

Non-problematic and problematic binge-watchers do not differ on prepotent response inhibition: A pre-registered pilot experimental study

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Abstract

Binge-watching (i.e., watching multiple episodes of TV series back-to-back) has become standard viewing practice. Yet, this phenomenon has recently generated concerns regarding its potential negative outcomes on the long run. The presumed addictive nature of this behavior has also received increasing scientific interest, with preliminary findings reporting associations between binge-watching, self-control impairments, and heightened impulsivity. Nevertheless, previous studies only relied on self-report data. The current pre-registered study, therefore, investigated whether non-problematic and problematic binge-watchers differ not only in self-report but also in experimental measures of behavioral impulsivity. Based on their viewing characteristics, 60 TV series viewers were allocated to one of three pre-determined groups: non-binge-watchers, trouble-free binge-watchers (absence of negative impact) and problematic binge-watchers (presence of negative impact). Participants performed tasks assessing response inhibition (Stop-Signal Task) and impulsive reward seeking (Delay Discounting Task), and completed self-reported questionnaires on sociodemographics, affect, symptoms of problematic binge-watching, and impulsive personality traits. According to the pre-registered analytic plan, one-way analyses of covariance (ANCOVAs) were computed to compare the pre-determined groups. With gender being controlled for, no differences were identified in self-report impulsivity and response inhibition abilities. Trouble-free binge-watchers reported higher rates of delay discounting than non-binge-watchers. Although preliminary, our results challenge the notion that problematic binge-watching is characterized by the same neuropsychological impairments as in addictive disorders as, contrary to our pre-registered hypotheses, no differences emerged between non-problematic and problematic binge-watchers regarding self-control variables considered as hallmarks of the latter. These results suggest the need for formulating and testing alternative conceptualizations of problematic binge-watching.

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Keywords: binge-watching; TV series; impulsivity; self-control; prepotent response inhibition; delay discounting; stop-signal task; pre-registration; addictive behaviors; behavioral addictions

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Introduction

With the expansion of video streaming platforms (e.g., Netflix, Amazon Prime, Hulu) offering viewers unlimited access to countless serialized programs, binge-watching (i.e., watching multiple episodes of a TV series back-to-back) has rapidly become the standard TV viewing mode (Deloitte, 2018; YouGov Omnibus, 2017). This popularization of binge-watching has raised concerns about the development of problematic viewing patterns, impacting daily living and health. In this respect, initial evidence suggests the potential harmfulness of excessive binge-watching in terms of sleep deprivation, sedentary lifestyle, and reduction of social relationships or other activities (De Feijter, Khan, Van Gisbergen, 2016; Exelmans & Van den Bulck, 2017; Rubenking, Bracken, Sandoval, & Rister, 2018; Vaterlaus, Spruance, Frantz, & Kruger, 2019). A growing body of literature even considers this activity as an addictive behavior (Ciaramella & Biscuiti, 2014; Orosz, Böthe, & Tóth-Király, 2016; Panda & Pandey, 2017; Riddle, Peebles, Davis, Xu, & Schroeder, 2017; Shim, Lim, Jung, & Shin, 2018; Starosta, Izydorczyk, & Lizińczyk, 2019).

This view is supported by repeated qualitative evidence showing that binge-watchers commonly watch longer than intended and report unsuccessful attempts to reduce or cut down viewing (De Feijter et al., 2016; Devasagayam, 2014; Flayelle, Maurage, & Billieux, 2017), an observation further strengthened by quantitative results demonstrating positive associations between binge-watching involvement and self-control deficits (Hasan, Kumar Jha, & Liu, 2018; Sung, Kang, & Lee, 2015; Tukachinsky & Eyal, 2018). In line with this, unplanned and unregulated binge-watching is related to heightened impulsivity (Flayelle, Maurage, Karila, Vögele, & Billieux, 2019a; Riddle et al., 2017), with more severe binge-watchers also

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reporting higher sensitivity towards immediate gratification (Shim et al., 2018). These findings, however, are nuanced by other data showing no connection between low self-control and binge-watching (Merrill & Rubenking, 2019; Rubenking & Bracken, 2018; Tefertiller & Maxwell, 2018). Yet, a shared limitation of all of these investigations is that they exclusively relied on self-report measures, even though it has been proposed that combining multimodal measurement strategies might be better suited for a thorough determination of individual impulsivity levels (see, in particular, findings from a meta analytic review; Sharma, Markon, & Clark, 2014).

This study addresses this issue by testing whether TV series viewers with more or less proneness to binge-watching (and especially problematic binge-watching) differ not only in self-report but also in behavioral impulsivity measures. Impulsivity is indeed a complex multidimensional construct (Evenden, 1999; Mackillop et al., 2016) involving three broad domains: impulsive personality traits, motor impulsivity, and cognitive impulsivity (Caswell, Morgan, & Duka, 2013; Chamberlain & Sahakian, 2007; Malloy-Diniz, Fuentes, Leite, Correa, & Bechara, 2007; Vassileva, Gonzalez, Bechara, & Martin, 2007; Whiteside & Lynam, 2001); each requiring specific assessment methods. Impulsive personality traits reflect self-rated regulatory abilities, assessed using self-report questionnaires. According to one of the most influential models in the field, the *UPPS model of impulsivity* (Cyders & Smith, 2008; Whiteside & Lynam, 2001), impulsivity traits relate to five main facets: negative urgency (the tendency to act rashly when experiencing intense negative emotions), positive urgency (the tendency to act rashly when experiencing intense positive emotions), lack of premeditation (the tendency not to take into account the consequences of an act before engaging in that act), lack of perseverance (the tendency to have difficulty remaining focused on a boring and/or difficult task), and sensation seeking (the tendency to enjoy and pursue new and exciting activities). While motor impulsivity refers to impulsive actions,

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characterised by an impaired capacity to refrain or suppress prepotent motor responses (see Friedman & Miyake, 2004), cognitive impulsivity is thought to reflect impulsive choices, marked by the preference for smaller immediate rewards over larger distal ones (i.e., delay discounting: Grant & Chamberlain, 2014; Green & Myerson, 2004; delay of gratification: Reynolds & Schiffbauer, 2005). Motor and cognitive impulsivity can be experimentally assessed with the Stop-Signal Task (Verbruggen & Logan, 2008) and the Delay Discounting Task (Lynam & Miller, 2004), both of which are highly effective for quantifying response inhibition and delay discounting (Bartholdy et al., 2016; Lipszyc & Schachar, 2010; Rachlin, Raineri, & Cross, 1991; van den Bos, Rodriguez, Schweitzer, & McClure, 2015). Investigating these three psychological constructs in binge-watching is of prime interest to the matter at hand as impulsive personality traits, executive function impairment, and lower tolerance of delayed rewards are well-established characteristics of impulsive and addictive disorders (Dawe & Loxton, 2004; Groman, James, & Jentsch, 2009; MacKillop et al., 2011). A pre-registered experiment was, therefore, conducted to assess these three indices of impulsivity in three pre-determined groups of TV series viewers: 1) *non-binge-watchers*, 2) *trouble-free binge-watchers*, and 3) *problematic binge-watchers*. The current groups' determination aligns with converging evidence pointing to the distinctiveness of high (but non-harmful) and problematic binge-watching involvement (Flayelle et al., 2019a; Flayelle et al., 2020), notably through the identification of common and distinct psychological processes underlying both viewing patterns. Based on our previous research, we proposed that, due to a higher (emotional) responsiveness to the cliffhanger ending of TV series episodes (i.e., leaving the storyline unresolved), binge-watchers (in general) would be more likely to seek the immediate gratification of watching the next episode, with those facing poorer self-control abilities being more at risk of developing uncontrolled patterns of binge-watching (Flayelle et al., 2019a).

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Prior to conducting this research, the study hypotheses, methodology and proposed analytic plan were pre-registered in the *Open Science Framework* at: <https://osf.io/srg9w> (Doi:10.17605/OSF.IO/SRG9W). The pre-registered hypotheses formulated are the following:

- 1) Compared to *non-binge-watchers*, (*trouble-free* and *problematic*) *binge-watchers* will report higher levels of negative and positive urgency (i.e., sub-facets of impulsivity referring to the tendency to act rashly when experiencing intense negative or positive emotions).
- 2) Compared to *non-binge-watchers* and *trouble-free binge-watchers*, *problematic binge-watchers* will show poorer performances in the inhibition of prepotent responses.
- 3) Compared to *non-binge-watchers*, (*trouble-free* and *problematic*) *binge-watchers* will report higher rates of delay discounting.

These assumptions were tested while considering a set of factors recognized to influence inhibitory control, i.e. age, gender, and affect (Billieux, Gay, Rochat, & Van der Linden, 2010; Cross, Copping, & Campbell, 2011).

Methods

Participants and procedure

This study followed a two-stage process. First, a brief online survey assessing sociodemographic characteristics and TV series watching behaviors was disseminated among students of the University of Luxembourg. Specifically, we asked them to report hours spent watching and number of episodes seen back-to-back during a typical viewing session. They

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also self-reported presence of functional impact and problematic binge-watching in the form of the two following “yes/no” questions: “Does TV series watching have already negatively impacted your everyday life (e.g., sleep deprivation, postponing of daily tasks, displacement of other activities, close relatives’ reproaches, etc.)?”, “Do you consider your TV series consumption as problematic?”. Inclusion criteria were age 18 years or older, French-speaker, and having watched TV series episodes on a regular basis on DVD, USB, SVOD, or streaming devices, over the past six months. Based on their viewing characteristics, 60 participants (76.7% female) aged between 18 and 37 years ($M=23.4$, $SD=3.28$) were selected in total (according to the inclusion criteria specified in Figure 1) and allocated to the three pre-determined groups (i.e., *non-binge-watchers*, *trouble-free binge-watchers*, and *problematic binge-watchers*) with 20 participants in each group. The current sample size determination was guided by an a priori computation (using G*Power software) to allow the detection of large effect sizes ($f^2 = .40$) with a statistical power of .80 and an α -error set at .05. The quantitative threshold used for grouping binge-watchers was drawn from the literature, where the cut-off point to start considering binge-level watching is most commonly set at three “hour-long” (average length: 42 minutes) TV series episodes (e.g., Erickson, Dal Cin, & Byl, 2019; Merrill & Rubenking, 2019; Riddle et al., 2017; Tukachinsky & Eyal, 2018).

FIGURE 1

This study obtained approval from the Ethics Review Panel of the University of Luxembourg (project identification code: ERP 18-055), and the selected participants received an incentive of 10€ for their participation. After providing informed consent, they completed a Stop-Signal Task (Verbruggen, Logan & Stevens, 2008) assessing inhibition of prepotent responses, together with a Delay Discounting Task (Lynam & Miller, 2004). Subsequently,

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they answered three self-report questionnaires in the following order: 1) the Binge-Watching Engagement and Symptoms Questionnaire (BWESQ; Flayelle et al., 2019b), three subscales of which (i.e., binge-watching, dependency, loss of control) were used to assess symptoms of problematic binge-watching, and thus ascertain the validity of participants' allocation to one of the pre-defined groups; 2) the short Impulsive Behavior Scale (s-UPPS-P; Billieux, Rochat, et al., 2012); and 3) the Positive And Negative Affect Schedule (PANAS; Gaudreau, Sanchez, & Blondin, 2006).

Instruments

Stop-Signal Task (SST)

The SST (Verbruggen et al., 2008) measures inhibition of prepotent responses. In the primary task, participants were requested to respond as rapidly as possible to the shape of a go stimulus (left response key for a square, and right response key for a circle) displayed on a computer screen. Participants were instructed to refrain from responding when an auditory stop signal appeared shortly after the presentation of the go stimulus, which occurred in 25% of the trials. The delay between the go stimulus and the stop signal (i.e., stop-signal delay; SSD) was adjusted throughout the experiment via a staircase procedure aimed at identifying a point at which the participant successfully inhibited responses on approximately 50% of stop trials (see Verbruggen et al., 2008 for further methodological details). Following an initial practice block of 32 trials, the task comprised three blocks of 64 trials, resulting in 48 stop trials considered for analysis. Inhibitory control performance was estimated by the stop-signal reaction time (SSRT; Logan & Cowan, 1984), where the calculation is based on the integration method (with replacement of go omissions), as recommended by a recent consensus among Stop-Signal Task experts (Verbruggen et al., 2019). Larger SSRTs index poorer response inhibition.

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Delay Discounting Task (DDT)

The DDT (Lynam & Miller, 2004) is a monetary choice task in which participants are presented with a series of choices between smaller (hypothetical) amounts available immediately and a larger one available after a variable delay. Three blocks of 34 trials, each involving a specific time length (i.e., one week, one month, and six months) for the delayed reward permanently fixed at 1000€, occurred twice: in ascending sequence, with the immediately available amount systematically increasing (from 1€ to 990€), and in descending sequence, with the immediately available amount continuously decreasing (from 990€ to 1€). For each time period, the equivalence point was derived by averaging the ascending and descending values for which participants switched from preferring the delayed reward to the immediate one, and vice versa. A mean total score was then computed as overall discounting rate, with a lower equivalence point indicating a higher preference for smaller immediate rewards (Lynam & Miller, 2004).

Binge-Watching Engagement and Symptoms Questionnaire (BWESQ)

The BWESQ (Flayelle et al., 2019b) is a 40-item scale assessing binge-watching engagement and features of problematic binge-watching. Only three subscales of the questionnaire were used in the present experiment: *binge-watching* (6 items, e.g., “When an episode comes to an end, and because I want to know what happens next, I often feel an irresistible tension that makes me push through the next episode.”), *dependency* (5 items, e.g., “I get tense, irritated or agitated when I can’t watch my favorite TV series.”), and *loss of control* (7 items, e.g., “I sometimes try not to spend as much time watching TV series, but I fail every time.”). Items are scored on a 4-point Likert scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*), with an average score being calculated for each subscale. The

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internal consistencies of these three subscales ranged from .65 (*dependency*) to .83 (*loss of control*) in the current sample.

Short Impulsive Behavior Scale (s-UPPS-P)

The s-UPPS-P (Billieux, Rochat, et al., 2012) is a 20-item scale evaluating five facets of impulsivity: *negative urgency* (e.g., “When I am upset I often act without thinking.”), *positive urgency* (e.g., “When I am really excited, I tend not to think on the consequences of my actions.”), *lack of premeditation* (e.g., “I usually think carefully before doing anything.” – the item is reverse scored), *lack of perseverance* (e.g., “I generally like to see things through to the end.”), and *sensation-seeking* (e.g., “I sometimes like doing things that are a bit frightening.”). Items are scored on a 4-point Likert scale ranging from 1 (*strongly agree*) to 4 (*strongly disagree*), and a total score is calculated for each of the five subscales. The internal consistencies of the s-UPPS-P subscales ranged from .74 (*positive urgency*) to .88 (*lack of perseverance, sensation seeking*) in the current sample.

Positive and Negative Affect Schedule (PANAS)

The PANAS (original French version; Gaudreau et al., 2006) measures the experience of *positive affect* (e.g., “Enthusiastic”) and *negative affect* (e.g., “Distressed”) through two 10-item mood scales. Items are rated on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*very much*). A total score is computed for each subscale. Their internal consistency ranged from .76 (*positive affect*) to .83 (*negative affect*) in the current sample.

Results

Data reduction

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The data from two participants in the *non-binge-watchers* group were excluded from the analyses due to longer or identical average reaction times on unsuccessful stop trials than on go trials, which precludes reliable SSRT estimation (Verbruggen et al., 2019). The final sample thus comprised 58 TV series viewers (75.9% female) aged between 18 and 37 years ($M=23.5$, $SD=3.26$), with 18 participants in the *non-binge-watchers* group, and 20 each in the two *binge-watchers* groups. The viewing characteristics of the three groups are summarized in Table 1.

TABLE 1

Initial group differences

According to the pre-registered data-analytic plan, potential pre-existing group differences regarding age, gender, affect, and symptoms of problematic binge-watching, were examined using one-way analyses of variance (ANOVAs) and applying Bonferroni-corrected post-hoc *t*-tests when significant differences emerged. As indicated in Table 2, the results showed that, compared with *non-binge-watchers*, *problematic binge-watchers* comprised significantly more female viewers, with members of this group reporting higher levels of loss of control and dependency on TV series watching. Furthermore, *problematic binge-watchers* presented significantly higher binge-watching rates than both *non-binge-watchers* and *trouble-free binge-watchers*. These results suggest that *problematic binge-watchers* can be distinguished from other groups on the basis of self-reported symptoms of problematic binge-watching, thereby confirming the validity of the present group allocation procedure.

TABLE 2

Impulsivity traits, inhibition of prepotent responses, and delay discounting

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One-way analyses of covariance (ANCOVAs) were then computed to compare levels of impulsivity traits, and scores on the stop-signal and delay discounting tasks, while controlling for gender. Although the results indicate that *trouble-free binge-watchers* are characterized by a higher preference for smaller immediate rewards over relatively short periods of time (i.e., one week and one month) than *non-binge-watchers*, no further differences were found between groups regarding self-reported impulsivity and inhibitory control performance. These results are shown in Table 3.

The current findings were mostly supported by computing (additional and non-pre-registered) Bayes factors (Schönbrodt & Wagenmakers, 2017). In the light of these post-hoc analyses, however, the findings proved inconclusive (i.e., no evidence) as to whether or not groups differed regarding the self-reported lack of perseverance and delay discounting rates (for the one week time period only), while providing anecdotal to strong evidence for the null hypothesis regarding all other assessed variables. Although not pre-registered either, and following the procedure proposed by Lawrence et al. (2009), we also computed additional analyses to test whether groups differed in response monitoring (i.e., post-error slowing). We conducted these additional analyses as impairments in response adjustment have recently been reported for another type of binge behavior (i.e., binge-drinking; Bø, Aker, Billieux, & Landrø, 2016). In the current study, however, the *t*-test comparing mean reaction time in go trials following successful and failed stop trials revealed no significant differences for each of the three groups. These additional results together with the complete anonymised data and matrix of correlations can be found at: <https://osf.io/2jzrw/>

TABLE 3

Discussion

Recently, binge-watching has been increasingly conceptualized as an addictive behavior. This pre-registered pilot experimental study explored potential differences on behavioral and self-reported impulsivity in viewers with varying patterns of TV series watching. Three groups (i.e., *non-binge-watchers*, *trouble-free binge-watchers*, *problematic binge-watchers*) were compared with regard to impulsivity-related processes (i.e., self-reported impulsivity traits, inhibition of prepotent responses, and delay discounting), whose disruption is a well-documented correlate of behavioral and substance-related addictive disorders (Biernacki, McLennan, Terrett, Labuschagne, & Rendell, 2016; Billieux, Lagrange, et al., 2012; Smith, Mattick, Jamadar, & Iredale, 2014). Contrary to our pre-registered assumptions, the results only show *trouble-free binge-watchers*' higher propensity to impulsive reward seeking (logically reflected by their practice of binge-watching, or in other words, seeking the immediate gratification of watching the next episode) compared with *non-binge-watchers*, while *problematic binge-watchers* do not stand out from the two other groups on any assessed forms of impulsivity.

Although preliminary, these findings imply that, unlike what typically happens in addictive disorders, inhibitory control impairment does not come into play as a key criterion to distinguish problematic from non-problematic binge-watching behavior, which suggests that problematic binge-watching requires its own framework of understanding. At a more general level, these experimental results thus stress again the potential inadequacy of approaches limiting their understanding of excessive-like recreational behaviors to the boundaries of addiction models, rather than focusing on their specific underlying psychological processes (i.e., Billieux, Schimmenti, Khazaal, Maurage, & Heeren, 2015; Kardefelt-Winther et al., 2017). In concert with others who previously stressed the necessity of investigating binge-watching through the lens of further theoretical models (Merrill &

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Rubenking, 2019), we, therefore, argue that alternative conceptualizations of problematic binge-watching should be explored, notably those considering problematic binge-watching as a maladaptive coping or emotion-regulation strategy (Flayelle et al., 2019a, 2019c; Rubenking & Bracken, 2018; Tukachinsky & Eyal, 2018).

Nonetheless, this study has several limitations. First, and most importantly, the current pre-determined groups were created by relying on preliminary criteria which, although based on the existing literature, need further research to ascertain their validity. Moreover, the self-report nature of our single-item assessment of functional impairment is another weakness to acknowledge, which could be overcome through validated measures of functional impairment (e.g., WHODAS 2.0; Üstün, 2010) in future attempts at constituting groups of non-problematic and problematic binge-watchers. In addition, it cannot be ruled out that group differences may have occurred if a treatment-seeking group of binge-watchers had participated in this experiment. Finally, it is also possible that inhibitory control impairments do not play a role in problematic binge-watchers when confronted with neutral stimuli such as those used in the present study, but could have occurred if emotional stimuli (known to interfere with response inhibition ability; Rebetz, Rochat, Billieux, Gay, & Van der Linden, 2015; Verbruggen & De Houwer, 2007) or even TV series-related stimuli have been used.

At this time, however, by revealing no differences on self-control-related dimensions between non-problematic and problematic binge-watchers, this pre-registered experimental study suggests that problematic binge-watching is not affected by the same inhibitory control impairments as in addictive disorders. This, in turn, underscores the importance of developing sound alternative theoretical rationales that better serve a genuine understanding of this emerging behavior, and the conditions under which it may become problematic.

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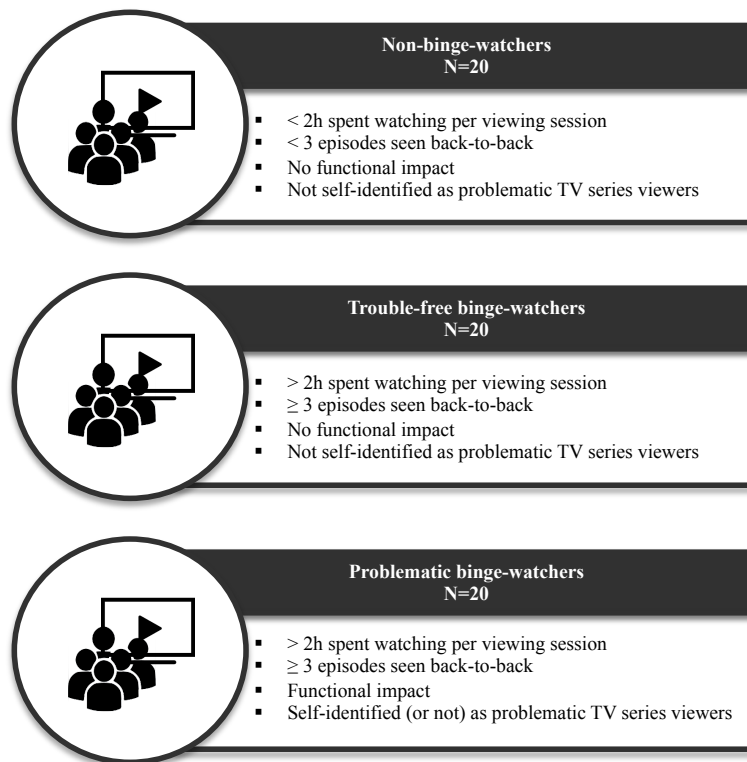


Figure 1. Selection criteria for the three groups.

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Table 1. Viewing characteristics of the three groups.

		Non-binge-watchers	Trouble-free binge-	Problematic binge-
		(N=18)	watchers	watchers
		(N=20)		(N=20)
	Range	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Hours spent watching	0-4	.66 (.53)	1.87 (.65)	1.83 (1.08)
(working-day)				
Hours spent watching (day-	0-8	1.14 (.72)	3.64 (1.77)	3.26 (1.62)
off)				
Number of episodes in one	1-6	1.94 (.72)	3.70 (1.30)	3.35 (.75)
session				
		%	%	%
Reported functional impact		0	0	100
Self-identified as		0	0	30
problematic viewer				

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Table 2. Comparison of age, gender, affect, and symptoms of problematic binge-watching between the three groups.

		Non-binge- watchers (N=18) <i>M (SD)</i>	Trouble-free binge-watchers (N=20) <i>M (SD)</i>	Problematic binge-watchers (N=20) <i>M (SD)</i>	<i>F</i>
	Range				
Sociodemographic characteristics					
Age	18-37	23.50 (2.50)	23.80 (4.57)	23.10 (2.27)	.23
Gender (F=1; M=2)		1.44 (.51)	1.25 (.44)	1.05 (.22) ^a	4.44*
Self-reported questionnaires					
PANAS	1-5				
Negative affect		2.26 (0.67)	2.39 (0.51)	2.31 (0.62)	.23
Positive affect		3.68 (0.28)	3.46 (0.53)	3.49 (0.52)	1.21
BWESQ	1-4				
Binge-watching		1.86 (.59)	2.17 (.52)	2.67 (.48) ^{a,b}	11.18**
Dependency		1.30 (.30)	1.61 (.50)	1.65 (.43) ^a	3.84*
Loss of control		1.44 (.38)	1.87 (.47)	2.16 (.59) ^a	10.06**

Note. PANAS=Positive and Negative Affect Schedule; BWESQ=Binge-Watching Engagement and Symptoms Questionnaire; ** $p < .01$; * $p < .05$. ^aStatistically significant in comparison to non-binge-watchers ($p < .05$); ^bStatistically significant in comparison to trouble-free binge-watchers ($p < .05$).

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Table 3. Comparison of impulsivity traits, scores on the Stop-Signal Task and delay discounting rates between the three groups.

	Non-binge- watchers (N=18) <i>M (SD)</i>	Trouble-free binge- watchers (N=20) <i>M (SD)</i>	Problematic binge-watchers (N=20) <i>M (SD)</i>	<i>F</i>
Self-reported assessment				
s-UPPS-P				
Negative urgency	2.22 (.66)	2.25 (.66)	2.29 (.59)	.46
Positive urgency	2.44 (.42)	2.45 (.68)	2.69 (.58)	.67
Lack of premeditation	1.81 (.54)	1.84 (.55)	2.06 (.62)	.78
Lack of perseverance	1.51 (.60)	1.84 (.71)	2.11 (.72)	2.71
Sensation seeking	2.69 (.69)	2.28 (.58)	2.53 (.82)	1.65
Laboratory assessment				
Stop-signal task				
SSRT	206.67 (40.95)	214.65 (28.97)	212.75 (45.09)	.38
goRT	536.28 (86.37)	587.95 (153.84)	569.30 (116.82)	.64
sRT	473.94 (65.88)	524.30 (128.03)	496.70 (83.69)	1.09
goPmiss	.0008 (.00226)	.0063 (.01221)	.0066 (.01253)	1.17
goERR	.0070 (.00635)	.0067 (.01052)	.0071 (.01199)	.01
Delay discounting task				
EP 1 week	984.44 (23.88)	931 (90.08) ^a	960.00 (53.36)	3.39*
EP 1 month	912.78 (92.06)	751.75 (248.73) ^a	829.50 (117.32)	3.63*
EP 6 months	796.94 (138.64)	680.25 (276.82)	657.50 (195.98)	.80

Note. s-UPPS-P=short Impulsive Behaviour Scale; SSRT=stop-signal reaction time; goRT=reaction time on go trials; sRT=reaction time on unsuccessful stop trials; goPmiss=go trials without a go response; goERR=choice errors on go trials; EP=equivalence point; * $p < .05$. ^aStatistically significant in comparison to non-binge-watchers ($p < .05$).