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Mood changes after watching pornography on the Internet are linked to tendencies towards Internet-pornography-viewing disorder

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ABSTRACT

Internet-pornography-viewing disorder (IPD) is considered one type of Internet-use disorder. For IPD's development, it was assumed theoretically that a dysfunctional use of Internet pornography to cope with depressive mood or stress might be considered to be a risk factor. To address the effect of Internet pornography use on mood, an online study with three measuring points with a sample of male participants was conducted. Participants were investigated regarding their tendencies towards IPD, personal use of Internet pornography, general mood, perceived stress, and their Internet pornography use motivation. Moreover, participants were asked regarding their current mood, sexual arousal, and need to masturbate before and after they watched Internet pornography self-determinedly in a private environment. Data showed that tendencies towards IPD were associated negatively with feeling generally good, awake, and calm and were correlated positively with perceived stress in daily life and using Internet pornography for excitation seeking and emotional avoidance. Self-determined use of Internet pornography in their private environment was accompanied by changes in mood and indicators of sexual arousal. Moreover, tendencies towards IPD were negatively related to mood before and after Internet-pornography use as well as an actual increase of good and calm mood. The results showed effects of watching Internet pornography on mood and sexual arousal which can be considered having reinforcing effects for the user. Thus, the results are in line with theoretical assumptions on IPD's development, in which the positive (and negative) reinforcement received by Internet-pornography use is related to cue-reactivity and craving reactions.

1. Introduction

The potential positive and negative effects of watching pornography on the Internet are discussed controversially (Campbell & Kohut, 2016; Grubbs, Exline, Pargament, Volk, & Lindberg, 2016; Hald & Malamuth, 2008; Harkness, Mullan, & Blaszczynski, 2015; Peter & Valkenburg, 2014; Shaughnessy, Byers, Clowater, & Kalinowski, 2014; Stanley et al., 2016). It has become obvious that some individuals report a loss of control regarding their pornography use, which is frequently accompanied by increasing using times and negative consequences in several life domains, such as school/academic/job functioning (Duffy, Dawson, & das Nair, 2016; Griffiths, 2012; Wéry & Billieux, 2015). The addictive nature of sexual behaviors is still debated (Potenza, 2014), but many researchers argue that both watching pornography and sexual behaviors in general might be considered addictive (Brand, Young, & Laier, 2014; Garcia & Thibaut, 2010; Kraus, Voon, & Potenza, 2016; Love, Laier, Brand, Hatch, & Hajela, 2015). While some argue that addictive viewing of Internet pornography may be a specific form of sex addiction or hypersexuality (Garcia & Thibaut, 2010; Kafka, 2015), others argue that it should be classified as a specific type of Internet addiction (Laier & Brand, 2014; Young, 2008). Indeed pornography was shown to be the Internet application at risk for developing an addictive usage pattern (Meerkerk, van den Eijnden, & Garretsen, 2006). Because of the ongoing discussion on its phenomenology we use the term Internet-pornography-viewing disorder (IPD) in analogy to Internet-gaming disorder as used in the DSM-5 (APA, 2013). Since there is no agreement on the diagnostic criteria of IPD, the prevalence of the phenomenon can only be estimated. One study examined a sample representative from Sweden and found 2% of the female and 5% of the male participants reporting symptoms of IPD (Ross, Månsson, & Daneback, 2012).

With respect to the development of IPD it was argued that characteristics of the medium (e.g., reinforcing effects, anonymity, accessibility) contribute to the motivation to watch pornography (Cooper, Delmonico, Griffin-Shelley, & Mathy, 2004). With respect to the characteristics of the users, it was argued that individuals might be predisposed for the development of IPD symptoms by personal characteristics (e.g., high sexual excitability) and that these characteristics

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interact with cognitions related to pornography usage (e.g., positive use expectancies) (Laier & Brand, 2014). Due to the reinforcing effects in terms of sexual gratification by watching pornography, processes of conditioning should lead to the development of cue-reactivity and resulting craving reactions to internal or external addiction-related cues. Evidence for the important role of sexual arousal and craving reactions for IPD has been shown in several studies (Brand et al., 2011; Laier, Pawlikowski, Pekal, Schulte, & Brand, 2013; Laier, Pekal, & Brand, 2014, 2015; Rosenberg & Kraus, 2014; Snagowski, Wegmann, Pekal, Laier, & Brand, 2015). These findings are consistent with the assumption that particularly those individuals are prone to develop IPD who functionalize pornography consumption to cope with depressive mood or stress (Cooper, Putnam, Planchon, & Boies, 1999). This assumption has also been suggested in the I-PACE model of specific Internet-use disorders (I-PACE stands for Interaction of Person-Affect-Cognition-Execution) (Brand, Young, Laier, Wolfling, & Potenza, 2016). One hypothesis of the model is that current mood might influence the decision to use a specific Internet application (e.g., Internet pornography) and that the effects received by using the specific application should reinforce Internet-related cognitions. In addition, the idea and expectancy that the use of the Internet application is helpful to cope with stress or abnormal mood is also considered to be reinforced and a general dysfunctional coping style, as well. Personality characteristics and also psychopathological symptoms may be stabilized or intensified by the experiences during the addiction process. Although dysfunctional coping has been shown to be associated to IPD (Laier & Brand, 2014), the role of current mood and mood changes after watching pornography on the Internet for symptoms of IPD has not been investigated, so far. The aim of the study was to contribute to filling this research gap by addressing the following hypotheses in a sample of regular Internet-pornography users: 1.) Tendencies towards IPD are related with general mood and with perceived stress, 2.) Tendencies towards IPD are associated with current mood and with sexual arousal before and after Internet pornography use, 3.) Tendencies towards IPD are associated with changes in mood and sexual arousal due to Internet pornography use, and 4.) The relationship between tendencies towards IPD and the motivation to use Internet pornography is moderated by sexual arousal gained due to watching pornography. To address these hypotheses, an online field study with three measuring points was conducted.

2. Material and methods

2.1. Procedure

Participants were recruited through e-mail lists, social network sites, and advertisements at the University of Duisburg-Essen (Germany). The description indicated explicitly that the online study investigates Internet-pornography use and that only male individuals were invited to participate. Individuals interested in participation were asked to answer the invitation by e-mail and were then briefed via a detailed description of the study. The study was introduced as a survey with three measuring points. In the first part, participants gave information about sociodemographic variables, the personal use of the Internet for sexually motivated behaviors, subjectively perceived stress, and symptoms of IPD ($t1$). It was explained to the participants that if they should self-determinedly watch Internet pornography in their private environment for the next time, they were asked to answer questions regarding their current mood and sexual arousal before (second measuring point, $t2$) and after (third measuring point, $t3$) viewing Internet pornography. After the participants gave written informed consent they received tokens to match their data from the measuring points. All volunteers were invited to participate in a lottery to win one voucher from BestChoice (3 vouchers á 50€, 5 vouchers á 20€, 5 vouchers á 10 €). The data was checked for plausibility and no noticeable problems were observed. The study was approved by the local ethics committee.

2.2. Participants

The sample comprised 80 male individuals (M_{age} = 26.41 years, SD = 6.23, range: 18–55). Mean education was 12.90 years (SD = 0.45), 43 individuals (53.8%) indicated to have a partner. Forty-nine individuals described themselves as “heterosexual”, 12 as “rather heterosexual”, 5 as “bisexual”, 2 as “rather homosexual”, and 12 as “homosexual”. The number of participants using specific Internet applications and the mean time spent for these specific applications are shown in Table 1. Sixty-six participants of the sample completed the survey at $t2$ and $t3$. Mean age of this subsample was 25.91 (SD = 5.43). All individuals of the subsample indicated to use cybersex applications on a regular basis.

2.3. Questionnaires

At $t1$, symptoms of IPD, general mood, perceived stress, and Internet-pornography use motivation were assessed. Tendencies towards IPD were measured with the short-version of the Internet Addiction Test modified for sex (s-IATsex, Cronbach's α = 0.83) (Laier et al., 2013; Wéry, Burnay, Karila, & Billieux, 2015), which consists of the two subscales “loss of control/time management” (s-IATsex-1) and “social problems/craving” (s-IATsex-2). Twelve items were answered on a scale from 1 (=never) to 5 (=very often), which are summed up for the total score with high scores representing high tendencies towards or high symptoms of IPD, respectively. General mood was assessed with the Multidimensional Mood State Questionnaire (MDMQ, Cronbach's α = 0.94) (Steyer, Schwenkmezger, Notz, & Eid, 1997). Twenty-four items were answered on a scale from 1 (=not at all) 5 (=very), and mean scores of the subscales “good-bad” (MDMQ-good), “awake-tired” (MDMQ-awake), and “calm-nervous” (MDMQ-calm) were calculated. High scores represent rather good than bad, rather awake than tired, and rather calm than nervous mood. The Pornography Consumption Inventory (PCI, Cronbach's α = 0.83) was used to measure the four motivational dimensions of Internet-pornography use (Reid, Li, Gilliland, Stein, & Fong, 2011). Fifteen items were answered on a scale from 1 (=never like me) to 5 (=very often like me), and mean scores for the subscales “emotional avoidance” (PCI-EA), “sexual curiosity” (PCI-SC), “excitement seeking” (PCI-ES), and “sexual pleasure” (PCI-SP) were calculated. High scores represent high motivational relevance for Internet-pornography use. To indicate stress vulnerability, the screening version of the Trier Inventory for Chronic Stress (TICS, Cronbach's α = 0.92) was applied (Schulz, Schlotz, & Becker, 2004). The questionnaire asks for perceived stress exposure in the last three months with twelve items which have to be answered on a scale from 0 (=never) to 4 (=very often). A sum score was computed. High scores represent high perceived stress. Consistent with previous studies (Laier et al., 2014, 2015), individuals were asked whether or not they use specific Internet applications with a response format “yes/no”. If so, we asked how often (“less than once a year”, “at least once in a year and less than once each month”, “at least once a month

Table 1
Description of the sample's cybersexual activities. Mean scores and standard deviations refer to the time (min/week) spend to use a specific cybersex application.

	n	*M*	*SD*
Softcore pictures	55	28.96	45.04
Softcore videos	26	20.03	30.81
Hardcore pictures	55	46.01	61.89
Hardcore videos	75	116.15	171.66
Sex chats	12	71.96	131.38
Sex via Webcam	4	185.45	154.08
Live sex Shows	7	32.20	37.35

Note. Please note the number of participants using one (n = 8), two (n = 14), three (n = 8), four (n = 25), five (n = 12), six (n = 10), or seven (n = 3) of the inquired specific cybersex applications. All mean scores and standard deviations only refer to individuals who used a specific cybersex application weekly.