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The development of the Problematic Series Watching Scale (PSWS)

GÁBOR OROSZ[1,2]*, BEÁTA BŐTHE[1] and ISTVÁN TÓTH-KIRÁLY[1]

[1]Institute of Psychology, Eötvös Loránd University, Budapest, Hungary
[2]Institute of Cognitive Neuroscience and Psychology, MTA Research Centre for Natural Sciences, Budapest, Hungary

Background and aims: The goal of the present study was to create a short Problematic Series Watching Scale (PSWS). *Methods:* On the basis of the six components model of Griffiths (2005), six items were identified covering all components of problematic series watching. Confirmatory factor analyses were carried out on two independent samples (N_1 = 366, N_2 = 752). *Results:* The PSWS has appropriate factor structure and reliability. The amount of free time was not, but the series watching time was associated with PSWS scores. Women had higher scores than men. *Discussion:* Before PSWS, no prior scale has been created to measure problematic series watching. Further research is needed to properly assess its validity and reliability; and for examining whether extensive series watching can lead to health-related and psychosocial problems. *Conclusions:* In the increasingly digitalized world there are many motivational forces which encourage people watching online series. In the light of these changes, research on problematic series watching will be progressively relevant.

Keywords: series watching, Problematic Series Watching Scale, PSWS, CFA, six components model

INTRODUCTION

Since the end of the 1990s problematic Internet use has been a controversial topic: some researchers and clinicians (e.g. Ko, Yen, Chen, Chen, & Yen, 2005 or Young, 1998) have claimed that problematic Internet use deserves a classification as a psychiatric disorder in its own right, while others (e.g. Griffiths, 1999, 2000 or Yellowlees & Marks, 2007) have claimed that people who spend excessive time on the Internet are not really addicted to it, but rather to the specific activities they can pursue through this medium. Recently, several screen-related online activities were identified as problematic online behaviors such as Facebook use (Andreassen, Torsheim, Brunborg, & Pallesen, 2012; Ryan, Chester, Reece, & Xenos, 2014), online gambling (Chóliz, 2015; Griffiths & Barnes, 2008), online gaming (Demetrovics et al., 2012; Grüsser, Thaleman, & Griffiths, 2006), or online pornography use (Grubbs, Sessoms, Wheeler, & Volk, 2010; Kor et al., 2014).

According to the research of Pontes, Szabó, and Griffiths (2015), when participants had to indicate their three most preferred online activities, watching videos and movies was mentioned by one-third of the respondents besides accessing general information and news, social networking, e-mailing and online chatting, and gaming or gambling. Although more than one-third of the examined population mentioned watching online content as their preferred non-work online activity, to our best knowledge no prior scientific study examined problematic series watching.

It might be a relevant issue for many people because accessing series by downloading or streaming is (a) very cheap (or free), (b) it is available for almost everyone who has broadband Internet access, (c) it does not depend on a certain place and time (i.e. playing squash depends on a certain place and time), (d) series have a high variety – everyone can find one which fits his/her interest, (e) they are not age- and socio-economic status-dependent, (f) it does not take effort to watch them, (g) and they are constructed to be highly enjoyable and often contain cliffhangers which motivate the viewer to continue. These characteristics are highly similar to the ones mentioned by Cooper (1998) regarding Internet and pornography. Based on these reasons and Pontes et al.'s (2015) findings, we assume that problematic series watching deserves scientific investigation.

Sussman and Moran's (2013) review on television addiction did not differentiate between the types of content that can be seen on television, they define television addiction as a subjective craving for watching anything on television including both classical and online content. In our research, we aimed to differentiate problematic series watching from the concept of television addiction as we focused on the content of the problematic use (series watching) rather than on the medium through which the problematic use happens (television). In our research, we observed problematic series watching which could be done either through a television (i.e. classical TV series) or a screen attached to a computer (i.e. Netflix). The device itself is just a medium through which the user can reach the content with the latter being in our main focus.

According to a recent study from a leading Internet television company with over 40 million members, 76% of series viewers mentioned that watching several episodes of a TV show is a favored escape from their busy lives and

* Corresponding author: Dr. Gábor Orosz; Institute of Psychology, Eötvös Loránd University, Izabella utca 46, H-1064 Budapest, Hungary; Phone: +36-70-237-9471; E-mail: orosz.gabor@ttk.mta.hu

73% of their respondents have positive feelings towards binge streaming TV (Netflix Media Center, 2013). In the literature of problematic behaviors, escapism and mood modification are good candidates in predicting a problematic activity. We assumed that if three quarters of the series streamers watch several episodes in succession for escaping from the problems of the everyday life, then it is possible to assume that problematic series watching can appear among them.

On the basis of Griffiths' components model (2005), we can distinguish six core elements of problematic series watching: (a) salience (series watching dominates thinking and behavior); (b) mood modification (series watching modifies/improves mood); (c) tolerance (increasing amounts of series watching are required to achieve initial effects); (d) withdrawal (occurrence of unpleasant feelings when series watching is discontinued); (e) conflict (series watching compromises social relationships and other activities); and (f) relapse (tendency for reversion to earlier patterns of series watching after abstinence or control).

In the present study our goal was to measure problematic series watching. Therefore, we created a scale with appropriate factor structure and reliability which is based on the six-component model of Griffiths (2005).

METHODS

Participants and procedure

The research was conducted with an online questionnaire system, the filling out lasted approximately six minutes. The data collection occurred in two waves: the first one in April 2014 (Sample 1), the second one in April–May 2015 (Sample 2). In both cases, participants were informed about the goal and the content of the study, also, the anonymity and the confidentiality of their answers were ensured. They were asked to check a box if they agreed to continue and participate. The first part of the questionnaire contained questions regarding demographic data, such as gender, age and level of education. Participants were also asked to estimate the amount of free time they have on an average weekday and weekend. In the subsequent part, the items of the problematic series watching were presented.

Sample 1 consisted of 366 Hungarian respondents (Female = 258; 70.5%) who were aged between 18 and 82 (M_{age} = 22.83, SD_{age} = 6.23). 250 of them (68.3%) lived in the capital, 35 (9.6%) in county towns, 58 (15.8%) in towns, and 23 (6.3%) in villages. Concerning their level of education, 14 (3.8%) had a primary school degree, 270 (73.8%) had a high school degree, 82 (22.4%) of them had a degree in higher education (bachelor, masters, or doctoral). On an average weekday they had 4.12 hours of free time (SD = 3.11 hours) and watched series for 62.39 minutes (SD = 60.77). On an average weekend they had 8.38 hours of free time (SD = 5.24) and watched series for 88.81 minutes (SD = 88.13). No outliers were detected using the Mahalanobis distance test, thus all 366 cases were retained in this sample.

Sample 2 consisted of 754 Hungarian persons (Female = 550; 72.9%). They were aged between 18 and 67 years (M_{age} = 27.25, SD_{age} = 8.70). 315 (41.8%) lived in the capital, 151 (20.0%) in county towns, 199 (26.4%) in towns and 89 (11.8%) of them lived in villages. 48 (6.4%) people from this sample had an elementary degree, 420 (55.7%) had a high school degree, 286 (37.9%) had a degree in higher education. Regarding their free time, on an average weekday they had 4.82 hours of free time (SD = 3). On an average weekend they had 9.10 hours of free time (SD = 4.44). In this case we did not measure the time they spent on series watching. After examining the data with the Mahalanobis distance test, two outliers were found in this sample. These cases were removed from further analyses, resulting in a final number of 752 valid cases.

Measures

To our best knowledge, currently there is no measurement that can assess problematic series watching. For this purpose, on the basis of the Bergen Work Addiction Scale (BWAS – Andreassen, Griffiths, Hetland, & Pallesen, 2012), we created a new scale – Problematic Series Watching Scale (PSWS) – to measure the six core elements of problematic series watching in terms of (a) salience, (b) tolerance, (c) mood modification, (d) relapse, (e) withdrawal, and (f) conflict. We chose this measure as a basis because it grasps each possible element of problematic behaviors and the basis of this questionnaire is widely used to measure other online and offline problematic behaviors. Besides Work Addiction, Andreassen, Torsheim et al. (2012) used this set of items to measure Facebook addiction and also shopping addiction (Andreassen et al., 2015). We chose to use the label of "Problematic Series Watching" instead of "Series Watching Addiction" because we have no solid evidence regarding health-related negative consequences of this behavior and this might be a too specific and peripheral behavior to call it addiction (Billieux, Schimmenti, Khazaal, Maurage, & Heeren, 2015).

The BWAS contains seven items; however, we wanted to have a larger initial item pool to ensure a better content validity regarding the framework of problematic behavior. Moreover, the original scale contains an additional dimension (health problems), but our aim was to create a measure using the above-mentioned six dimensions. Therefore, those 12 items have been chosen that were the initial items of Andreassen, Griffiths et al. (2012) and belonged to one of the six core components. First, all 12 items were translated following the protocol of Beaton, Bombardier, Guillemin, and Ferraz (2000). Then, the items were modified to reflect the individual's series watching habits by replacing the subject "work" in each item with the word "series watching". Grammatical errors were also corrected. Respondents had to answer using a 5-point scale (1 = Never; 2 = Rarely; 3 = Sometimes; 4 = Often; 5 = Always).

Statistical analysis

Preliminary statistical analysis comprised of the descriptive analysis in SPSS 22 such as means, standard deviations, frequencies, and skewness-kurtosis values. Later, estimation of Cronbach's alpha values, correlations, *t*-tests and

ANOVAs were performed with this software as well. All cases had complete data in both samples.[1]

Participants were asked to estimate the amount of free time they have on an average weekday and weekend. According to the survey of the Hungarian Central Statistical Office (2011), on an average day, a Hungarian individual (aged between 15 and 74) spends 712 minutes with satisfying his/her physiological needs (i.e. sleeping, eating, hygiene) and the remaining 728 minutes is for other activities. Based on these results, we set a threshold for the amount of possible maximum free time one individual can have in our sample in order to minimize bias. Reported amount of free time more than 728 minutes were recoded as missing data, however, these cases were not completely deleted. To have a single indicator of free time for an average day of the week, the reported values were weighted by the following formula: (weekday time*5 + weekend time*2)/7. After recoding the high values, 344 cases were retained where a realistic amount of time was indicated, whereas 22 cases were considered as missing for this variable.

Prior to the confirmatory factor analyses (CFA), the data was investigated for normality. Regarding univariate normality, the simulation study of Curran, West, and Finch (1996) concluded that problems can arise from having a skewness value above 2.0 and a kurtosis value above 7.0. Also, multivariate normality was examined in Mplus 7.3 (Muthén & Muthén, 1998–2012) using two-sided test of fit for skewness and kurtosis (Wang & Wang, 2012). As these tests were statistically significant in both Sample 1 and Sample 2, the assumption of multivariate normality was violated.

In order to investigate the factor structure of this new measurement, a series of CFAs were conducted using Mplus 7.3. Since the data did not have multivariate normal distribution, the robust maximum-likelihood estimator (MLR) was used instead of maximum-likelihood (ML). Multiple goodness of fit indices were taken into consideration based on the recommendations of Brown (2015): the comparative fit index (CFI), the Tucker–Lewis index (TLI), the root mean square error of approximation (RMSEA) and its 90% confidence interval, and test of close fit (CFit), the standardized root mean square residuals (SRMR). Guided by suggestions of several methodologists (Bentler, 1990; Brown, 2015; Browne & Cudeck, 1993; Hu & Bentler, 1999; Schermelleh-Engel, Moosbrugger, & Müller, 2003), good or acceptable model fit was defined by the following criteria: CFI (≥ .95 for good, ≥ .90 for acceptable), TLI (≥ .95 for good, ≥ .90 for acceptable), RMSEA (≤ .06 for good, ≤ .08 for acceptable), CFit (≥ .10 for good, ≥ .05 for acceptable), and SRMR (≤ .05 for good, ≤ .10 for acceptable).

Moreover, to test whether the amount of free time could have an effect on PSWS scores, a multiple indicators multiple causes (MIMIC) analysis (Brown, 2015) was carried out. The MIMIC model consists of a measurement model (previously established in the CFA) and a structural model

which makes it possible to estimate the effect of indicators (spare time) on the latent variable (PSWS) while controlling for other variables.

Finally, regarding reliability, internal consistency was measured by Cronbach's alpha taking Nunnally's (1978) suggestions into consideration regarding the acceptability of the value (.70 is acceptable, .80 is good). However, as Cronbach's alpha value could have biases which could inflate or deflate the reliability (see Osburn, 2000 or Sijtsma, 2009), two additional values were calculated: factor determinacy and composite reliability. Factor determinacy refers to the correlation between the estimated and the true factor scores and it describes how well the factor is described by the indicators. It ranges from zero to one with higher scores indicating higher levels of reliability (Muthén & Muthén, 1998–2012). Composite reliability can also be considered when assessing a model. Values above .70 should be considered acceptable (Nunnally & Bernstein, 1994). Additionally, inter-item correlations were also observed with values between .15 and .50 considered acceptable (Clark & Watson, 1995).

Ethics

In case of both Sample 1 and Sample 2, the studies were conducted in accordance with the Declaration of Helsinki and were approved by the Institutional Review Board of Eötvös Loránd University, Budapest, Hungary. All subjects were informed about the studies they participated in and all provided informed consent.

RESULTS

Since we had two independent datasets, the analyses were carried out as it follows: Sample 1 was used for the investigation of the factor structure and for the MIMIC analysis, whereas Sample 2 was used for cross-validation and for examining differences across gender, age, educational level, and place of residence. Several solutions were observed: (1) a 12-item unidimensional solution, (2) a 6-item unidimensional solution based on the BWAS, (3) a 6-item unidimensional solution which retained one item per factor based on modification indices as suggested by Brown (2015). In a second step, using the more diverse Sample 2 for cross-validating this factor structure, we carried out the analysis with the 6-item version which was based on modification indices.

Structural analysis

For the initial 12 items of the PSWS, skewness values ranged from −.24 to 1.94, and kurtosis values ranged from −1.11 to 2.60 which were within the acceptability range proposed by Curran et al. (1996). Next, a series of confirmatory factor analyses were conducted on Sample 1 in order to test alternative models. The comparison of the examined models can be seen in Table 1. The results showed that the unidimensional 6-item model showed acceptable model fit in the case of both Sample 1 (CFI = .98, TLI = .97, RMSEA = .04 [90% CI .00–.08], CFit = .64, SRMR = .03) and Sample 2 (CFI = .96, TLI = .93, RMSEA = .07 [90% CI .05–.09], CFit = .06, SRMR = .03).

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[1]The questions within the utilized questionnaire system were set as "required" in order to minimize the amount of missing data. If participants did not finish the filling out and clicked on the "submit" button, then their responses were not received, thus they were not part of the sample.

Table 1. Confirmatory factor analyses results of the Problematic Series Watching Scale (PSWS)

		CFI	TLI	RMSEA [90% CI]	CFit	SRMR
Sample 1	12-item unidimensional model (all initial items are included)	.65	.58	.15 [.14–.16]	.00	.09
	6-item unidimensional model of the BWAS (items 2, 3, 6, 7, 10, 11)	.94	.89	.07 [.04–.10]	.13	.04
	6-item unidimensional model of the PSWS (items 2, 3, 6, 7, 9, 12)	.98	.97	.04 [.00–.08]	.64	.03
Sample 2	6-item unidimensional model of the PSWS (items 2, 3, 6, 7, 9, 12)	.96	.93	.07 [.05–.09]	.06	.03

Notes: CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation; CFit = RMSEA's test of close fit; SRMR = standardized root mean square residuals.

Table 2. Standardized factor loadings, reliability indices and descriptive statistics of the Problematic Series Watching Scale (PSWS) with two independent samples

		Sample 1 ($N = 366$)	Sample 2 ($N = 752$)
Standardized factor loadings	Salience 1	.54	.54
	Tolerance 2	.42	.60
	Mood modification 3	.41	.52
	Relapse 4	.62	.59
	Withdrawal 5	.62	.67
	Conflict 6	.69	.68
Reliability indices	Cronbach's alpha	.69	.76
	Factor determinacy	.85	.88
	Composite reliability	.73	.77
	Mean inter-item correlations	.29	.36
Descriptive statistics	Mean *(SD)*	13.85 (4.67)	12.62 (4.41)
	Skewness *(SD)*	.62 (.13)	.85 (.09)
	Kurtosis *(SD)*	−.24 (.25)	.67 (.18)

Standardized factor loadings, reliability indices (Cronbach's alpha, factor determinacy, composite reliability, and inter-item correlations) and descriptive statistics regarding both Sample 1 and 2 can be seen in Table 2. Factor loadings were acceptable (ranging from .43 to .62 in Sample 1 and from .52 to .68 in Sample 2). Although the Cronbach's alpha value was borderline in the case of Sample 1 ($\alpha = .69$), other reliability indices had adequate values and inter-item correlations were also within the acceptable range for both samples. These results indicate that the PSWS has good factor structure and acceptable reliability. For the final Hungarian and English versions, see Appendix.

MIMIC model analysis

In order to investigate the effect of the amount of free time on problematic series watching scores, a MIMIC analysis was applied. The model fit indices showed that the model remained acceptable (CFI = .99, TLI = .99, RMSEA = .02 [90% CI .00–.06], CFit = .91, SRMR = .03). Daily average spare time was not significantly ($\beta = .01$, $p = .93$) associated with the PSWS latent variable.

Gender, age, educational level and place of residence differences

PSWS scores moderately correlated with series watching time [$r(364) = .27$, $p < .001$]. For further measuring demographic differences, we used the larger and more diverse sample (Sample 2) of 752 cases. Women ($M_{female} = 12.91$, $SD_{female} = 4.50$) had higher scores [$t(750) = −2.90$, $p < .01$] than men ($M_{male} = 11.86$, $SD_{male} = 4.08$). Relatively weak negative correlations were found between age and PSWS [$r(750) = −.21$, $p = .001$]. Using one-way ANOVA (with Bonferroni-corrected post-hoc test), educational level-related differences were measured between the three groups [$F(2, 749) = 6.44$, $p < .01$]. Those who have higher education degree ($M = 11.97$, $SD = 4.19$) scored significantly lower on PSWS than those who have elementary school ($M = 13.96$, $SD = 4.96$, $p = .011$) or high school degree ($M = 12.92$, $SD = 4.44$, $p = .013$). Using the same method no place of residence-related differences were found.

DISCUSSION

Our results show that the PSWS has an appropriate factor structure and reliability. Respondents watch series more than one hour per day which is more than one-fifth of their free time which indicated that series watching might be an important free time activity. However, the amount of free time one has is not associated with PSWS scores. Women had higher scores on PSWS and respondents with higher education had lower scores on it.

We have to consider the concept of overpathologization (Billieux et al., 2015) which argues that everyday activities are being turned into behavioral addictions. Indeed, it is not obvious that problematic series watching affects a large part

of the population. Moreover, clinically validated diagnostic tests with adequate levels of sensitivity and specificity are required for establishing an accurate diagnosis (Maráz, Király, & Demetrovics, 2015). In light of these suggestions, it can be said that the problematic series watching belongs to a group of problematic behaviors – along with for instance dance (Maráz, Urbán, Griffiths, & Demetrovics, 2015) and smartphone use (Wang, Wang, Gaskin, & Wang, 2015) – that are not necessarily as addictive and prevalent as classical substance addictions. Still, it might be important to consider these problematic behaviors in today's changing era.

Given the lack of empirical research on series watching, we supposed that it might be similar to other problematic screen-related behaviors (e.g. online gaming, Internet or Facebook use). Although health-related variables were not included in this research, intense screen-time can be related to various health problems, such as reduced physical and psychosocial health (Tremblay et al., 2011), increased cardiovascular risk (Grøntved et al. 2014), sleeping problems (Do, Shin, Bautista, & Foo, 2013), lower levels of life satisfaction (Mentzoni et al., 2011), or interpersonal problems (Lo, Wang, & Fang, 2005).

Some limitations of this research need to be addressed. This was a questionnaire-based study which is prone to bias. However, this limitation could be overcome by implementing more objective measures that would respect the individual's privacy as well. Although the two samples were diverse, neither was representative which limits the generalization of the results. Regarding the PSWS, the results were based on a correlational design which does not make it possible to infer causality. More research is needed to examine its temporal stability, convergent, divergent, and predictive validity in different cultures.

In this new research area where cross-sectional studies are rare, a longitudinal design could be fruitful in examining how series watching is affected by different life events and also how it might impact one's health. In terms of clinical practice, prevalence and incidence should be investigated. Further research is needed to explore whether problematic series watching and other problematic online behaviors have the same roots. It is possible that they have the same negative consequences. Other possible covariates could be examined in the future such as loneliness or urgency. Also, further investigation is needed whether extensive series watching can lead to health and psychosocial problems.

CONCLUSIONS

To our best knowledge no prior study examined problematic series watching. In the present study a 6-item Problematic Series Watching Scale was created on the basis of the six-component model of Griffiths (2005). The scale has good factor structure and reliability. PSWS scores are positively related with time spent on series watching, whereas the amount of free time does not have an effect on PSWS scores. In the more and more digitalized world there are many forces which encourage people watching online series. In the light of these changes, research on problematic series watching will be increasingly relevant.

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APPENDIX

ENGLISH VERSION

Below you find 6 questions related to series watching. Answer each of the 6 questions by selecting one response alternative (ranging from "never" to "always") that best describes you.

1 – Never.	*2 – Rarely.*	*3 – Sometimes.*	*4 – Often.*			*5 – Always.*	
During the last year, how often have you ...			**1**	**2**	**3**	**4**	**5**
1. thought of how you could free up more time to watch series?			O	O	O	O	O
2. spent much more time watching series than initially intended?			O	O	O	O	O
3. watched series in order to reduce feelings of guilt, anxiety, helplessness and depression?			O	O	O	O	O
4. been told by others to cut down on watching series without listening to them?			O	O	O	O	O
5. become restless or troubled if you have been prohibited from watching series?			O	O	O	O	O
6. ignored your partner, family members, or friends because of series watching?			O	O	O	O	O

KEY: Add the scores of the items then divide by the number of the items.

HUNGARIAN VERSION

A következőkben 6 sorozatnézéssel kapcsolatos tételt olvashatsz. Válaszolj a kérdésekre az alábbi skála segítségével:

1 – Soha.	*2 – Ritkán.*	*3 – Néha.*	*4 – Gyakran.*			*5 – Mindig.*	
Az elmúlt évben milyen gyakran ...			**1**	**2**	**3**	**4**	**5**
1. gondolkodtál azon, hogyan tudnál minél több időt tölteni sorozatnézéssel?			O	O	O	O	O
2. fordult elő, hogy több időt töltöttél sorozatnézéssel, mint amennyit valójában terveztél?			O	O	O	O	O
3. néztél sorozatot azért, hogy csökkentsd a bűntudatod, szorongásod, kilátástalanságod, depressziód?			O	O	O	O	O
4. tapasztaltad azt, hogy mások arra kértek, hogy kevesebb sorozatot nézz, de nem hallgattál rájuk?			O	O	O	O	O
5. lettél nyugtalan vagy ideges, amikor akadályoztak a sorozatnézésben?			O	O	O	O	O
6. hanyagoltad el családod, partnered, barátaid sorozatnézés miatt?			O	O	O	O	O

KIÉRTÉKELÉS: A tételek pontszámát össze kell adni, majd elosztani a tételek számával.