



Sexual Addiction & Compulsivity

The Journal of Treatment & Prevention



ISSN: 1072-0162 (Print) 1532-5318 (Online) Journal homepage: <https://www.tandfonline.com/loi/usac20>


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To cite this article: Nicholas C. Borgogna, Jessica Duncan & Ryon C. McDermott (2018) Is scrupulosity behind the relationship between problematic pornography viewing and depression, anxiety, and stress?, *Sexual Addiction & Compulsivity*, 25:4, 293-318, DOI: [10.1080/10720162.2019.1567410](https://doi.org/10.1080/10720162.2019.1567410)

To link to this article: <https://doi.org/10.1080/10720162.2019.1567410>

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Is scrupulosity behind the relationship between problematic pornography viewing and depression, anxiety, and stress?

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ABSTRACT

This study examined how scrupulosity, depression, anxiety, stress, and neuroticism may statistically predict problematic pornography viewing dimensions. Participants ($n=507$ women and $n=250$ men) responded to an online survey. Structural equation modeling indicated scrupulosity as a significant positive predictor across all problematic pornography viewing dimensions across genders. Depression was also a significant positive predictor, but only for those who use pornography to escape negative emotions, and for women with functional problems related to pornography use. The relationship between scrupulosity and functional pornography problems was significantly stronger for men. Interaction analyses suggested that low scrupulosity may buffer the relationship between mental health concerns and problematic pornography viewing in men, while high scrupulosity may exacerbate the relationship between anxiety and excessive pornography use in women. The full model accounted for 14 – 34% of the variance of various dimensions of problematic pornography viewing. Clinical implications and areas of further research are discussed.

Over the past two decades researchers and clinicians have become increasingly interested in understanding predictors of problematic pornography viewing (Borgogna & McDermott, 2018; Brand, Antons, Wegmann, & Potenza, 2018; Grubbs & Perry, 2018; Grubbs, Perry, Wilt, & Reid, 2018; Kor et al., 2014; Price, Patterson, Regnerus, & Walley, 2016; Short, Black, Smith, Wetterneck, & Wells, 2012; Sniewski, Farvid, & Carter, 2018; Twohig, Crosby, & Cox, 2009). Defined as personal/interpersonal problems associated with compulsive/addictive pornography use, problematic pornography viewing has been conceptualized as a multidimensional construct. Using Kor et al.'s (2014) framework specifically, these dimensions include functional problems related to pornography viewing; i.e., relationship/work

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problems (Kor et al., 2014; Leonhardt, Willoughby, & Young-Petersen, 2017; Manning, 2006; Minarcik, Wetterneck, & Short, 2016; Muusses, Kerkhof, & Finkenauer, 2015; Perry, 2016; Poulsen, Busby, & Galovan, 2013); problems associated with excessive use and control difficulties (D'Orlando, 2011; Kor et al., 2014; Kraus, Potenza, Martino, & Grant, 2015); and, using pornography as a dysfunctional means of escaping mental health problems (Kor et al., 2014; Perry, 2017). While multiple studies have observed significant positive relationships between pornography viewing and various mental health outcomes (e.g., Butler, Pereyra, Draper, Leonhardt, & Skinner, 2018; Egan & Parmar, 2013; Levin, Lillis, & Hayes, 2012; Perry, 2017), few have included important cultural and individual difference factors that may be relevant in determining how general mental health concerns (i.e., anxiety/depression) are related to problematic pornography viewing. Such factors may be helpful for informing clinical interventions.

Gender and religiosity constructs have both been offered as avenues that may moderate frequencies of pornography viewing and subjective feelings of problematic pornography viewing behaviors (e.g., perceived addiction; Grubbs, Stauner, Exline, Pargament, & Lindberg, 2015; Grubbs, Wilt, Exline, Pargament, & Kraus, 2018). Scrupulosity specifically has gained recent attention as a particular aspect of religiosity that may be strongly predictive of problematic pornography behaviors (Borgogna & McDermott, 2018; Grubbs et al., 2018; Short, Kasper, & Wetterneck, 2015), although this view has been debated (Brand et al., 2018). However, to date, no study has examined mental health and scrupulosity variables simultaneously in the prediction of problematic pornography viewing. Nor has any study examined how gender, scrupulosity, and mental health may interact in the prediction of problematic pornography viewing. We, therefore, sought to address these gaps in the literature.

Pornography viewing and mental health

While research on *problematic* pornography viewing is relatively nascent, multiple studies have indicated concerning outcomes associated with pornography viewing frequency. These include modest positive correlations with loneliness (Butler et al., 2018; Yoder, Virden, & Amin, 2005), depression (Kraus et al., 2015; Nelson, Padilla-Walker, & Carroll, 2010; Perry, 2017; Wolak, Mitchell, & Finkelhor, 2007; Ybarra & Mitchell, 2005), anxiety (Harper & Hodgins, 2016; Levin et al., 2012), narcissism (Kasper, Short, & Milam, 2015), headaches (Anand & Dhikav, 2012), and neuroticism (Egan & Parmar, 2013). Moreover, pornography use has also been modestly negatively associated with general life satisfaction (Harper & Hodgins, 2016;

Wright, Tokunaga, Kraus, & Klann, 2017), relationship satisfaction/relationship problems (Bergner & Bridges, 2002; Bridges, Bergner, & Hesson-McInnis, 2003; Daspe, Vaillancourt-Morel, Lussier, Sabourin, & Ferron, 2018; Perry, 2018), and sexual satisfaction/desire (Carvalho, Traeen, & Stulhofer, 2015; Daspe et al., 2018; Sun, Bridges, Johnson, & Ezzell, 2016; Wright, Bridges, Sun, Ezzell, & Johnson, 2018; Wright, Sun, Steffen, & Tokunaga, 2017). While mental health factors are implicated in relation to pornography viewing (both as a statistical predictor and as an outcome; Butler et al., 2018; Perry, 2017), cultural and individual factors have also been reported to be important in determining who may develop problematic pornography viewing behaviors. Religiosity and gender have both been identified as variables important to this consideration (e.g., Nelson et al., 2010; Perry, 2017; Twohig et al., 2009).

Pornography and religiosity

Multiple studies have noted that the negative outcomes related to pornography viewing are pronounced in religious populations (Borgogna & McDermott, 2018; Bradley, Grubbs, Uzdavines, Exline, & Pargament, 2016; Grubbs, Exline, Pargament, Volk, & Lindberg, 2017; Grubbs & Perry, 2018; Grubbs, Stauner, et al., 2015; Nelson et al., 2010; Patterson & Price, 2012; Perry, 2017; Perry & Snawder, 2017; Short et al., 2015; Whitehead & Perry, 2018), and more specifically religious men (e.g., Perry, 2017). Prior reports have demonstrated that religious individuals may perceive their pornography use as addictive even if it may not follow an addictive paradigm (termed perceived addiction; Grubbs, Exline, Pargament, Hook, & Carlisle, 2015; Wilt, Cooper, Grubbs, Exline, & Pargament, 2016; however, see Brand et al., 2018). Perceived addiction is statistically predictive of psychological distress even when pornography viewing frequency is controlled (Grubbs, Stauner, et al., 2015; Grubbs, Volk, Exline, & Pargament, 2015; Wilt et al., 2016). While these findings broadly suggest that religious individuals may be at-risk for developing problems related to pornography use, other researchers have suggested religiosity may act as a potential protective factor (e.g., Hardy, Steelman, Coyne, & Ridge, 2013). Moreover, religiosity as a broad-construct may have dimensions that function as both protective and risk-factors. Scrupulous-religiosity (scrupulosity) has been suggested as a potential religious dimension that may serve as a risk-factor for problematic pornography viewing (N.C. Borgogna & McDermott, 2018).

Characterized as a psychological condition defined by pathological guilt and/or obsession associated with moral or religious issues (Abramowitz, Huppert, Cohen, Tolin, & Cahill, 2002; Miller & Hedges, 2008), scrupulosity was suggested as a potential risk factor in the role between religiosity

and problematic pornography viewing by Short et al. (2015). Grubbs et al. (2018) similarly identified “religious scruples” as relevant to the development of perceived addiction to pornography viewing. Most recently, scrupulosity was reported as a significant statistical predictor of problematic pornography viewing in men and women across all dimensions in Kor et al.’s (2014) framework (Borgogna & McDermott, 2018).

While these studies indicate scrupulosity may be relevant to the development of problematic pornography viewing, no studies have examined how mental health issues and scrupulosity may interact to exacerbate and/or buffer problematic pornography viewing tendencies. Similarly, there is a need to further examine how gender may influence such possible interactions. This is important as men typically report more problematic tendencies associated with their viewing and higher viewing frequencies than women (e.g. Albright, 2008; Carroll et al., 2008; Harper & Hodgins, 2016; Price, Patterson, Regnerus, & Walley, 2016; Wéry & Billieux, 2017). Thus, there is need to examine the suggested moderating roles of scrupulosity and gender on the relationships between general mental issues and problematic pornography viewing.

The current study

We addressed these considerations by conducting a study examining how depression, anxiety, and stress may statistically predict the problematic dimensions suggested in Kor et al.’s (2014) framework, while simultaneously examining the contribution of scrupulosity and gender. Four hypotheses guided our analyses: First, consistent with Borgogna and McDermott (2018), we hypothesized that scrupulosity would emerge as a strong significant statistical positive predictor across all problematic pornography viewing constructs. Second, consistent with examinations of mental health in relation to problematic pornography viewing (e.g., Kor et al., 2014; Kraus et al., 2015; Levin et al., 2012), we hypothesized that anxiety, depression, and stress would modestly and positively statistically predict all dimensions as well. Third, because men view pornography more often than women (Albright, 2008; Carroll et al., 2008; Paul, 2009; Price et al., 2016), we hypothesized that gender would moderate these relationships, such that the relationship between scrupulosity and mental health as positive statistical predictors of problematic pornography viewing would be significantly stronger for men. Fourth, as a means of further exploration, and consistent with research indicating religious populations experience worse mental health outcomes associating with pornography viewing in general (Grubbs, Stauner, et al., 2015; Nelson et al., 2010; Patterson & Price, 2012; Perry, 2017; Perry & Whitehead, 2018; Volk, Thomas, Sosin, Jacob, & Moen,

2016), we also examined how scrupulosity may interact with anxiety, depression, and stress. Specifically, we hypothesized that an exacerbation effect would occur at high levels of scrupulosity, with the interactions being significantly predictive of all dimensions of problematic pornography viewing. We further hypothesized that gender would additionally moderate the interaction effect of scrupulosity, such that the interaction paths would be significantly stronger for men.

Method

Participants/Procedure

After review board approval, participants were gathered online via a subject pool located at a university in the southeastern United States, with additional snowball sampling through professional research social media formats (such as the Psychology on the Net web service), and postings on craigslist and Reddit. Data were gathered from January 2017 to January 2018. The study was advertised as a social survey exploring mental health and sexuality. Participants gathered through the subject pool were offered extra-credit, and those participating through the snowball procedure could optionally enter a raffle for one \$100 Visa-gift card. We only included participants who completed at least 80% of all measures and passed a random response check in the survey. Since gender as a binary variable was critical, 16 non-cisgender participants were removed from analyses, yielding a final sample of 757 (507 women and 250 men). Demographics are available in Table 1.

Measures

Problematic pornography viewing

We used the Problematic Pornography Use Scale (PPUS; Kor et al., 2014) as our measure of problematic pornography viewing. The PPUS is a 12-item measure with four, three-item factors. The factors are: distress and functional problems (FP, “I risked or put in jeopardy a significant relationship, place of employment, educational or career opportunity because of the use of pornographic materials”), excessive use (EU, “I spend too much time being involved in thoughts about pornography”), control difficulties (CD, “I feel I cannot stop watching pornography”), and use for escape/avoidance negative emotions (ANE, “I watch pornographic materials when am feeling despondent”). Items are scored on a Likert scale (1-never true to 6-almost always true). The four-factor model has been validated across genders via confirmatory factor analyses, though some research has indicated questionable reliability for the functional problems scale in women

Table 1. Demographic Information.

	Men (<i>n</i> = 250)	Women (<i>n</i> = 507)
Race		
White or Caucasian	72.40%	65.30%
Black/African American	12.40%	18.30%
Hispanic/Latino(a)	5.20%	5.10%
Asian American/Middle Eastern	6.80%	7.10%
Native American/Pacific Islander	0.40%	1.00%
Other/Multiracial	2.80%	3.20%
Sexual Orientation		
Heterosexual	86.00%	83.20%
Homosexual	5.20%	3.20%
Bisexual	5.60%	9.70%
Questioning	1.60%	2.40%
Other Sexual Minority	1.60%	1.60%
Relationship Status		
Single	46.80%	37.10%
Casually Dating	8.40%	13.00%
Seriously Dating	30.40%	36.10%
Engaged/Married	11.60%	9.30%
Separated/Divorced	2.00%	2.60%
Widow	0.40%	1.20%
Other	0.40%	0.80%
Highest Level of Education		
High School	70.40%	73.60%
Associates/Technical	12.00%	11.80%
Bachelors	12.00%	9.50%
Masters	4.00%	3.90%
Doctorate/Professional	1.60%	1.20%
Religion		
Christian	62.00%	72.80%
Agnostic/Atheist	24.00%	15.00%
Hindu	0.80%	0.00%
Muslim	4.80%	1.00%
Jewish	1.20%	1.80%
Buddhist	1.20%	2.40%
Other	6.00%	6.90%
Missing/Did Not Respond	0.00%	0.20%
	Mean (<i>SD</i>)	Mean (<i>SD</i>)
Age	24.2 (9.9)	24.1 (10.7)
Age of First Pornography Viewing	13.2 (2.4)	15.2 (4.3)

(Borgogna, Lathan, & Mitchell, 2018). The measure has further been shown to have appropriate convergent and construct validity (Kor et al., 2014). Internal consistencies were adequate on all four subscales: FP $\alpha = .70$, EU $\alpha = .89$, CD $\alpha = .88$, and ANE $\alpha = .90$. Pornography was defined as viewing materials that depict sexual activity, organs, and/or experiences for the purpose of sexual arousal (Kalman, 2008).

Scrupulosity

We used the 12-item “Fear of Sin” subscale of the Penn Inventory of Scrupulosity (PIOS; Abramowitz et al., 2002) as our measure of scrupulosity (“I feel guilty about immoral thoughts I have had”). Items are scored on a Likert-Scale (1-never to 4-constantly). The PIOS has demonstrated good internal consistency and adequate convergent and discriminant validity (Abramowitz et al., 2002; Olatunji, Abramowitz, Williams, Connolly, &

Lohr, 2007). The Fear of Sin subscale alone has been shown to be an efficient way of measuring scrupulosity (Borgogna & McDermott, 2018; Olatunji, 2008). Internal consistency for the current sample was excellent: $\alpha = .93$.

General mental health

We used the Depression, Anxiety and Stress Scale (DASS; Lovibond & Lovibond, 1995) as our measure of general mental health. The DASS is a 21-item measure with three, seven-item factors: Depression (DASS-D, “Over the past week, I couldn’t seem to experience any positive feeling at all”), anxiety (DASS-A, “Over the past week, I felt I was close to panic”), and stress (DASS-S, “Over the past week, I found it hard to wind down”). Items are presented using a Likert scale (*1-did not apply to me at all to 4-applied to me very much, or most of the time*). The DASS has been validated across genders, races, and cultures, and has demonstrated adequate construct, convergent, and discriminate validity (Crawford & Henry, 2003; Norton, 2007). Internal consistencies were excellent on all three subscales: DASS-D $\alpha = .90$, DASS-A $\alpha = .81$, and DASS-S $\alpha = .84$.

Neuroticism

We used the 8-item Neuroticism scale from the Big Five Inventory (BFI-N; John, Donahue, & Kentle, 1991) as our measure of neuroticism (“I see myself as someone who worries a lot”). Items are presented using a Likert scale (*1-disagree strongly to 5-agree strongly*). The BFI has been validated across genders, races, and cultures via exploratory and confirmatory factor analyses and has demonstrated adequate convergent and discriminant validity (John, Naumann, & Soto, 2008). Internal consistency was good: $\alpha = .85$.

Primary analysis plan

We used multi-group structural equation modeling (SEM) to examine the hypothesized relationships between depression, anxiety, stress, and scrupulosity on problematic pornography viewing dimensions (i.e., functional problems, excessive use, control difficulties, and avoidance of negative emotions), while controlling for neuroticism (as it has been shown to be a statistical predictor of general mental health problems (Lahey, 2009) and problematic pornography viewing tendencies (Egan & Parmar, 2013)). [Figure 1](#) depicts the basic conceptual model that was examined across genders. Following best practices for SEM (Kline, 2016), we first tested a measurement model to ensure that all latent variables were adequately

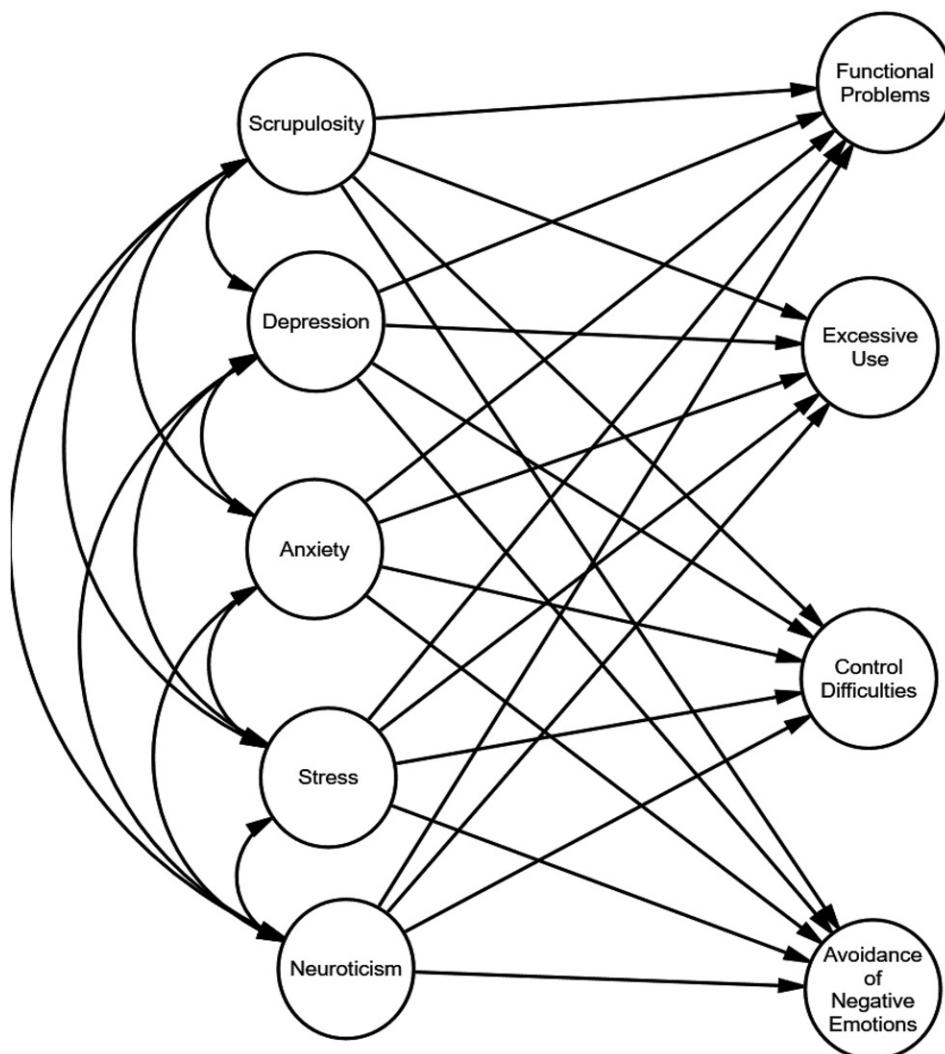


Figure 1. Conceptual Model.

Note: Error and disturbance terms are not shown for readability.

represented by their manifest indicators. We then examined a structural model with paths included to test the hypothesized relationships. For evaluating model-fit, we used the following indices and cutoffs (Hu & Bentler, 1999; Kline, 2016): comparative fit index (CFI) and the Tucker-Lewis index (TLI; values above .90 indicate acceptable fit for both the CFI and TLI), the root-mean-square error of approximation (RMSEA) with 90% confidence intervals (CIs; low values of .06 or less and high values less than .10 indicate a good fit), and the standardized root-mean-square residual (SRMR; values of .08 or less indicate a good fit). The chi-square test statistic was also reported (a non-significant value indicates a good fit to the data); however, it was interpreted with caution, given its sensitivity to sample size.

Because the present study also examined the potential moderating effect of gender, we tested measurement and structural invariance between groups (Kline, 2016). Three forms of invariance were examined: configural invariance (determining whether the same basic pattern of factor loadings was evidenced across genders), metric invariance (testing the equivalence of factor loadings for each latent variable between genders), and direct-effects invariance (determining whether the direct effects between depression, anxiety, stress, neuroticism, and scrupulosity on the problematic pornography viewing factors were equivalent between genders). Configural and metric invariance are necessary to ensure that any moderation effects are not due to underlying differences in the measurement of the constructs between groups. Direct-effects invariance is the final step of the analysis, and if significant differences in the strength of the direct relationships are found, then moderation is evident (Kline, 2016).

To evaluate measurement invariance in each model, we used a scaled chi-square difference test in which a more parsimonious model was tested against a less parsimonious model. A non-significant chi-square difference provides support for invariance (Kline, 2016). However, the chi-square difference test is sensitive to sample size; thus, even small changes in the chi-square can be statistically significant (Kline, 2016). Therefore, we also used two alternative approaches to measurement invariance testing: examining the change in CFI (Cheung & Rensvold, 2002) and calculating the bias-corrected bootstrapped confidence intervals (CIs) of the difference between groups on parameters of interest (Cheung & Lau, 2012). A change of CFI less than or equal to .01 (Cheung & Rensvold, 2002) and a CI containing zero for the between-groups difference on a particular unstandardized parameter suggest invariance (Cheung & Lau, 2012).

Because we also examined the potential interaction effect of scrupulosity with anxiety, depression, and stress, we constructed several latent variable interaction models. Our interactions were created using the latent moderated structural equations method suggested by Klein and Moosbrugger (2000). In these models, mental health variables were examined in prediction of dimensions of problematic pornography viewing at high (1 *SD* above the mean) and low (1 *SD* below the mean) levels of scrupulosity.

Results

Preliminary analyses

Of the 757 participants, few had missing responses (no more than four on any item). A small number of participants were identified as univariate outliers (< 2.8% on the PPUS scales). Some (< 4.1%) multivariate outliers were also identified by examining the Mahalanobis distances in the total

Table 2. Correlations, Means, and Standard Deviations.

Variable	1	2	3	4	5	6	7	8	9	Men		Women	
										<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
1. PPUS-FP	—	.51***	.48***	.43***	.24***	.25***	.25***	.39**	.23***	1.71	.99	1.27	.59
2. PPUS-EU	.52***	—	.72***	.59***	.16*	-.11*	.24***	.31*	.21**	2.01	1.16	1.41	.88
3. PPUS-CD	.49***	.66***	—	.58***	.13	.15*	.25***	.36***	.16*	1.28	1.36	1.27	.74
4. PPUS-ANE	.39***	.69***	.63***	—	.37**	.23***	.32***	.36***	.25***	2.37	1.43	1.59	1.16
5. DASS-D	.19***	.17***	.15**	.31***	—	.62***	.70***	.26***	-.15**	1.81	.76	1.74	.74
6. DASS-A	.14**	.21***	.19***	.24***	.64***	—	-.23***	.29***	.58***	1.63	.59	1.74	.62
7. DASS-S	.15**	.20***	.13**	.28***	.73***	.72**	—	.40***	.59***	1.88	.64	2.02	.65
8. PIOS	.20***	.28***	.25***	.26***	.29***	.31***	.35***	—	.29***	2.07	.85	1.98	1.00
9. BFI-N	.04	.11*	.08	.22***	.55***	.51***	.62***	.29***	—	2.82	.88	3.25	.85

Note: Men above the midline, women below. PPUS-FP = Problematic Pornography Use Scale - Functional Problems, PPUS-EU = Excessive Use, PPUS-CD = Control Difficulties, PPUS-ANE = Avoidance of Negative Emotions, Depression, Anxiety, and Stress Scale - D = Depression, DASS-A = Anxiety, DASS-S = Stress, PIOS = Penn Inventory of Scrupulosity, BFI-N = Big Five Inventory - Neuroticism.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

sample. Most of the predictor variables were distributed normally, with exception to depression (positively skewed). Additionally, each of the PPUS subscales showed a positive skew. Thus, we used a maximum likelihood estimator with robust standard errors in our primary analyses to fit the model, while taking into account potential normality violations. Table 2 displays the bivariate correlations, means, and standard deviations across men and women.

Primary analysis

After our preliminary analyses, we tested the specified SEM measurement and structural models. These analyses were conducted in Mplus version 8 (Muthén & Muthén, 2017). Item parcels were generated for the DASS-D, DASS-A, DASS-S, PIOS, and BFI-N scales. Our parceling procedure involved conducting an exploratory factor analysis for items in each scale fitted to a one-factor solution. Items were then assigned to three parcels in an iterative fashion to ensure that all loadings were balanced (Russell, Kahn, Spoth, & Altmaier, 1998). Since each of the PPUS subscales consists of three items, we used the individual items to form the PPUS subscale latent variables. All analyses (except bootstraps) used a maximum likelihood estimator with robust standard errors.

Measurement model

The measurement model provided a good fit for men, ($n = 250$) χ^2 (288) = 441.89, $p < .001$, CFI = .96, TLI = .95, RMSEA = .046 (90% CI = .037, .055), and SRMR = .046; and an acceptable fit for women, ($n = 507$) χ^2 (288) = 655.49, $p < .001$, CFI = .94, TLI = .93, RMSEA = .05 (90% CI =

.045, .055), and SRMR = .043. A configural invariance model, in which all paths were freely estimated between men and women, provided an acceptable fit overall, $\chi^2(576) = 1117.88$, $p < .001$, CFI = .95, TLI = .94, RMSEA = .05 (90% CI = .045, .054), and SRMR = .044. Thus, the measurement model appeared to be capturing the same general pattern of factor loadings between men and women.

We then tested a metric invariance measurement model by constraining the factor loadings to be equal across genders. The constrained model provided acceptable fit, $\chi^2(594) = 1166.50$, $p < .001$, CFI = .94, TLI = .93, RMSEA = .05 (90% CI = .046, .055), and SRMR = .051. The scaled chi-square difference test indicated that the metric invariance model was significantly worse than the configural model, $\chi^2(18) = 44.73$, $p < .001$; however, the change in CFI was within appropriate limits ($\Delta\text{CFI} = -.003$). Furthermore, bias-corrected bootstrap confidence intervals of the differences between factor loadings (Cheung & Lau, 2012) were all non-significant, with exception to the items on the excessive use scale. [Supplementary Table 1](#) displays the factor loadings in the measurement model.

Structural model

We then examined a structural model with paths specified between men and women. The configural invariance structural model provided acceptable fit, $\chi^2(612) = 1210.52$, $p < .001$, CFI = .94, TLI = .93, RMSEA = .051 (90% CI = .047, .055), and SRMR = .053. Bias-corrected bootstrap samples ($n = 1000$) were then used to estimate the confidence intervals of each path from depression, anxiety, stress, and scrupulosity to the problematic pornography viewing variables. [Table 3](#) displays the unstandardized and standardized coefficients for each path and the 95% confidence intervals. Results indicated several significant paths for both men and women. Specifically, scrupulosity significantly predicted functional problems, excessive use, control difficulties, and avoidance of negative emotions, while depression significantly predicted avoidance of negative emotions in the sample of men. For women, nearly the same relationships were found across scales, with scrupulosity predicting functional problems, excessive use, control difficulties, and avoidance of negative emotions, and depression significantly predicting functional problems and avoidance of negative emotions. All other relationships between mental health constructs and problematic pornography viewing dimensions were non-significant (see [Table 3](#) for specific coefficients).

Moderation analyses

To examine the potential moderation effect of gender in the structural model, we constrained the direct effects between each latent variable to be

Table 3. Standardized and Unstandardized Structural Model Results.

Gender	Predictor Variables →	Criterion Variables	Direct Effect <i>B</i>	<i>SE</i>	Standardized Direct Effect β	95% CI
Men	Scrupulosity →	FP	.53	.14	.46***	(.244, .792)
Women	Scrupulosity →	FP	.13	.05	.21*	(.042, .251)
Men	Scrupulosity →	EU	.42	.14	.30**	(.133, .549)
Women	Scrupulosity →	EU	.28	.07	.26***	(.147, .447)
Men	Scrupulosity →	CD	.48	.14	.32**	(.198, .744)
Women	Scrupulosity →	CD	.22	.06	.26***	(.100, .341)
Men	Scrupulosity →	ANE	.50	.15	.31**	(.226, .811)
Women	Scrupulosity →	ANE	.25	.09	.19**	(.092, .432)
Men	Depression →	FP	.16	.15	.12	(-.082, .478)
Women	Depression →	FP	.16*	.08	.23*	(.022, .386)
Men	Depression →	EU	-.11	.21	-.07	(-.435, .225)
Women	Depression →	EU	.04	.16	.03	(-.305, .383)
Men	Depression →	CD	-.22	.21	-.12	(-.645, .239)
Women	Depression →	CD	.18	.14	.18	(-.074, .488)
Men	Depression →	ANE	.69	.24	.36**	(.188, 1.159)
Women	Depression →	ANE	.52	.20	.33*	(.147, .927)
Men	Anxiety →	FP	.15	.42	.07	(-.466, .961)
Women	Anxiety →	FP	-.03	.18	-.03	(-.501, .301)
Men	Anxiety →	EU	-.02	.45	-.01	(-.601, .690)
Women	Anxiety →	EU	.20	.34	.11	(-.557, .958)
Men	Anxiety →	CD	-.28	.45	-.10	(-1.136, .615)
Women	Anxiety →	CD	.46	.34	.34	(-.183, 1.128)
Men	Anxiety →	ANE	-.67	.54	-.23	(-1.719, .187)
Women	Anxiety →	ANE	.15	.43	.07	(-.679, .999)
Men	Stress →	FP	-.15	.32	-.09	(-.848, .307)
Women	Stress →	FP	.15	.23	.18	(-.303, .731)
Men	Stress →	EU	.28	.31	.15	(-.317, .678)
Women	Stress →	EU	.12	.44	.08	(-.725, 1.153)
Men	Stress →	CD	.66	.37	.33	(-.032, 1.454)
Women	Stress →	CD	-.40	.41	-.36	(-1.323, .287)
Men	Stress →	ANE	.38	.41	.17	(-.386, 1.219)
Women	Stress →	ANE	-.22	.54	-.12	(-1.300, .788)

FP = Functional Problems, EU = Excessive Use, CD = Control Difficulties, ANE = Avoidance of Negative Emotions. Contact first author for non-significant neuroticism path coefficients.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

equal across groups (i.e., direct effects invariance). The scaled chi-square difference test indicated that the direct effect invariance model was a significantly worse fit compared to a model in which direct effects were freely estimated, $\chi^2(18) = 41.46$, $p < .001$, though the CFI did not change. The bootstrap procedure only suggested significant differences on the relationship between scrupulosity and functional problems, with the relationship being significantly stronger for men than women. For men, the structural model accounted for 27% of the variance for functional problems, 15% of the variance for excessive use, 16% of the variance for control difficulties, and 25% of the variance for avoidance of negative emotions. For women, the structural model accounted for 13% of the variance for functional problems, 12% of the variance for excessive use, 12% of the variance for control difficulties, and 15% of the variance for avoidance of negative emotions.

Table 4. Latent Variable Interactions Reaching or Approaching Significance at $p < 0.05$.

Gender	Interaction →	Criterion Variables	Direct Effect <i>B</i>	<i>SE</i>	Standardized Direct Effect β	<i>p</i> Value
Men	SCRUPXDEP →	EU	-.27	.11	-.17*	$p = .018$
Men	SCRUPXDEP →	CD	-.32	.16	-.14*	$p = .040$
Men	SCRUPXDEP →	ANE	-.44	.19	-.19*	$p = .021$
Men	SCRUPXANX →	CD	-.41	.21	-.13	$p = .051$
Men	SCRUPXSTRESS →	EU	-.33	.11	-.12**	$p = .003$
Men	SCRUPXSTRESS →	CD	-.35	.17	-.18*	$p = .035$
Men	SCRUPXSTRESS →	ANE	-.48	.19	-.18**	$p = .010$
Women	SCRUPXANX →	EU	.36	.18	.16*	$p = .041$

Note: FP = Functional Problems, EU = Excessive Use, CD = Control Difficulties, ANE = Avoidance of Negative Emotions, SCRUPXDEP = Scrupulosity X Depression Interaction, SCRUPXANX = Scrupulosity X Anxiety Interaction, SCRUPXSTRESS = Scrupulosity X Stress Interaction. Contact first author for other non-significant interaction coefficients.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Interaction analyses

We then examined interactions between scrupulosity and depression, anxiety, and stress for each dimension of problematic pornography viewing (see Table 4 for all significant interactions, with a value approaching significance at $p < 0.05$ ($p = 0.051$) also included). We chose to examine gender samples separately since Mplus is currently unable to consider categorical grouping variables within latent variable interaction models. For men, a significant interaction occurred between depression and scrupulosity on excessive use, control difficulties, and avoidance of negative emotions. Figure 2 demonstrates these relationships. For men, anxiety also interacted with scrupulosity to statistically predict control difficulties (see Figure 2). Interactions also occurred between stress and problematic pornography viewing across excessive use, control difficulties, and avoidance of negative emotions (see Table 4 and Figure 3). In each case, low levels of scrupulosity buffered the relationship between mental health problems and problematic pornography use; however, the buffering effect is non-significant for those high in scrupulosity, and becomes somewhat exacerbating for those struggling with depression who are also high in scrupulosity (see Figure 2). Unlike men, no interactions occurred between depression or stress with scrupulosity across any of the dimensions of problematic pornography use in the sample of women. However, anxiety and scrupulosity interacted with an exacerbation effect on excessive use in women (see Figure 3). For men, the depression X scrupulosity interaction model increased variance accounted for to 31% for functional problems, 22% for excessive use, 22% of the variance for control difficulties, and 32% of the variance for avoidance of negative emotions. The anxiety X scrupulosity interaction model increased variance accounted for to 31% for functional problems, 20% for excessive use, 22% for control difficulties, and 31% for avoidance of negative emotions. The stress X scrupulosity interaction model increased

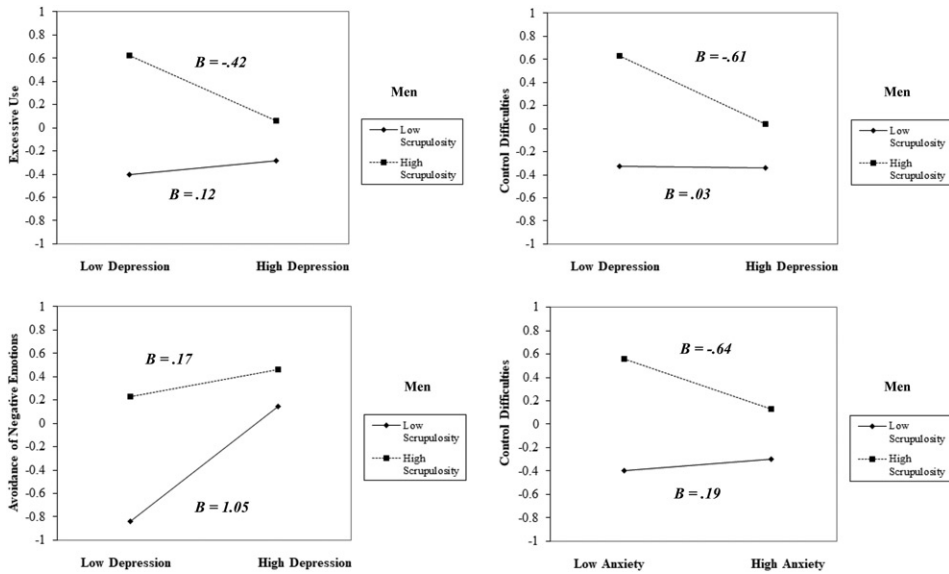


Figure 2. Unstandardized simple slope coefficients are given for high (1 SD above) and low (1 SD below) levels of scrupulosity.

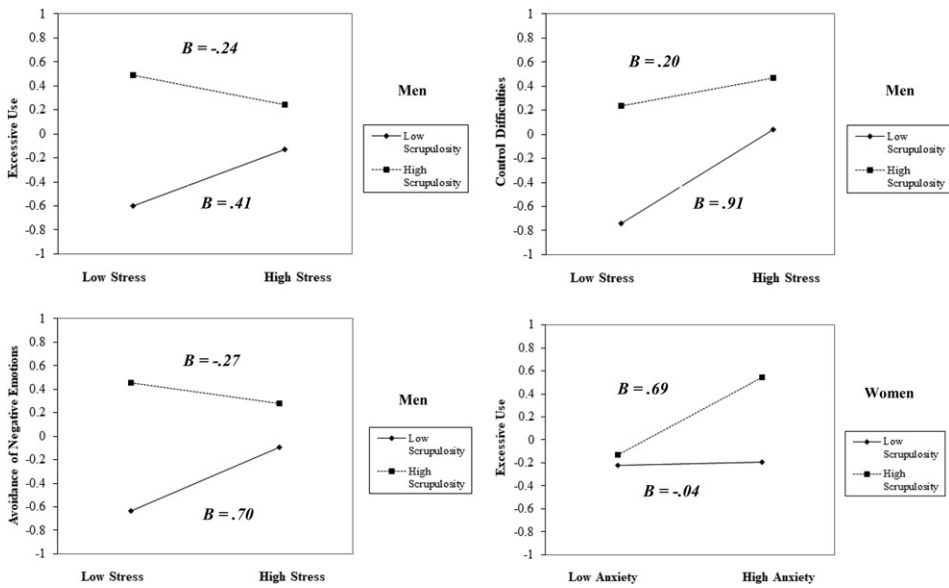


Figure 3. Unstandardized simple slope coefficients are given for high (1 SD above) and low (1 SD below) levels of scrupulosity.

variance accounted for to 33% for functional problems, 23% for excessive use, 21% for control difficulties, and 34% for avoidance of negative emotions. For women, the depression X scrupulosity and anxiety X scrupulosity interaction models did not account for any additional variance. The stress X scrupulosity interaction model increased variance accounted for to 14%

for functional problems but did not account for additional variance across the other problematic pornography viewing dimensions.

Discussion

This study advanced prior work by examining how scrupulosity and gender moderate the relationships across a range of mental health concerns (depression, anxiety, and stress) and multiple dimensions of problematic pornography viewing (functional problems, excessive use, control difficulties, and avoidance of negative emotions). Broadly, results were consistent with our hypotheses, with a few notable exceptions. Consistent fully with our first hypothesis, scrupulosity emerged as a strong significant positive statistical predictor across all measures of problematic pornography viewing in both men and women. These results are consistent with Borgogna and McDermott (2018), and further suggest scrupulosity as a construct within the broader domain of religiosity, that may be relevant to the construct, impact and potential treatment of problematic pornography use.

Partially consistent with our second hypothesis, depression was a strong significant positive statistical predictor of pornography use to avoid negative emotions across men and women. This is logical, as those using pornography in a dysfunctional manner to escape unpleasant emotions must first be experiencing unpleasant emotions. Furthermore, depression was a significant moderate positive statistical predictor of functional problems only in the sample of women. This could be indicative of the relationship problems some women experience as the result of pornography use with a partner. Recent findings have indicated that women who hold traditionally masculine conceptualizations of what men should be may be more likely to experience functional problems associated with their pornography use (Borgogna, McDermott, Browning, Beach, & Aita, 2018). However, these results could also be related to findings that indicate viewing pornography in relationships is associated with more positive outcomes for men than for women (Poulsen et al., 2013). This would be especially relevant for scrupulous women who may be opposed to pornography use but view it at their partner's behest. Future qualitative studies examining the context in which functional problems develop for both men and women and how they are associated with depression and scrupulosity would be beneficial for understanding these findings further. Interestingly, stress, anxiety, and neuroticism were not significant statistical predictors of any dimensions of problematic pornography viewing across men or women within the full model, despite being significantly related to many of the variables at the bivariate level.

Inconsistent with our third hypothesis, the gender moderation analyses (via direct effects invariance) were broadly non-significant with one exception: the relationship between scrupulosity and functional problems was moderated by gender, with men reporting a significantly stronger relationship. This is consistent with literature indicating that men may be more at-risk than women for having pornography affect their relationships in a negative way (e.g., Willoughby, Carroll, Busby, & Brown, 2016; Wright, Bridges, et al., 2018; Zitzman & Butler, 2009), have pornography jeopardize their employment (Kor et al., 2014; Maltz & Maltz, 2009), or jeopardize their respect (such as work examining the role of pornography use among clergy; Ahmad et al., 2015; Ferree, 2002). More importantly, these findings suggest a stronger need to examine gender-related differences across mental health issues and problematic pornography viewing in future studies, especially as many of the studies suggesting a relationship between mental health issues and pornography viewing have used male-exclusive samples (see Egan & Parmar, 2013; Kraus et al., 2015; Levin et al., 2012; Nelson et al., 2010; Twohig et al., 2009 for examples).

The interaction analyses were partially consistent with our fourth hypothesis. For men, high scrupulosity was related to more problematic pornography viewing compared to low scrupulosity across depression, anxiety, and stress. However, only in a few cases was there an exacerbation effect in the sample of men. Rather, low scrupulosity acted as a buffer across most of the interactions in the sample. Additionally, for most of the significant interactions, high levels of mental health concerns lowered problematic pornography viewing in highly scrupulous men (see Figures 2 and 3), while increasing problematic pornography viewing for those low in scrupulosity.

The interaction analyses were largely non-significant across the sample of women. However, consistent with our fourth hypothesis, a single interaction occurred with anxiety and scrupulosity exacerbating problems related to perceptions of excessive pornography use. Interestingly, anxiety was non-significant in the direct effects model for women, suggesting scrupulosity as a key contributor to the excessive use problems. This is the first study to identify such a nuanced finding and suggests that women who are highly anxious and scrupulous may perceive their pornography use as excessive. Despite neuroticism being controlled, this may indicate additional personality dimensions worth examining in future studies. For instance, scrupulosity has been shown to partially mediate the relationship between perfectionism and mental health concerns (Allen & Wang, 2014). Thus, researchers may want to consider perfectionism as a variable in future examinations, given that excessive use problems may be based on subjective perceptions that behaviors are excessive or interfering (see

discussions on perceived addiction; e.g., Brand et al., 2018 and Grubbs, Stauner, et al., 2015).

Limitations

While this study contributes novel findings, it is not without limitations. Namely, the cross-sectional nature of the data precludes causal inferences. Furthermore, we only explored general mental health problems. Past research has implicated severe mental health issues, such as bipolar disorder, as being associated with problematic internet use (Wölfling, Beutel, Dreier, & Müller, 2015). Thus, a potential area of further research would be examining how problematic pornography use relates to other (and possibly more severe) psychopathologies. The self-report nature of this study places the data at risk of participant biases. The study also used a relatively liberal threshold for setting statistical significance, as multiple comparisons were not controlled. The generalizability of these results is also limited to a primarily white population from the United States. While the majority of the extant research has been conducted on American and European samples, recent data have indicated that black Americans may view more pornography than white Americans, with religiosity only moderating the relationship for white Americans (Perry & Schleifer, 2019). Thus, further research across different ethnic and cultural groups appears to be an important area of study.

The interaction between scrupulosity and anxiety on control difficulties in men should also be examined carefully in future studies. The standard error of .21 is slightly larger than half the unstandardized coefficient of -.41. Indeed, the *p*-value of .051 is technically outside of the domain for assigning statistical significance by traditional methods. Thus, we emphasize a need for replication of this interaction, as well as our findings more broadly.

Additionally, future studies should consider examining these variables with alternative measures of problematic pornography use. Specifically, the problematic pornography consumption scale (PPCS; Bóthe et al., 2018) has recently been published which contains additional measurements for tolerance and withdrawal factors. This scale was not available when the current study began data collection, but has strong theoretical and psychometric support. Additional nuanced measures such as compulsive pornography consumption scale (CPC; Noor, Rosser, & Erickson, 2014) and the cyber pornography use inventory (CPUI; Grubbs, Sessoms, Wheeler, & Volk, 2010) may also provide nuanced information about relationship between problematic pornography use, scrupulosity, and mental health problems, and should thus be considered in future studies.

Implications

The results provide considerable implications for researchers and clinicians. For researchers, these findings highlight the importance of considering multiple potentially related constructs when examining variables related to problematic pornography use. For instance, several researchers report significant bivariate relationships between problematic pornography viewing and anxiety (e.g., Kor et al., 2014). However, in the current study, this relationship disappears when accounting for the role of depression, stress, neuroticism, and scrupulosity in a structural model. Interestingly, anxiety then reemerges as a significant statistical predictor but only in interaction with scrupulosity for control difficulties in men and excessive use problems in women. Similarly, unlike Egan and Parmar (2013), neuroticism was not related to any dimensions of problematic pornography use in our analyses for men or women when controlling for the additional roles of mental health and scrupulosity, despite being significantly related at the bivariate level. Thus, continued nuanced approaches utilizing sophisticated analyses while controlling for multiple co-varying factors across studies of problematic pornography use are recommended.

For clinicians, these findings contribute to a growing literature (e.g., Bradley et al., 2016; Grubbs, Stauner, et al., 2015; Grubbs et al., 2018; Perry, 2017; Wilt et al., 2016) implicating religiosity, and particularly scrupulosity (Borgogna & McDermott, 2018; Grubbs et al., 2018; Short et al., 2015), as a variable relevant to the problematic pornography use. Multiple nationwide analyses have indicated that internet searches for pornographic material are highest in regions of the United States that are more religious and traditionally conservative (Edelman, 2009; Macinnis & Hodson, 2015; Whitehead & Perry, 2018). Thus, exploring religious factors in the context of treatment of problematic pornography use should be considered an integral part of assessment and conceptualization (Kraus and Sweeney, 2018). Clinicians may consider investigating dysfunctional methods clients may have used to control their pornography viewing. For instance, Borgogna and McDermott (2018) suggest avoidant-based mechanisms, such as thought suppression techniques (as examined in scrupulous populations), may serve to increase pornography-related thoughts. Therefore, approaches that emphasize mindful awareness techniques – paired with values-based behavioral goals – may provide more meaningful results (Crosby & Twohig, 2016; Twohig & Crosby, 2010).

Clinicians should also assess what particularly about the client's pornography use is problematic. Measures such as the PPUS (Kor et al., 2014), PPCS (Bóthe, Tóth-Király, Zsila, et al., 2018), CPUI (Grubbs et al., 2010); and CPC (Noor et al., 2014) can be helpful in this process. Importantly, many individuals in treatment may refer to their pornography use as

“addictive;” however, clinicians should not assume and/or treat the use as a traditional addiction without proper assessment. Indeed, there is a considerable debate as to whether problematic pornography viewing should be conceptualized as an addiction (Bóthe, Tóth-Király, Potenza, et al., 2018; Kowalewska et al., 2018; Ley, Prause, & Finn, 2014; Stark, Klucken, Potenza, Brand, & Strahler, 2018; Potenza et al., 2017; Prause et al., 2017). Moreover, formal categorization of compulsive/addictive pornography use is not included in the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013).

Grubbs and colleagues (2015; 2018) have reported that religious individuals may perceive their viewing as addictive, and may describe their problems using such terminology, even if their behavior may not follow an addictive pattern (i.e., with features such as withdrawal and tolerance). Thus, some individuals in treatment may not be viewing pornography very frequently, yet may find it highly distressing when it occurs. Moreover, exploring values and perceptions on a case-by-case basis may be beneficial in establishing achievable goals for therapeutic work. Clinical trials investigating the treatment of problematic pornography viewing (Crosby & Twohig, 2016; Twohig & Crosby, 2010) are consistent with these recommendations, and may be used as additional sources for recommendations and guides for therapists.

Conclusion

In conclusion, problematic pornography viewing is likely going to continue being a clinical concern (Brand et al., 2018; Cooper, Delmonico, & Burg, 2000; Grubbs & Perry, 2018; Sniewski et al., 2018). Our findings extend prior research implicating scrupulosity as a primary factor relevant to problematic pornography use (Borgogna & McDermott, 2018). We extended prior work by examining the potential contributions of scrupulosity, anxiety, depression, and stress, while also controlling for neuroticism, as predictors of functional problems related to pornography viewing, perceived excessive pornography use and control difficulties, as well as the use of pornography to avoid uncomfortable emotions. Scrupulosity was the strongest factor in relation to all dimensions of problematic pornography use across genders. Multiple interactions were noted in the sample of men with a single interaction in the sample of women between scrupulosity and mental health constructs (see figures 2 and 3). Low scrupulosity broadly buffered the relationship between mental health issues and problematic pornography viewing in men, though high scrupulosity exacerbated excessive use problems in anxious women. Our models broadly accounted for a moderate portion of the variance across all problematic pornography

viewing dimensions for both men and women. We recommend examining scrupulosity as a potentially relevant factor in clinical interventions designed to reduce problems associated with pornography use. Given the novelty of our findings, as well as the high degree of nuance, we additionally recommend continued research across these variables, with an emphasis on replication.

The authors declare that they have no conflicts of interest. The data used for this study has not been presented elsewhere.

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