International Journal of Communication 16(2022), 2688–2708 1932–8036/20220005

Binge-Watching Dependence: A Function of Sensation Seeking, Need for Cognition, and Flow

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This study discusses various definitions and features of the binge-watching phenomenon, with a particular focus on psychological traits, sensation seeking (SSK), and need for cognition (NFC). Specifically, the current study, based on an online survey conducted by an online research company, examined how SSK and NFC were associated with binge-watching dependence and the mediating role of flow. The final analysis included 1,009 respondents who identified themselves as binge-watchers and who had experienced binge-watching. Questionnaires included participants' psychological traits (SSK, NFC), flow, and binge-watching dependence. Results showed that individuals who ranked higher on SSK and NFC were more likely to become binge-watching dependent. In addition, the relationships between SSK/NFC and binge-watching dependence were found to be mediated by flow. Implications and future research are discussed.

Keywords: binge-watching, sensation seeking, need for cognition, flow, media dependence

Binge-watching is a popular phenomenon among screen viewers who watch programs on television, smartphones, laptops, computers, or tablet computers. There is no agreed-on definition of binge-watching, but several studies (Caramella & Biscuiti, 2014; Horvath, Horton, Lodge, & Hattie, 2017; Jenner, 2016; Kilian, Bröckel, Overmeyer, Dieterich, & Endrass, 2020; Shim, Lim, Jung, & Shin, 2018) suggest that the principal criterion for identifying an individual as a binge-watcher is that the person view on a screen in one sitting three or more episodes of the same TV series or content (Forte, Favieri, Tedeschi, & Casagrande, 2021). Binge-watching seems to be fueled by the introduction of innovative electronic platforms, such as Netflix and other streaming networks (Jenner, 2018; Limov, 2020). With the accompanying advent of personal media devices and high-speed Internet, viewers are now able to access their favorite programs at any time, in any place, and in uninterrupted succession, making it possible to watch multiple episodes of a single series for as long as they wish (Castro, Rigby, Cabral, & Nisi, 2021; Schweidel & Moe, 2016).

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Date submitted: 2021-08-22

Because of the recent coronavirus pandemic, many people have spent more time at home searching for diversions. That entertainment is a popular choice is evidenced by Netflix's addition of 37 million new paid subscribers globally in 2020 and 18 million in 2021—well above the 7 million that it had expected, as people worldwide sought ways to entertain themselves amid the COVID-19 lockdown (Jarzyna, 2021; Munson, 2022; Rushe & Lee, 2020). Increases in time spent watching TV have raised concerns about the possibility of individuals becoming overly dependent on binge-watching. The literature on excessive binge-watching warns of symptoms of media dependence, such as high levels of stress and anxiety when individuals are unable to terminate the behavior (Ahmed, 2017; Karmarkar & Kruger, 2016; Tukachinsky & Eyal, 2018). This warning implies that dependence on binge-watching may lead to problems in viewers' daily lives, such as not addressing issues regarding their physical and psychological well-being. For example, viewers may disregard important real-world obligations, such as engagement in social interactions (Foy, 2017; Jarzyna, 2021). Additionally, excessive binge-watching can bring about negative psychological experiences, such as higher levels of anxiety and social isolation (Ciaramella & Biscuiti, 2014; Granow, Reincke, & Ziegele, 2018; Wheeler, 2015).

Based on these anecdotal reports and studies, there is a need to identify individuals who are vulnerable to binge-watching dependence and to understand the cognitive mechanisms that underlie progression toward binge-watching dependence. Previous research has investigated various antecedents of binge-watching (Limov, 2020; Pittman & Sheehan, 2015; Shim & Kim, 2018; Shim et al., 2018; Sung, Kang, & Lee, 2018). However, not addressed are elements associated with conditions under which viewers tend to develop binge-watching dependence.

As an exploratory study, the current research seeks to understand psychological traits that could be associated with viewers' susceptibility to binge-watching dependence. Specifically, based on the literature of media dependence and media addiction, this study focuses on sensation seeking and the need for cognition. In addition, the cognitive mechanism that leads to binge-watching dependence is investigated from the perspective of flow—a "shift into a common mode of experience" when people "become absorbed in their activity" (Csikszentmihalyi, 1975, p. 43).

Binge-Watching as Media Dependence

Media addiction and media dependence need to be considered as two distinct concepts; however, in previous studies, the two have become interchangeable (e.g., Chory & Banfield, 2009; Kubey, 1996; LaRose, Lin, & Eastin, 2003; McIlwraith, 1998), so that in some cases, addiction has been used interchangeably with dependence and vice versa. Media addiction is often rooted in indistinctive exposure to media content, leading to excessive use of media. More specifically, media addiction is regarded as a type of "behavioral addiction" (Marks, 1990) in which no external chemical substance is involved (LaRose et al., 2003). Behavioral addiction usually involves inducing and reinforcing features that promote addictive tendencies, such as craving, avoidance, anticipation, dependency, loss of control, or mood alteration (Forte et al., 2021; Griffiths, 1995), regardless of being passive (e.g., television addiction) or active (e.g., computer game addiction). Given that binge-watching is generally related to viewers' weakened self-regulation or excessive levels of watching TV, binge-watching seems to reflect some of the addictive tendencies of media addiction.

Several scholars have questioned whether such problematic media use should be regarded as media addiction. Peele (2000) posited that the term *addiction* may be abused in terms of generating a sense of urgency about psychological problems that alarmists (e.g., Fabris, Marengo, Longobardi, & Settanni, 2020) employ to seek monetary profit by "curing" so-called addicted behaviors. Therefore, in the field of clinical psychology, some scholars have replaced the term *addiction* with *dependence* (American Psychiatric Association, 1994). Kubey (1996) noted that the term *dependence* should be preferred to *addiction* when describing problematic media consumption, suggesting use of the term *media dependence*. Forte and colleagues (2021) also argued that characteristics of media dependence do not fully meet all the criteria of behavioral addiction. Media dependence is "subjectively experienced as being to some extent involuntary, displacing more productive activities and difficult to stop or curtail" (McIlwraith, 1998, p. 372).

Media dependence is defined as a goal-directed relationship between media sources and media consumers (Gaziano, 1990). Media dependence at times accompanies manageable "benign problems" that affect media users to some degree (Hall & Parsons 2001). Symptoms of media dependence, such as viewing programs much more than planned or unsuccessful efforts to reduce program watching, are not symptoms of a disordered or diseased personality (e.g., Chory & Banfield, 2009; LaRose et al., 2003; McIlwraith, 1998; Smith, 1986; Young, 1999). Based on features of media dependence, *media dependence* describes binge-watching behavior more appropriately than the concept of media addiction. As noted earlier, binge-watchers are indeed goal-oriented. Their intentions are to escape reality or to forget hardships, take a break, or just enjoy entertainment productions. As such, binge-watching should not be regarded as a pathological problem that requires professional interventions. Rather, given that binge-watching presupposes long-term program consumption, the behavior should be understood as excessive media use. Therefore, the current study prefers the term "media dependence" to "media addiction" to describe excessive binge-watching behavior. This study defines binge-watching dependence as the tendency to expose oneself to a TV series excessively and consistently, with unsuccessful efforts to reduce watching the programs.

Binge-Watching Features and Psychological Traits

Binge-watching behavior is said to share features such as content aspects, viewing environment aspects, or narrative desire of binge-watched programs. First, in terms of the content features of the binge-watching programs, binge-watched TV series tend to have sophisticated narratives and complex plots that stimulate viewers' curiosity and thoughts about the plot or storylines (Shim et al., 2018). For example, commonly used narratives include cliffhanger endings that position TV characters in precarious situations, or shocking revelations at the conclusion of each episode (Michlin, 2011), thereby enticing viewers to keep watching subsequent episodes without a break. Furthermore, a seamless plot from one episode to the next can enhance viewers' identification with characters and immersion in the story (Walter, Murphy, & Rosenthal, 2018).

Second, when it comes to aspects of the viewing environment, uninterrupted viewing of multiple episodes of a TV series in succession anytime and anywhere became possible with online streaming platforms such as Netflix and Hulu, and various media devices (Hirsen, 2015; Schweidel & Moe, 2016).

Furthermore, using multiple media devices at the same time helps maximize acquisition of TV-series-related information during binge-watching, thus improving the viewing experience. For instance, the practice of second-screen viewing—the use of smartphones, tablets, and laptops while watching TV to obtain relevant information or share opinions or feelings with others (Van Cauwenberge, Schaap, & Van Roy, 2014)—enriches the entertainment experience and helps increase information processing related to binge-watched content (Walter et al., 2018).

Third, binge-watching also helps to satisfy individuals' increasing desire for lengthy narratives in the digital era. Our digital lifestyle, in which storytelling is often reduced to bite-sized, 140-character conversations, leaves individuals craving storytelling in today's TV shows (Lilyvolt, 2021). Given this, watching multiple episodes of a TV show can be a welcome refuge from binge-watchers' busy lives and make the shows more enjoyable (CISION, 2013). As such, individuals turn to entertainment for greater insights and meaningfulness and for fun and pleasure (Oliver & Raney, 2011; Vorderer, Klimmt, & Ritterfeld, 2004). In sum, these features can serve as a gateway to excessive media content consumption (i.e., binge-watching).

According to previous studies, the degree of media dependence has been proved to vary depending on individual conditions that include psychological traits (Chory & Banfield, 2009; Kircaburun & Griffiths, 2018; Kubey, 1996; Lin & Tsai, 2002). Numerous studies have examined the relationship between individuals' psychological traits and media dependence in various media contexts, such as social media, mobile phones, and online gaming (Cheng, Wang, Sigerson, & Chau, 2019; Khang, Kim, & Kim, 2013; Kircaburun & Griffiths, 2018). For example, extraversion has been shown to have a positive association with social media dependence. Extraverted individuals who frequently use social networking applications to engage in social interaction may acquire more social resources online (Cheng et al., 2019; Peris, de la Barrera, Schoeps, & Montoya-Castilla, 2020). Sensation seeking is also associated with excessive Internet use (Lin & Tsai, 2002). These findings imply that psychological traits can be key factors for identification of underlying mechanisms that lead to binge-watching dependence. In the light of those findings, this study focuses mainly on sensation seeking and need for cognition, given that those factors are known to influence the intensity of individual TV watching (Henning & Vorderer, 2001; Hirschman, 1987; Shim et al., 2018; Yoon, Duff, & Bunker, 2021).

Sensation Seeking, Need for Cognition, and Binge-Watching Dependence

Sensation seeking (SSK) is defined as "a need for varied, novel, and complex sensations and experiences and the willingness to take physical and social risks" (Zuckerman, 1979, p. 10). SSK has been known to exert a positive influence on media engagement (Henning & Vorderer, 2001; Hirschman, 1987). Given that binge-watching is a type of media engagement, it can be assumed that SSK has the potential to affect binge-watching dependence.

Sensation seekers tend to select media content that is exciting and stimulating to elevate their arousal level (Edwards, 1991; Zuckerman, 1994). Shim and colleagues (2018) examined whether binge-watching serves as an arousing stimulus particularly for high sensation seekers. They found that, in contrast to low sensation seekers, high sensation seekers exhibit a greater acceptance of or desire for

captivating stimuli to reach a state of optimal arousal. Lin and Tsai (2002) also found that SSK was significantly associated with a likelihood of media dependence. Based on this line of reasoning, the following hypothesis is put forth.

H1: Sensation seeking will be positively related to binge-watching dependence.

Binge-watched TV series tend to be accompanied by complex plots and narratives that can stimulate viewers' thoughts and curiosity about storylines. However, even if viewers are exposed to TV series that contain those features, not every viewer is involved in binge-watching, implying that other factors play a role in leading to binge-watching dependence. Considering the literature on the need for cognition (NFC) and binge-watching, this study focused on NFC as a psychological trait that viewers in binge-watching dependence may have.

NFC is defined as an individual's tendency to seek, engage in, and enjoy effortful thinking (Cacioppo, Petty, & Kao, 1984; Haugtvedt, Petty, & Cacioppo, 1992). NFC is also recognized as a key antecedent that determines the way that individuals cognitively engage in and process media content in general (Shim et al., 2018). Individuals with high NFC, compared with those with low NFC, are likely to recall more message arguments and issue relevant information (Cacioppo et al., 1984).

Some binge-watched programs require considerable cognitive resources from viewers to follow details of a complex, provocative, or delicate storyline across several episodes. Storytelling with cliffhanger endings, which are typical of binge-watched content, triggers never-ending curiosity in binge-watchers, urging them to click the "next" button to find out how a dilemma is resolved (Michlin, 2011; Shim et al., 2018). Individuals with low NFC tend to prefer maintaining established preferences and beliefs rather than searching for new, intellectually stimulating information (Cacioppo, Petty, & Morris, 1983; Cacioppo et al., 1984). TV shows that are binge-watched seek to stimulate viewers' curiosity, for example, by double-tracking plotlines that serve as effortful cognitive tasks. Extending this line of literature to binge-watching dependence, NFC is less likely to limit viewers' binge-watching activity as a way to digest more episodes to resolve their curiosity. Importantly, failure of self-control can serve as an important predictor of excessive media use (Kwon et al., 2013; LaRose & Eastin, 2004). Therefore, we predict that NFC may boost binge-watching dependence as posed by the following hypothesis.

H2: Need for cognition will be positively related to binge-watching dependence.

The Mediating Role of Flow in Binge-Watching Dependence

Flow represents a state of concentration that leads to the feeling of deep enjoyment in which an individual is so focused that attention amounts to absolute absorption in an activity (Csikszentmihalyi, 1975, 1990). Flow experiences produce excessively emotional and pleasurable feelings during the process of a particular activity (Chou & Ting, 2003).

Characteristics of flow that include absorption, interest, and enjoyment (Csikszentmihalyi, 1997) are often experienced by television viewers when they identify themselves with media characters (Chory &

Cicchirillo, 2007; Chory-Assad & Yanen, 2005). Studies have shown that absorption and enjoyment are two principal components of optimal flow (Ghani & Deshpande, 1994), and they are also likely to be created by binge-watching. Extending this line of research, it is worth exploring whether binge-watching can serve as a self-motivating experience to which individuals may turn in an effort to gain enjoyment or immersion in the experience of flow.

Previous studies have delved into what role *flow* plays in media dependence (Chory & Banfield, 2009; Chou & Ting, 2003). When individuals experience flow, they tend to lose track of time and awareness of events occurring around them (Csikszentmihalyi, 1990). Chou and Ting (2003) found that individuals immersed in flow during an activity developed a tendency to repeat the activity for the sake of a positive and optimal experience. Given that binge-watchers often experience time-related distortion—that is, losing track of time while watching a TV series—they are likely to be engaged in flow, leading to binge-watching dependence.

Csikszentmihalyi (1997) described *enjoyment*, as realized in the flow state, as an "autotelic" experience characterized by loss of reflective self-consciousness. Binge-watching may prompt viewers to constantly pay attention to binge-watched programs with persistent curiosity that, in turn, leads to enjoyment. The more binge-watchers focus on a TV series, the more likely it is that they will enjoy the production. When the state of enjoyment continues through this process, binge-watchers are highly likely to experience the state of optimal flow that may lead to binge-watching dependence. Watching TV may serve as a short-term tranquilizer, a way to relax and escape from stress (Rubin, 1983). Binge-watching, as an even stronger sedative, may lengthen the tranquilizing effect, thus making it more difficult for viewers to self-regulate their viewing time.

Meanwhile, the experience of flow, as discussed in much literature, has been found to mediate relationships between psychological traits and media addiction (Csikszentmihalyi, 1990; Hartmann, Jung, & Vorderer, 2012; Hawi, 2012; Khang et al., 2013; Tokunaga & Rains, 2010; Wang, Yang, & Zhang, 2020). For example, Wang and colleagues (2020) found that the effect of sensation seeking on smartphone addiction was fully mediated by flow experience. Srivastava, Shukla, and Sharma (2010) showed that the need for cognition also exerted a considerable influence on the flow of online experiences, and flow, in turn, showed a stronger impact on addiction to cybergames.

The mediation effect of flow on media dependence has rarely been investigated. However, numerous studies (e.g., Chory & Banfield, 2009; Kubey, 1996; LaRose et al., 2003) have used two terms—"media addiction" and "media dependence"—interchangeably. Several studies used the term "media dependence" instead of "media addiction," even though what they addressed was media addiction (e.g., Chory & Banfield, 2009). Indeed, the two concepts share some similarities. For example, media addiction and media dependence are not related to either the physiological demand for media use or pathological disorders, and neither condition involves an external chemical substance; yet, both conditions presuppose somewhat excessive or problematic use of certain types of media. Given this, as prior studies on media addiction suggest, the experience of flow in binge-watching may mediate the relationship between an individual's psychological traits and binge-watching dependence. Thus, the following hypothesis is suggested.

H3: *Flow experience during binge-watching will mediate the relationship between individual psychological traits (SSK, NFC) and binge-watching dependence.*

Figure 1 shows a conceptual framework of this research.

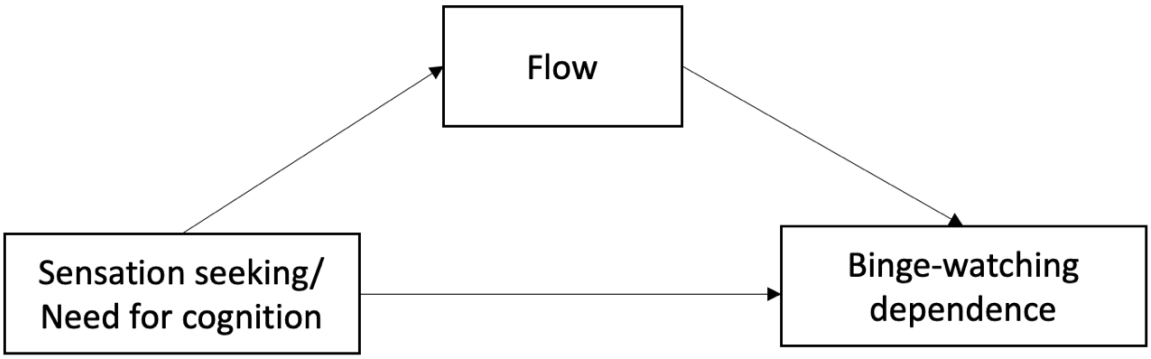

Figure 1. Conceptual research framework.

Method

Sampling Procedure

To examine the hypotheses put forth in this study, an online survey was conducted. Participants were recruited from an online research company, Macromill Embrain Co., which provides survey panels. A total of 1,300 potential respondents were invited to participate in the survey via e-mail and 1,125 replies were received (a response rate of 86.54%).

All the respondents were asked about their sensation-seeking behavior and need for cognition as individual characteristics. The following definition of binge-watching was given to participants: "watching multiple consecutive episodes of the same TV show in one sitting on a screen, be it a TV, computer, or mobile phone." Of 1,125 responses, 116 participants reported that they did not binge-watch at all and thus were screened out for the rest of the survey. A total of 1,009 identified themselves as a binge-watcher and answered survey questions about the level of flow, binge-watching dependence, and binge-watching behavior patterns (e.g., binge-watching frequency, binge-watched genres). Finally, questions about demographic information, such as income and education, were asked.

Survey Instrument Development and Measures

Sensation seeking (SSK), adopted from the Brief Sensation Seeking Scale developed by Hoyle, Stephenson, Palmgreen, Lorch, and Donohew (2002), was measured with eight items on a 5-point Likert scale (1 = *strongly disagree,* 5 = *strongly agree*; α = .80; *M* = 2.88, *SD* = .66): "I would like to explore strange places," "I would like to take off on a trip with no pre-planned routes or timetables,"

"I get restless when I spend too much time at home," "I prefer friends who are excitingly unpredictable," "I like to do frightening things," "I would like to try bungee jumping," "I like wild parties," and "I like new and exciting experiences, even if I have to break the rules." Also assessed was *need for cognition (NFC),* adopted from Thompson's (1995) and Cacioppo et al.'s (1984) scale, with eight items on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*; α = .83; *M* = 3.15, *SD* = .46). Items were "I would prefer complex to simple problems," "I find satisfaction in deliberating hard and for long hours," "I like to have the responsibility of handling a situation that requires a lot of thinking," "The idea of relying on thoughts to make my way to the top appeals to me," "Learning new ways to think excites me very much," "I prefer my life to be filled with puzzles that I must solve," "The notion of thinking abstractly is appealing to me," and "The notion of thinking abstractly is appealing to me."

Adopted and modified from Csikszentmihalyi (1975), Ghani and Deshpande (1994), and Webster, Trevino, and Ryan (1993) were questions about *flow* in binge-watching, measured by nine items on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*; α = .93; *M* = 3.66, *SD* = .64): "I got a sense of deep enjoyment," "It was fun for me," "It was interesting," "I fully concentrated on what I'm doing," "I was totally absorbed in what I was doing," "I was deeply engrossed in what I was doing," "My attention was focused on what I was doing," "I lost track of time," and "The sense of duration of time was altered."

For the dependent variable, participants were asked to indicate their level of *binge-watching dependence*. Adopted and modified from McIlwraith, Jacobvitz, Kubey, and Alexander (1991), Park, Kim, Shon, and Shim (2013), Smith (1986), and Wang, Vang, Lookadoo, Tchernev, and Cooper (2015), binge-watching dependence was measured with 12 items on a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*; α = .93; *M* = 2.84, *SD* = .78). The items were: "I feel comfortable when I binge-watch," "I feel uneasy when I can't binge-watch," "I tend to spend too much time binge-watching," "When I am not binge-watching, I often feel agitated," "I find myself binge-watching unintentionally," "I can't stop binge-watching even when I have a lot of work," "I tend to binge-watch without any purpose," "Binge-watching is part of my daily life," "When I have time, I tend to binge-watch, "I have made unsuccessful attempts to reduce the time I spend binge-watching," "I sleep less to stay up late to binge-watch," and "I keep thinking I should minimize the time I spend binge-watching." Finally, questions regarding respondents' demographics were asked. In addition, participants' binge-watching behavior (e.g., binge-watching frequency, binge-watched genre) and other requested demographics were provided.

Results

Table 1 shows the details of a sample profile and binge-watching consumption.

Table 1. Sample Profile.

Demographics and Binge-Watching-Related Experience	*n* (%)
Gender	
Male	585 (58.0)
Female	424 (42.0)
Age	
Under 19	66 (6.5)
20–29	424 (42.0)
30–39	377 (37.4)
40–49	109 (10.8)
50–59	28 (2.8)
More than 60	5 (.5)
Education	
Under middle school graduate	28 (2.8)
High school graduate	106 (10.5)
Attending college	176 (17.4)
College graduate	589 (58.4)
Attending graduate school	32 (3.2)
Master's/doctoral degree	78 (7.7)
Income	
Less than KRW 1,000,000	29 (2.9)
KRW 1,000,000–2,000,000	87 (8.6)
KRW 2,000,000–3,000,000	173 (17.1)
KRW 3,000,000–4,000,000	184 (18.2)
KRW 4,000,000–5,000,000	196 (19.4)
KRW 5,000,000–6,000,000	116 (11.5)
KRW 6,000,000–7,000,000	69 (6.8)
Over KRW 7,000,000	155 (15.4)
Binge-Watching Frequency (for the last 2 months)	
Never	41 (3.6)
Once every two weeks	59 (5.2)
Once a month	263 (23.4)
Once every two weeks	181 (6.1)
Once a week	465 (41.3)
Total	1,009 (100)

Psychological Traits and Binge-Watching

Table 2 shows the correlation between psychological traits and binge-watching dependence. A series of linear regression analyses was performed to examine the relationship between psychological traits and binge-watching dependence (H1 and H2). Results revealed that both SSK, $b = .49$, $\beta = .42$, $t(1,007) = 14.59$, $p < .001$; $F(1, 1,007) = 212.95$, $p < .001$; adjusted $R^2 = .17$, and NFC, $b = .12$, $\beta = .07$, $t(1,007) = 2.31$, $p < .05$; $F(1, 1,007) = 5.35$, $p < .05$; adjusted $R^2 = .004$, were positively associated with binge-watching dependence. Thus, both H1 and H2 were supported. Compared with NFC, SSK appears to be more strongly related to binge-watching dependence.

Additionally, to confirm SSK and NFC as key attributes related to binge dependence, a series of *t* tests was performed in terms of SSK and NFC differences between binge-watchers and non-binge-watchers. Findings showed that, compared with non-binge-watchers, binge-watchers displayed higher SSK, $M_{binge} = 2.91$ vs. $M_{non\text{-}binge} = 2.64$; $t(1,123) = 4.13$, $p < .001$, and NFC, $M_{binge} = 3.16$ vs. $M_{non\text{-}binge} = 3.07$; $t(1,123) = 1.97$, $p < .05$.

Table 2. Correlation Between Psychological Traits and Binge-Watching Dependence (N = 1,009).

Variables	SSK	NFC	Flow	BW
1. Sensation seeking (SSK)	1	–	–	–
2. Need for cognition (NFC)	.37**	1	–	–
3. Flow	.16**	.14**	1	–
4. Binge-watching dependence (BW)	.42**	.07*	.31**	1

* $p < .05$. ** $p < .01$

Mediation Effects of Flow on Binge-Watching Dependence

Mediation analyses were conducted using PROCESS macro (Model 4) with 10,000 bootstrapped samples (Hayes, 2017) to investigate the mediation role of flow on the relationships between psychological traits and binge-watching dependence (H3). In addition, participants' demographic information (e.g., age, gender, education, income), binge-watching frequency, and preference of binge-watched genre were included as covariates. Table 3 shows a summary of mediation analyses.

Table 3. Summary of Simple Mediation Analyses.

	Dependent Variables			
	Flow		Binge-Watching Dependence	
Antecedent	Coefficient	*SE*	Coefficient	*SE*
Sensation Seeking	.148***	.031	.420***	.034
Flow	–		.303***	.034
Age	−.005**	.002	.005	.003
Gender[a]	.066	.042	−.137**	.045
Education[b]	−.012	.063	.002	.069
Income[c]	.034	.040	.004	.043
Genre[d]	.065*	.042	−.057	.045
Binge-Watching Frequency	.077	.018	.062	.019
Constant	3.013***	.139	.202*	.182
	R^2 = .063 F(7, 1,001) = 9.559, p < .001		R^2 = .254 F(8, 1,000) = 42.548, p < .001	
	Flow		Binge-Watching Dependence	
Antecedent	Coefficient	*SE*	Coefficient	*SE*
Need for Cognition	.200***	.044	.015	.051
Flow	–		.366***	.037
Age	−.006*	.002	.003	.003
Gender[a]	.049	.041	−.237***	.048
Education[b]	−.018	.063	.015	.074
Income[c]	.048	.040	.055	.046
Genre[d]	.072	.042	−.063	.048
Binge-Watching Frequency	.082***	.018	.079***	.021
Constant	2.806***	.175	1.132***	.227
	R^2 = .061 F(7, 1,001) = 9.233, p < .001		R^2 = .137 F(8, 1,000) = 19.789, p < .001	

[a]female = 1. [b]high = 1. [c]high = 1. [d]drama = 1.
* p < .05. ** p < .01. *** p < .001.

Results showed that SSK was positively related to flow (b = .147, *SE* = .031), which in turn led to binge-watching dependence (b = .303, *SE* = .034). And the relationships between SSK and binge-watching dependence was found to be mediated by flow; the confidence interval was .024 to .069, not including zero (effect = .045, *SE* = .012). Similarly, NFC was positively related to flow (b = .200, *SE* = .044), which subsequently led to binge-watching dependence (b = .366, *SE* = .037). The relationship between NFC and binge-watching dependence was also mediated by flow during binge-watching (effect = .073, *SE* = .021). The confidence interval for the indirect effect was .034 to .116. Findings indicate that flow during binge-

watching mediated the relationship between psychological traits (SSK, NFC) and binge-watching dependence. All detailed figures are shown in Table 3.

Discussion

This study explored psychological traits associated with viewers' binge-watching dependence and its underlying cognitive mechanism by focusing on flow. Findings displayed a strong relationship between SSK and binge-watching dependence. This finding is in line with prior studies that also found a significant positive relationship between SSK and media dependence (Lin & Tsai, 2002). Wang and colleagues (2015) specifically found that high sensation seekers tend to select media content that is exciting and stimulating, as opposed to dull and placid content, to elevate preferred levels of arousal. Dramatic tension could be physiologically stimulating or psychologically rewarding to binge-watchers, especially for high sensation seekers, who therefore are likely to continue the binge-watching behavior, developing media dependence.

Findings of this current study further showed that NFC is also associated with binge-watching dependence. A possible reason is that the binge-watching behavior itself is essentially associated with processing certain content (e.g., TV series) presented as ongoing narratives with plots, characters, and, often, surprise endings. For example, viewers with high NFC may be influenced by binge-watched programs that reflect effortful cognitive activities such as careful scrutiny of incoming information. Prior studies have revealed that dramas consisting of different genres, including thrillers and mysteries, significantly stimulated viewers' cognitive needs (e.g., Knobloch-Westerwick & Keplinger, 2008; Rosenbaum & Johnson, 2016).

Interestingly, NFC, in comparison with SSK, was found to be a weaker attribute relative to the development of media dependence. Prior studies (e.g., Fikkers & Piotrowski, 2020) show that habitual use does not require a high degree of effortful cognitive elaboration; this implies that, in some cases, binge-watching could come from a habitual behavior (Steins-Loeber, Reiter, Averbeck, Harbarth, & Brand, 2020), as evidenced by a lower association between NFC and binge-watching dependence.

This study contributes to research on binge-watching by identifying the mediating role of flow in relationships between psychological traits (SSK and NFC) and binge-watching dependence. Viewers with high levels of SSK and NFC both reported high levels of flow experiences, which in turn were connected to a high likelihood of binge-watching dependence. As literature on extreme media usage suggests (Csikszentmihalyi, 1990; Hartmann et al., 2012; Hawi, 2012; Khang et al., 2013; Tokunaga & Rains, 2010; Wang et al., 2020), psychological traits such as SSK and NFC motivate individuals to become engaged with certain objects (i.e., binge-watched programs). Further, binge-watched programs tend to stimulate viewers' state of arousal and continue to provoke curiosity that requires cognitive elaborations, which people with high SSK and NFC prefer (Cacioppo et al., 1984; Edwards, 1991; Zuckerman, 1994); thus, they become more involved in program watching. Given that the flow experience entails loss of self-regulation (LaRose et al., 2003), binge-watchers involved in the flow state may be unlikely to control their endless desire to continue watching binge-watched programs. Considering that individuals tend to have different levels of self-regulation as a personality trait (Hong & O'Neil, 2001), it will be worth investigating whether the impact of flow on binge-watching dependence varies by individual levels of self-regulation as a topic for future research.

The current study has several limitations. This study was based on self-reported data by individuals who engage in binge-watching. Given that flow in binge-watching is a status rather than a trait (Csikszentmihalyi, 1975), an experimental research study is needed to investigate causal relationships among those key variables (SSK, NFC, flow, and binge-watching dependence). Additional research is needed to explore the impact of other psychological factors that may further contribute to a better understanding of binge-watching dependence. For example, factors such as the Big 5 personality traits, dysphoric moods (e.g., loneliness), and need for affect (Appel & Richter, 2010) have been found to relate to narrative transportation (similar to flow) and are known to influence media consumption (Green & Jenkins, 2020; Kraaykamp & Van Eijck, 2005; Sung et al., 2015). According to social cognitive theory (SCT), expected gratifications and self-regulation as personal agency may also play a role in excessive use of media (Bandura, 1989; LaRose et al., 2003). In particular, SCT suggests a high possibility of falling into binge-watching dependence when expected gratifications to be gained through binge-watching are greater than the ability to control binge-watching. Future research that expands the model presented in this study, including the level of individual self-regulation, merits consideration.

Finally, there is still no consensus on the definition of binge-watching. While this study defined binge-watching as "watching multiple consecutive episodes of the same TV show in one sitting," the criterion of *multiple* consecutive episodes (as opposed to a clearer threshold or a continuous scale) is vague. A related consideration is that each episode has a different running time, so the total amount of binge-watching time should be considered in future studies (Sung et al., 2018). This study used only the binge-watching definition to identify binge-watchers and subsequently asked about other key variables (e.g., psychological traits and binge-watching dependence); thus, future research needs to investigate model differences depending on relative levels of binge-watching by developing a clearer definition of what the phenomenon of binge-watching encompasses.

Despite its limitations, this study lays a foundation for understanding the relationships among psychological traits, flow experience, and binge-watching dependence. This study theoretically contributes to extant literature on media dependence by extending it to binge-watching. In addition, this research adds to the literature on media psychology by explicating the role of flow as linked to binge-watching dependence. Managerially, findings from this study will help practitioners in broadcasting and over-the-top industries better understand binge-watchers and binge-watching behavior and provide insights into developing innovative creative content.

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