HIV status was a significant predictor, $\beta = -.51$, $p = .0001$. In the final step, and in line with our hypothesis, more attention to unprotected sex acts predicted lower safe-sex intentions, $\beta = -.18$, $p = .016$, whereas general attention to sexual stimuli did not, $\beta = -.10$, $p = .21$ (overall $R^2 = .33$, $\Delta R^2 = .038$, $p = .038$). In this step, HIV status also remained a significant predictor, $\beta = -.47$, $p = .0001$. These results show that attention to UAI acts negatively predicted safe-sex intentions, but attention to general sexual stimuli did not. This effect was obtained over and above controlling for variables such as HIV status and previous bareback pornography preferences. It is noteworthy that HIV status was a stronger predictor than individual bareback pornography preferences.

We therefore analyzed the data separately by self-reported serostatus, in order to carve out the influence of previous bareback pornography preferences. For HIV-negative participants ($N = 163$), the following pattern emerged: Previous bareback

Table 1 Means, SDs, and frequencies of the predictor variables and dependent variable in Study 1 ($N = 220$)

Predictor variable	*M*	*SD*	*n*
Age (in years)	43	10.41	
Income[a]	4.47	1.28	
Education[b]	5.71	1.42	
STI testing frequency[c]	2.11	.65	
HIV status			163 HIV neg
			55 HIV pos
Previous bareback preference	3.10	1.32	
Sexual stimuli attention	5.80	1.13	
UAI attention	2.35	.63	
Safe sex intentions	71.97	34.47	

[a] Income was assessed in six incremental steps of 15.000€

[b] Education was assessed in seven incremental steps, from mandatory schooling to university-level academic training

[c] STI testing frequency per year

Table 2 Regression coefficients for Study 1 predicting safe sex intentions from UAI and sexual stimuli attention

Predictor	Safe sex intentions			
	B	*SE B*	*β*	ΔR^2
Step 1				.29***
Income	−1.69	2.45	−.057	
Age	.04	.25	.01	
HIV status	−.39.57	6.23	−.51***	
STI testing frequency	4.57	3.97	.094	
Education level	1.28	1.78	.06	
Step 2				.009
Income	−1.63	2.45	−.05	
Age	−.071	.25	.02	
HIV status	−36.16	6.85	−.47***	
STI testing frequency	4.1	3.89	.084	
Education level	1.74	1.82	.08	
Previous bareback preference	−2.76	2.32	−.11	
Step 3				.041*
Income	−2.85	2.45	−.09	
Age	−.02	.25	−.006	
HIV status	−36.93	3.92	−.47***	
STI testing frequency	3.77	3.92	.078	
Education level	2.18	1.80	.10	
Previous bareback preference	−1.73	2.32	−.07	
Sexual stimuli attention	−3.48	2.74	−.10	
UAI attention	−6.3	2.82	−.172**	
Total R^2	.34			

HIV serostatus coded as −1 (positive) or 1 (negative)

***$p < .0001$, **$p < .01$, *$p < .05$

pornography preference was entered in the first step of the regression, $\beta = -.15$, $p = .05$ ($R^2 = .022$), which negatively predicted safe-sex intentions. In the second step, both previous bareback pornography preference and UAI attention were entered. Previous bareback pornography preference did not remain a predictor of safe-sex intentions, $\beta = -.12$, $p = .12$, but UAI attention predicted safe-sex intentions, $\beta = -.19$, $p = .015$ ($R^2 = .057$; $\Delta R^2 = .035$, $p = .015$). These results show that, for HIV-negative MSM, attention to UAI stimuli negatively predicted safe-sex intentions over and above previous bareback pornography preferences. For HIV-positive MSM ($N = 55$), previous bareback pornography preference remained a predictor in both steps of the regression: Step 1, $\beta = -.28$, $p = .04$, and Step 2, $\beta = -.24$, $p = .08$, while UAI attention was non-significant in Step 2, $\beta = -.13$ ($R^2 = .093$; $\Delta R^2 = .015$).

Discussion

Taken together, the results supported our hypothesis. In a choice situation, the attention given to unprotected anal intercourse depicted on pornographic film covers predicted viewers' own safe-sex intentions, but attention given to general sexual stimuli (naked bodies, erected genitals) did not. This suggests that mere attention to certain UAI sex acts might be sufficient to filter through to individual safe-sex intentions; the consumption of the pornography might not even be necessary to induce behavioral modulation. Furthermore, in our second analysis, we tested and found that the effect of pre-existing bareback viewing preference on safe-sex intentions can be surpassed by the effect of exposure to, and perception of, UAI stimuli on pornography covers. These results showed that the UAI attention effects were more pronounced for HIV-negative MSM, who are at greater risk to be influenced by bareback stimuli. For HIV-positive MSM, pre-existing pornography preference, which can be part of a rather pervasive bareback preference, dominated between the two predictors. At the same time, the predictor size difference for UAI attention was not that different between the two populations (−.19 for HIV-negative and −.13 for HIV-positive) and the lack of a significant result for UAI attention could be due to the smaller sample size for HIV-positive participants. Thus, we do not want to fully rule out that a UAI attention effect is also possible for HIV-positive MSM.

The strength of this study lies in its ecological validity. Individuals usually choose pornographic films from a selection of many films (either in an online or real-life adult store) and typically choose the film or the cover element that attracts the most positive attention. In doing so, the type of sexual acts depicted define a behavioral norm and serve as a potential basis for imitation.

A small number of limitations are also important to consider. First, one may object to our dichotomous grouping of the interest zones into a "UAI" vs. "PAI, oral sex, kissing, and body parts" group. We chose to do so for two reasons. First of all, this dichotomous grouping reflects the most relevant STI/HIV infection risk difference. Secondly, the attention matrix (i.e., all interest zones independently) proved to be too sparse to allow for a respective testing of PAI, oral sex, kissing, or body parts as individual predictors. In fact, the attention varied most between these two sets (UAI and the rest). In addition, one could propose that the genre of pornography, beyond bareback or not, could have influenced the effect. While we acknowledge that the potential for a film to influence a viewer likely increases when there is a closer fit between the style of the pornography and the viewer's own genre preferences, we made efforts to choose film covers that avoided strong suggestions of particular subgenres. Further, it seems reasonable that the UAI vs. PAI differences should be a stronger predictor of safe-sex intentions than other stylistic aspects, and is the factor for which one can most easily derive clear psychological hypotheses. Still, we sought to rule out this influence in Study 2. Finally, our results have the limitation that the direction of causality was not clarified through experimental manipulation. While a causal explanation fits with the fact that safe-sex sex intentions were assessed after the cover pictures were viewed, we conducted a second study to address this issue more directly. In Study 2, we experimentally varied the type of pornographic film presented, and subsequently examined its immediate impact on viewers' safe-sex intentions.

Study 2

Study 2 tested the immediate causal impact of pornographic films depicting (un)protected sex on the sexual behavior of viewers. In addition, we controlled for different types of pornography, to rule out preference effects. In line with imitation theories, we expected UAI film scenes, but not PAI film scenes, to increase sexual risk-taking intentions.

Method

Participants

A total of 34 Dutch-speaking MSM ($M = 44$ years, range = 21–63) participated, in exchange for a safe sex overnight bag containing items such as condoms and lubricant (approximate value 5€). They were solicited on the basis of flyers and mailings.

Measures

Pornographic Stimulus Material

Tastes and preferences for age of sexual partners or actors within pornographic material differ greatly between individuals (Adam, 2000; Sowell & Philipps, 2010).This differentiation is often based on "twinks" (denoting younger actors) and "men"

(denoting older actors), typically expressed by the absence or presence of facial and body hair. In order to avoid a bias based on actor age, we showed two films to each group. In this manner, we aimed to demonstrate that our effects did not merely result from a like/dislike of one particular type of actor. Both experimental groups saw two 7-min sequences (one with younger actors and one with older actors). As in Study 1, we did not differentiate for pornography subgenres besides the actor age variation. As UAI pornographic films, we chose "Petits Cochons" (Moussu, 2009) (actors around 20 years) and "Christian" (Morris & Sohl, 2009) (actors around 35 years). As corresponding PAI pornographic films, we chose "Pornboy" (Booth, 2009) and "Sommerloch" (Carlson, 2009). All actors had a Caucasian ethnic background. In each film, we selected a comparable anal penetration scene that was approximately 7 min in duration, with condoms clearly visible in the PAI condition and clearly not present in the UAI condition. To keep the stimulus material comparable across films, actors did not change sex roles (i.e., penetrative vs. receiving) during the sequences and no additional sexual behaviors (e.g., oral-genital contact) were included.

Questionnaire

Participants completed a paper and pencil questionnaire after watching each film. As in Study 1, the main dependent variable was a slider measuring safe-sex intentions, but this time phrased with regard to if they were to have sex at that moment. Furthermore, they also indicated their sexual arousal after each film on three items (horny, aroused, and bored; $\alpha = .72$). After the last film, we collected brief demographic information.

Procedure

We tested a 2 (Type: unprotected sex scenes vs. protected sex scenes) × 2 (Age: younger actors vs. older actors) design, with the actor age as a within-subjects factor. Four participants identified as HIV-positive and four did choose not to disclose their HIV status.

To increase ecological validity, the study was conducted in an Amsterdam gay men's club where so-called "sex parties" are routinely hosted in the evenings. Participants were solicited via websites, mailing lists, and flyers. They were randomly assigned to one of two groups (UAI vs. PAI pornography) and invited to arrive on location on a Saturday afternoon for their respective screening time. Participants were again informed about the presence of sexual content in the study. Each group of participants then saw a set of two films and completed a short questionnaire after each film. After the screening, they were fully debriefed and received their compensation (a safe sex overnight bag) upon leaving the location. The study was approved by the University of Amsterdam IRB (2010-SP-1273).

Results and Discussion

Manipulation Check

To avoid a bias due to differential arousal of the UAI and PAI pornographic films, we assessed post-film arousal. UAI versus PAI films were not rated as being differentially arousing, $F < 1$.

Effects on Safe-Sex Intentions

Our hypothesis, that viewing UAI promotes reduced safe-sex intentions, required a significant main effect of pornography type. We still analyzed a full mixed design in order to further test whether our specific stimulus materials (e.g., actors' age differences) had differential effects. This was not the case, as the interaction between type of pornography and age of actors was not significant, $F(1, 29) = 2.07$, $\eta_p^2 = .07$. Furthermore, the within-participants (age of actor) main effect was $F < 1$. More importantly, the main effect of condition was significant and showed a very robust effect size, $F(1, 29) = 10.31$, $p = .003$; $\eta_p^2 = .26$.[1] Average safe-sex intentions after viewing UAI films ($M = 60.19$, $SE = 7.32$) were much lower than after viewing PAI films ($M = 91.05$, $SE = 6.22$) indicating that consumption of unprotected sex led to lower spontaneous safe-sex intentions. Figure 1 shows the mean values for all four types of pornography used.

General Discussion

We presented two studies testing the impact of (un)protected sex in pornography on viewers' own safe-sex intentions. In Study 1, we assessed general safe-sex intentions of MSM and whether they were predicted by attention patterns to unprotected sex depictions (mainly UAI) on pornography film covers. We found that consumers' greater attention to unprotected sex acts in an array of several film covers predicted their lower safe-sex intentions. This study replicated previous research (Adams & de Wit, 2010; Silvera et al., 2009) and extended the findings to the choice situation that consumers routinely encounter in a store or online. The results suggest that, in the moment of choosing a film for later consumption, the medium might exert an influence upon viewers' imitative behavior. This effect was neither driven by sociostructural variables nor by previous pornography preferences. Still, HIV serostatus turned out to be a relevant predictor, likely due to generally lower safe-sex intentions of HIV-positive males (Ekstrand, Stall, Paul, Osmond, & Coates, 1999; Parsons et al., 2005). Of course, one has to interpret our results with caution, since this study was correlational in nature and causality cannot be confirmed. These

[1] Since HIV status turned out to be such a strong predictor in Study 1, we ran the analysis again and excluded the four HIV positive participants, since they may drive the effect. Virtually the same results were obtained when the four HIV positive participants were excluded: Main effect of condition, $F(1, 24) = 9.27$, $p = .006$; $\eta_p^2 = .27$.

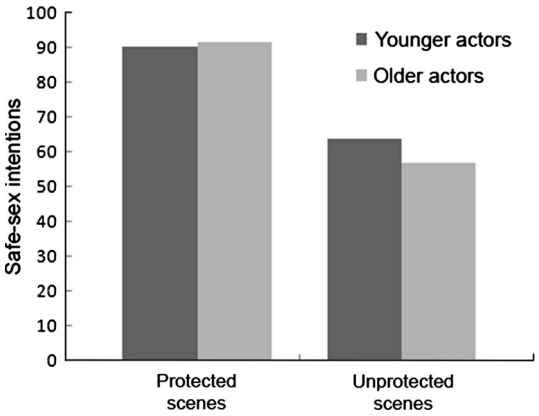

Fig. 1 Participants' spontaneous safe-sex intentions following protected or unprotected pornographic films with younger and older actors (Study 2)

findings provided the impetus for our Study 2, however, in which we tested the causal influence of pornography type on safe sex intentions.

Our second study offered a first causal test of the notion that exposure to bareback material increases intentions toward sexual risk-taking among MSM, addressing prior pleas for experimental research (Adams & de Wit, 2010) on this issue. We assessed participants' safe-sex intentions immediately after viewing pornography showing either unprotected sex or protected sex. In line with our expectations, the bareback film consumption led to significantly lower safe-sex intentions, compared to the group that watched depictions of protected anal penetration. This effect had a very robust effect size of $\eta_p^2 = .26$. These results demonstrate a causal link of pornography consumption upon sexual risk-taking intentions among MSM.

Our research extended the previous findings on imitation of behaviors that have a negative valence or that create dissonance in the actor, such as nicotine consumption or drinking alcohol, to the context of sexual behavior and sexual risk-taking. It becomes evident that the imitation potential of behavior is not impeded by possible associated health risks. Furthermore, our results can inform whether theoretical models of pornography influence on sexual risk-taking adequately reflect such behavior. For example, Wilkerson et al.'s (2012) SEM risk model assumes that only "novel" behaviors that viewers observe in pornographic films have the potential to modify sexual intentions and behavior while "known" behaviors lead to a maintenance of the perceivers' sexual intentions and behaviors. In contrast, our data suggested that even exposure to "known" behavior (i.e., UAI in film and UAI preference) can significantly change sexual risk-taking intentions.

Of course, some limitations apply to our research. First of all, our sampling method was not completely random and allowed for self-selection, especially in Study 2. On the other hand, even given potential self-selection biases, it is noteworthy that our results corroborated studies with larger samples (Adams & de Wit, 2010; Silvera et al., 2009). As a second limitation, one could argue that we did not examine actual risky sexual behavior. There are important meta-analyses that point to intention-behavior gaps (Albarracín, Johnson, Fishbein, & Muellerleile, 2001; Noar, Cole, & Carlyle, 2006) with regard to condom use. On the other hand, it is relevant to point out that these gaps pertain more to the intention to use condoms and then not using them, not necessarily the intention not to use condoms and then using them. Nevertheless, a measure of actual behavior would be desirable. To test our hypothesis in this manner would violate ethical standards, however, since participants would be exposed to a health hazard if seeking actual, risky sexual behavior after viewing the stimulus material. Other possible measures, given the brevity of time available, such as amount of condoms taken home, also lack the direct link to safer sex behavior. Thus, assessing behavioral responses at the level of self-reported intentions is useful, as there is ample evidence that action semantics are integral to action preparation (Lindemann, Stenneken, van Schie, & Bekkering, 2006) and generally carry over to actual behavior (Dijksterhuis & Bargh, 2001; Jonas & Sassenberg, 2006), including contexts specific to sexual behavior (Harakeh, Engels, Vohs, van Baaren, & Sargent, 2010). Furthermore, using the same intentional measure, we have obtained data in a different study that showed a significant negative correlation of reported STIs acquired during the last 6 months and safe-sex intentions. Those gay male participants who reported more previous STIs reported lower safe-sex intentions (Jonas, Kommattam, Hawk, Meinema, & de Groot, 2012) on this measure, thereby validating our measurement approach in terms of behavioral consistency of previous behavior (more STIs) and future intentions (less safe-sex behavior). Thus, given the limitations of time during the studies and the validity of the measure, we felt confident to use it.

Our results could have interesting implications for STI and HIV prevention strategies among pornography consumers. While we, of course, cannot derive a direct intervention strategy based on the results, the underlying mechanism could motivate practitioners to make pornography consumers or bar owners aware of the effects of the type of films they view or show to their clients. Although often demanded (Hurley, 2009; Johnson, 2010), a variety of practical, ethical, and legal factors make a ban of bareback pornography quite unlikely. A strategy of choice could, therefore, be to make bareback pornography consumers more aware of the potential risks following consumption. Prevention strategies that rely upon and promote an "educated viewer" (Green, 2004) could turn out to be more promising. Practitioners in the field of safe sex prevention could draw on two successful examples from other domains. Specifically, warning ads placed within movies that depicted smoking significantly lowered viewers' subsequent nicotine consumption (Harakeh et al., 2010). For pornography-related sexual aggression, prior research has shown a computer-based educational intervention to be effective (Isaacs & Fisher, 2008). Such an adopted intervention could be placed easily within adult online stores. Thus, it is not unlikely that an equivalent intervention aimed at bareback pornography

consumption could yield similar results. MSM consumers can be made aware of the unconscious impact their pornography choices have on their own sexual risk-taking, either through labeling on pornography covers, or through education programs implemented in actual communities or through online sexual social networking sites. Before the implementation of such interventions, however, further studies should examine the generalizability and replicability of these findings. Consultation with consumers and filmmakers regarding the acceptability of such intervention strategies can also ensure that they would not have unanticipated or even counterproductive effects.

Taken together, these two studies have provided important and novel causal evidence of the impact of bareback pornography consumption on viewer's sexual risk-taking, which can now be elaborated upon for purposes of education, intervention, and prevention.

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