

Reference List to Accompany the Webinar:

Teens and Pornography: The Latest Research and Resources

1. Novelty, Conditioning and Attentional Bias to Sexual Rewards (2015)

Banca, P., Morris, L. S., Mitchell, S., Harrison, N. A., Potenza, M. N., & Voon, V. (2016). Novelty, conditioning and attentional bias to sexual rewards. *Journal of Psychiatric Research*, 72, 91-101. doi:10.1016/j.jpsychires.2015.10.017

<http://www.journalofpsychiatricresearch.com/article/S0022-3956%2815%2900313-1/fulltext>

"A study that assessed the predictive power of several types of Internet applications (gaming, gambling, email, etc.) on the development of compulsive Internet use suggested that online sexually explicit stimuli have the highest potential for addictive/compulsive use." When testing healthy men, it was found that viewing the same sexually explicit video repeatedly caused lower levels of sexual arousal. This suggests that novelty is key in becoming addicted. The Internet provides the ability to have a steady stream of novel stimuli, making it that much more dangerous.

This study also talks about brain imaging and the different parts of the brain that are activated when viewing sexual images. During this study, researchers hypothesized that healthy adult males and CSB (Compulsive Sexual Behavior) adult males who were given a choice between familiar sexually explicit images or novel sexually explicit images would differ in their preferences – CSB males choosing novel images. The results of the study proved the hypothesis accurate as far as CSB participants were concerned. CSB participants did choose novel sexual stimuli over familiar images. They also showed a preference for images with money. However, Healthy males chose novel, neutral stimuli as opposed to familiar images.

Overall this study provides good material for someone trying to show that those prone to pornography addiction are in greater danger of Internet porn addiction because of the availability of endless, novel stimuli.

2. Neurobiological Basis of Hypersexuality (2016)

Kühn, S., & Gallinat, J. (2016). Neurobiological basis of hypersexuality. *International Review of Neurobiology Imaging the Addicted Brain*,129, 67-83. doi:10.1016/bs.irn.2016.04.002

This article discusses the similarity between the brain structures and responses of cocaine addicts compared to pornography addicts and the brain activity responses to visual cues recorded during Neuroimaging. This study showed that the more hours spent viewing pornography, the fewer the BOLD response in the left putamen in response to sexual images. It also showed less gray matter in the striatum – showing a tolerance to the material being viewed.

The evidence shows that the areas of the brain involved in reward processing are affected causing the "addict" to need more new material to view in order to feel satisfied.

3. Brain Structure and Functional Connectivity Associated With Pornography Consumption: The Brain on Porn (2014)

Kühn, S., & Gallinat, J. (2014). Brain structure and functional connectivity associated with pornography consumption. *JAMA Psychiatry*,71(7). doi:10.1001/jamapsychiatry.2014.93

This article also shows a strong correlation between the number of hours spent weekly viewing porn and the number of years doing so to the volume of grey matter in the right caudate of the brain as well as the functional activity of the left putamen during the viewing of a sexual images. This suggests that the viewing of pornography desensitizes the individual and numbs the reward center causing the individual to need more new images or more sexually explicit images to achieve the same sexual response they had before.

A study in Sweden on adolescent boys showed that those who consumed pornography daily showed "more interest in deviant and illegal types of pornography" and a greater desire to act out the things they had seen. Those who viewed pornography online regularly became compulsive computer users within a year.

Some people have suggested that those who are "addicted" to pornography are just more sexually stimulated than those who do not have the same need. However, studies show that addicts are actually less sexually stimulated and have less interest in sex with a real partner.

4. Pornographic picture processing interferes with working memory performance. (2013)

Laier, C., Schulte, F. P., & Brand, M. (2013). Pornographic picture processing interferes with working memory performance. *Journal of Sex Research*, 50(7), 642-652. doi:10.1080/00224499.2012.716873

This study included heterosexual men over the age of 18. Working memory (WM) of participants was tested before the trial in order to obtain a baseline. The within group design used "pictorial 4-back task" (participants were asked to compare an image from four picture sets earlier and remember if they are the same or not). "The main result of the study is worse WM performance for pornographic pictures compared to neutral, negative, and positive stimuli." This is shown by more incorrect answers after viewing pornographic answers and experiencing sexual arousal.

Pornographic pictures lead to brain activity in the emotion and attention areas of the brain and often to a need/desire to masturbate. It was suggested by the study that the need to view pornography is similar to other addictions. Viewing pornography is often followed by the desire to masturbate (craving reaction) which interferes with cognitive process.

5. Sexual Picture Processing Interferes with Decision-Making under Ambiguity (2014)

Laier, C., Pawlikowski, M., & Brand, M. (2014). Sexual picture processing interferes with decision-making under ambiguity. *Archives of Sexual Behavior*, 43(3), 473-482. doi:10.1007/s10508-013-0119-8

This study shows that when individuals are influenced by sexually explicit images, their decision making abilities are affected. "In a current study, 82 heterosexual, male participants watched sexual pictures, rated them with respect to sexual arousal, and were asked to indicate their current level of sexual arousal before and following the sexual picture presentation. Afterward, subjects performed one of two modified versions of the Iowa Gambling Task in which sexual pictures were displayed on the advantageous and neutral pictures on the disadvantageous card decks or vice versa.

Results demonstrated an increase of sexual arousal following the sexual picture presentation. Decision making performance was worse when sexual pictures were associated with disadvantageous card decks compared to performance when the sexual pictures were linked to the advantageous decks." This interference with decision-making may explain why some people experience negative consequences with cybersex use.

6. Mood changes after watching pornography on the Internet are linked to tendencies towards Internet-pornography-viewing-disorder (2017)

Laier, C., & Brand, M. (2017). Mood changes after watching pornography on the Internet are linked to tendencies towards internet-pornography-viewing disorder. *Addictive Behaviors Reports*,5, 9-13. doi:10.1016/j.abrep.2016.11.003

<http://www.sciencedirect.com/science/article/pii/S2352853216300499>

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 . . . 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." This has a reinforcing affect and may be the reason a disorder is likely to form.

7. Neuroscience of Internet Pornography Addiction A Review and Update (2015)

Love, T., Laier, C., Brand, M., Hatch, L., & Hajela, R. (2015). Neuroscience of internet pornography addiction a review and update. *Behavioral Sciences*,5(3), 388-433. doi:10.3390/bs5030388

<http://www.mdpi.com/2076-328X/5/3/388/htm>

This article focuses on the fact that behaviors such as gambling, Internet use, gaming, pornography, and sexual acting out can all become addictions. Pornography use is a behavioral addiction, which causes actual changes in the brain – similar to those of chemical addiction. The Internet's has the ability to produce unending stimulation, which helps to explain the reason for the brain manifesting addiction related changes.

The three stages of addiction are covered: 1. The Binge/Intoxication stage 2. Withdrawal/Negative Affect 3. Preoccupation/Anticipation. This is followed by an explanation by Everitt and Robbins about the transition of behavior from voluntary to addiction. Then, a section about how genetics plays a role in addictions followed by the molecular changes that take place making it harder to stop addictive behaviors. Research by Norman Doidge is shared which discusses how the "brain maps for sexual excitement" are changed by viewing Internet pornography. Because of the way the brain changes, the addict requires higher levels of excitement each time to achieve the same result. Brain changes also occur with increased hours of viewing pornography as well as an inability to achieve arousal with real partners while still being able to achieve it while viewing porn.

Overall, the study provides evidence that addictions are determined by the common effects on the brain, not the difference in substance or behavior.

8. Trading Later Rewards for Current Pleasure: Pornography Consumption and Delay Discounting (2015)

Negash, S., Sheppard, N. V., Lambert, N. M., & Fincham, F. D. (2015). Trading later rewards for current pleasure: pornography consumption and delay discounting. *The Journal of Sex Research*, 1-12. Retrieved March 24, 2017, from

This paper includes two different studies about individual's ability to wait for things they want now in exchange for a bigger reward later and the effect that has on an individual's ability to abstain from pornography.

“Study 1 used a longitudinal design. Participants completed a pornography use questionnaire and a delay discounting task at Time 1 and then again four weeks later. Participants reporting higher initial pornography use demonstrated a higher delay discounting rate at Time 2, controlling for initial delay discounting.

Study 2 tested for causality with an experimental design. Participants were randomly assigned to abstain from either their favorite food or pornography for three weeks. Participants who abstained from pornography use demonstrated lower delay discounting than participants who abstained from their favorite food. The finding suggests that Internet pornography is a sexual reward that contributes to delay discounting differently than other natural rewards. Theoretical and clinical implications of these studies are highlighted.”

9. Is Internet Pornography Causing Sexual Dysfunctions? (2016)

Park, B. Y., Wilson, G., Berger, J., Christman, M., Reina, B., Klam, W. P., & Doan, A. P. (2016). Is Internet pornography causing sexual dysfunctions? A review with clinical reports. *Behavioral sciences*,6(3). doi:10.3390/bs6030017

<http://www.mdpi.com/2076-328X/6/3/17/htm>

This article focuses on studies that suggest different sexual dysfunctions may be caused by an alteration to the brain's motivational system due to over-exposure and addiction to Internet pornography. There has been a sharp rise in sexual dysfunction in the last decade or so. A study done in 2002 suggested that for men 40-80 years old in Europe the rate of ED was 13%. In 2011, ED rates among 18-40 year olds were 14-28%. In 2014, a study in Canada showed 53.5% of males age 16-21 had symptoms of sexual problems and that the new diagnoses of ED had nearly doubled between 2004 and 2013.

One study also suggests, that terminating Internet Pornography use is sometimes sufficient to reverse the negative effects and solve sexual dysfunction difficulties. Bronner and Ben-Zion conducted a study that showed those who had escalated to hard-core pornography

and sought help for sexual arousal problems were able to reverse their problem and enjoy "good sexual relations" after eight months of stopping all exposure to pornography.

The article also discusses the cognitive changes that take place with the viewing of pornography and compares it with the changes that occur in the brains of drug users. The normalization of pornography viewing, despite the obvious sexual problems it creates is also discussed.

10. Neural Correlates of Sexual Cue Reactivity in Individuals with and without Compulsive Sexual Behaviours (2014)

Voon, V., Mole, T. B., Banca, P., Porter, L., Morris, L., Mitchell, S., . . . Irvine, M. (2014). Neural correlates of sexual cue reactivity in individuals with and without compulsive sexual behaviours. *PLoS ONE*,9(7). doi:10.1371/journal.pone.0102419

This study involved neuroimaging on "healthy men" as well as men who had compulsive sexual behavior (CSB). The CSB participants were age-matched with the control group to ensure a fair trial. During the imaging process, individuals were shown pictures which were: neutral, monetary, non-sexually exciting, erotic, and explicit sexual. The videos were shown for 9 seconds followed by a question about whether the video was indoors or outdoors. Then they were asked to rate how much 1. They liked the video. 2. It increased their sexual desire. CSB participants were less likely to like the video but more likely to want more.

CSB participants all reported that due to the excessive use of sexually explicit materials they had lost jobs, damaged intimate relationships, negatively influenced other social activities, used escorts, experienced diminished libido or ED, had suicidal thoughts, used large amounts of money, used masturbation instead of real partners, or had difficulty in relationships with people but not sexually explicit material. They had also been introduced to sexually explicit material at an earlier age, had greater Internet use than healthy males, and viewed more hours per week of sexually explicit material.

11. A Meta-Analysis of Pornography Consumption and Actual Acts of Sexual Aggression in General Population Studies (2015)

Wright, P. J., Tokunaga, R. S., & Kraus, A. (2015). A meta-analysis of pornography consumption and actual acts of sexual aggression in general population studies. *Journal of Communication*, 66(1) 183-205. Retrieved from <http://onlinelibrary.wiley.com/doi/10.1111/jcom.12201/abstract>

Whether pornography consumption is a reliable correlate of sexually aggressive behavior continues to be debated. Meta-analyses of experimental studies have found effects on aggressive behavior and attitudes. That pornography consumption correlates with aggressive attitudes in naturalistic studies has also been found. Yet, no meta-analysis has addressed the question motivating this body of work: Is pornography consumption correlated with committing actual acts of sexual aggression? 22 studies from 7 different countries were analyzed. Consumption was associated with sexual aggression in the United States and internationally, among males and females, and in cross-sectional and longitudinal studies. Associations were stronger for verbal than physical sexual aggression, although both were significant. The general pattern of results suggested that violent content may be an exacerbating factor.