Binge-watching: what do we know so far? A first systematic review of the evidence

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Abstract

Purpose of review: Along with the expansion of on-demand viewing technology, the practice of binge-watching (i.e., watching multiple episodes of TV series back-to-back) has recently gained increasing research interest, given its potential harmfulness and presumed addictive characteristics. The present article provides the first systematic review of the evidence regarding this increasingly widespread behavior.

Recent findings: The results of this systematic review (including 24 studies and 17,545 participants) show that binge-watching remains an ill-defined construct as no consensus exists on its operationalization and measurement. Although such methodological disparities across studies hinder the comparability of results, the preliminary findings gathered here mainly point to the heterogeneous nature of binge-watching which covers at least two distinct realities, i.e. high but non-harmful engagement and problematic involvement in TV series watching.

Summary: In these early stages of research, there is a major need for more consistency and harmonization of constructs and their operationalizations to move forward in the understanding of binge-watching. Just as important, future research should maintain the distinction between high and problematic involvement in binge-watching to avoid overpathologizing this common behavior.

Keywords: binge-watching; TV series; systematic review; operationalization; assessment; correlates

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Introduction

Video streaming platforms (e.g., Netflix, Hulu, Amazon Prime) have been expanding at a fast pace in the past few years. Combining ease of use (affordability and wide accessibility through just about any internet-connected device) and prolific content libraries available on-demand at one's convenience, these services are now part of millions of TV series viewers' daily routines [1-3]. Central to the changes afforded by these technologies is the move away from the traditional week-by-week release of episodes with entire seasons of TV series now being made available at once. As a prime indicator of the cultural shift in watching, binge-watching (i.e., watching multiple episodes of a TV series back-to-back) has rapidly become the new normative mode of viewing TV shows, especially among young adults [1, 4].

Nevertheless, in this unparalleled era where viewers are free to watch literally as many TV series episodes as wanted — and where problematic online behaviors are taken seriously —, a new sector of research recently emerged, building on the notion that prolonged involvement in binge-watching leads to problematic patterns of TV series viewing and deleterious consequences. Among the initial evidence of impairments associated with excessive binge-watching are insomnia and chronic fatigue [5], a sedentary and unhealthy lifestyle [6], negligence of other activities [7, 8] and reduction of social relationships [7, 9]. While the compelling nature of TV series may be considered as posing a genuine challenge to viewers' self-control abilities, there is a widespread asssumption in the literature that binge-watching has addictive qualities [6, 10-13] although a specific framework of understanding still needs to be elaborated.

In a structured effort to progress in this direction, the present article aims at providing the first systematic review of existing data on binge-watching.

Methods

In accordance with PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines [14], we carried out a systematic literature review. We identified relevant studies by consulting two academic databases (*Scopus* and *PsycINFO*) and *Google Scholar*, using the following algorithm: ["Binge-watching" OR "Binge-viewing" OR "Marathon viewing" OR "Marathon watching" OR "Media marathoning" OR "Increased viewing" OR "Excessive viewing" OR "Problematic viewing" AND "TV series" OR "TV shows" OR "TV dramas"]. Articles were retained for consideration depending on whether they were: (1) published in a peer-reviewed journal from 1st of January 2013 to 11th of September 2019 (this time window covering the period from the inaugural year[1] when the term "binge-watching" entered the popular vocabulary to our search date); (2) published in English; (3) dealing with the practice of binge-watching episodes of TV series (i.e., involving a measurement of this specific behavior or, at least, of the extent of engagement in TV series watching); and (4) relying on quantitative data (theoretical articles, qualitative studies and single case reports were excluded).

The initial search yielded 892 results (11 in *Scopus*, 176 in *PsycINFO*, 705 in *Google Scholar*) that were processed according to the multi-step procedure depicted in Figure 1. A first removal of duplicates led to the retention of 789 records. All of them were subsequently screened from their title/abstract. As a result, 19 articles were found to match the current search criteria (see Figure 1) and were therefore subjected to a full-text reading for appraising their overall relevance to our topic. This step led to the further deletion of 1 article reporting the results of a study designed for marketing research. Finally, the reference lists of the 18

[1] Google Trends (https://www.google.com/trends/) clearly shows that "binge-watching" started to become a search term of interest in February 2013, coinciding with the first time when Netflix released simultaneously all 13 episodes of the first season of *House of Cards*.

retained articles were considered for the purpose of identifying other potentially relevant studies, which resulted in the inclusion of 6 additional articles following full-text review. Consequently, 24 papers were included in the current systematic literature review.

INSERT FIGURE 1 HERE

For all retained articles, the following data were systematically extracted: (1) the identification of the study (names of the authors, year of publication, country); (2) the characteristics of the sample (sample size, age, gender ratio); (3) the assessment of binge-watching behavior (operationalization, measurement, reported prevalence); (4) the design of the study (methodology type, set of variables measured); and (5) the identified correlates of binge-watching (divided across the following categories: socio-demographics, motivations, personality traits, positive/negative outcomes, and mental health). Additionally, an assessment of each study's methodological quality was conducted by using the "Appraisal tool for Cross-Sectional Studies" (AXIS) [15], the selection of which was guided by the fact that most included studies were observational and cross-sectional in design. This 20-item scale, developed on the basis of an international Delphi procedure, evaluates the appropriateness of study design, reporting quality and risk of bias in cross-sectional studies across disciplines. Nevertheless, as this tool does not involve any quality assessment score, we used the shortened version from Sacolo, Chimbari, & Kalinda [16], consisting of 10 yes/no questions, resulting in a total score to give a quality rating from 1–4 (Low), 5–7 (Moderate) to 8–10 (High). The details of this assessment per item/question and the total quality score for each study are presented in Table 1.

INSERT TABLE 1 HERE

Key characteristics of the studies

A summary of the information extracted from each of the 24 included articles is presented in Table 2. The reviewed studies primarily focused on: (1) the investigation of factors (e.g., personality traits, psychopathology) related to binge-watching (58% of the studies); (2) the identification of binge-watching motivations (25%); (3) the development and validation of related measurement instruments (17%); (4) the characterization of binge-watching frequency (13%) and its definition (8%); and (5) the experimental testing of its impact on audience engagement (8%). The flourishing of binge-watching research over recent years is reflected by the growing number of scholarly articles, with the first one published in 2015 [17], 2 in 2016 [18, 19], 7 in 2017 [20-26], 9 in 2018 [27-35] and already 5 released in 2019 [36-40]. In most instances, these studies were carried out in the United States (n = 12), while the remaining ones took place in Belgium (n = 2), Hungary (n = 2), South Korea (n = 2), Australia (n = 1), China (n = 1), Germany (n = 1), Poland (n = 1), the United Arab Emirates (n = 1), and the United Kingdom (n = 1). With the exception of two studies involving experimental designs [22, 36], all are online cross-sectional survey-based studies. A total of 17,545 participants took part in the 24 reviewed studies with an average female representation of 69.3% (n = 12,162) and a mean age of 26.4 years, calculated on the basis of papers reporting this information (n = 19) [17-22, 24**-29, 33-35, 37-40]. As shown in Table 1, the quality scoring of these studies ranges from « moderate » to « high » values, with 63% of them [18, 19, 21-26, 28, 29, 31-35, 37-40] assessed as « high » in methodological quality.

INSERT TABLE 2 HERE

Operationalization of binge-watching

We identified considerable variability in the operational definitions proposed for binge-watching, with some articles even specifying two different options [17, 23, 29, 30, 33, 39], thus bringing the total number of distinct possibilities to 19 across the 28 definitions listed in the studies directly operationalizing binge-watching (22/24). These operationalizations almost systematically consist of the following sequence of sub-components: (1) a quantity based-index; (2) the characterization of the content; and (3) a time pattern. With respect to the first feature (i.e., quantity-based index), it appears that binge-watching is predominantly understood as the amount of episodes (n = 19) and programs (n = 1) [17, 18, 20, 21, 23-25, 28-32, 34**-40] or, more rarely, of hours spent viewing (n = 2) [22, 23], comprising an underlying notion of multiplicity [18, 21, 27, 30, 31, 37] or the genuine specification of quantitative cut-offs, ranging from watching more than 1 episode (n = 3) [17, 20, 28], to 2 episodes (n = 6) [17, 23, 25, 32, 35, 40], and 3 episodes (n = 7) [24**, 29, 34**, 36, 38*, 39], or watching for more than 1 hour [23] or 3 hours [22]. Rubenking and Bracken [29] added a further subtlety by adapting their proposed threshold to the typical length of the show (i.e., 30-minute or hour-long episodes) but this constitutes an exception among current definitions. In turn, last alternatives involved more broad-based patterns by relying on the viewing of a full season [30, 33, 39] or an entire series [33]. From the second feature (i.e., characterization of the content), most operationalizations referred to the viewing of the same series (n = 20) [17-21, 23, 24**, 28-30, 32-37, 39], while the rest of them delt with undifferentiated programs (n = 5) [22, 27, 29, 30, 38*] or did not specify the type of binge-watched content (n = 3) [25, 31, 40]. Finally, with regard to the third feature (i.e., time pattern), the proposed operationalizations involved various timeframes, the majority of which referring to the notion of consecutiveness, i.e. "in a single sitting" (n = 22) [17-32, 34**-39], whereas the remaining ones relied on the following distinct temporalities: "in a small amount of time" [33], "a day" [40], "in several days" [17, 30], and "within a week" [39]. A graphical overview of these

operational disparities across studies is provided in Figure 2. Unsurprisingly, the lack of a validated and common definition of binge-watching is clearly identified by the authors as a major obstacle to coherence and reproducibility in current early binge-watching research [17, 20, 21, 29, 30, 33, 35, 36, 37].

INSERT FIGURE 2 HERE

Assessment and prevalence of binge-watching

Similar to operationalizations of binge-watching, its measurement substantially varies across papers. In the absence of accepted assessment criteria, most studies simply relied on global quantity estimates, as usually done in media research [41], revolving around three sets of indicators: (1) the frequency, assessed in various terms (i.e., generally speaking, over the last month, over the last week), of binge-watching (n = 9) [17-21, 24**, 29, 32, 35, 38*, 39]; (2) the average duration of one viewing session (n = 7) [20, 21, 25, 29, 32, 35, 38*]; and the number of episodes usually watched (per viewing session or per day; n = 5) [20, 21, 32, 34**, 35]. These criteria were either assessed alone [24**, 39] or in different combinations [20, 21, 29, 32, 35, 38*, 40], sometimes complemented by additional idiosyncratic questions relating to the intention (i.e., planning ahead) and severity of binge-watching [17], the number of consecutive days spent watching a show recently [34**], or by a non-validated measure of narrative transportation (i.e., deep sense of immersion into the world of a story) [32]. These indicators (or their combination) have been used as stand-alone dependent variables [17, 21, 29, 38*] or construed as forming a composite binge-watching score [20, 32, 34**, 35, 40]. For the remaining studies where there was no use of such criteria, binge-watching was assessed through other questions relating to: its recent occurrence based on participants' self-perceived binge-watching duration [25], the general tendency to binge-watching [30, 31], and

the pace of watching a particular series [18, 33]. Finally, beyond mere measurement items, four studies used custom made and non-validated binge-watching measures of intention [23], tendency [27], behavioral/cognitive involvement [28], or excessiveness [40], while three studies used proposed psychometrically validated measurement instruments [19, 26, 37]. The conceptual underpinnings and robustness of methods behind the current assessment of binge-watching are thus manifold, this heterogeneity again being disclosed as impeding consistency among existing studies [21, 24**, 27, 29, 38*]. Such plurality of measurement alternatives also poses a major challenge to replication of results and data comparability, which is presently made difficult due to these discrepancies at theoretical and methodological levels. The available prevalence data offer a prime example of this as, based on their respective assessment criteria, studies (n = 12) report a prevalence rate of binge-watching ranging from 44.6% to 98%. It should be stressed, however, that all of these form an average prevalence of 72.14%, thus suggesting that binge-watching is not an atypical viewing practice, but rather the norm across the current samples, which corroborates recent market reports [1, 4].

Emerging profiles of binge-watchers

The results from the studies included in this systematic review suggest a number of susceptibility factors for binge-watching, which provides some preliminary insight into binge-watchers' profile. A first category of binge-watching correlates concerns their socio-demographic characteristics. A number of studies showed a positive association between female gender and engagement in binge-watching, either in terms of frequency and intensity of viewing sessions [17, 21, 25, 38*], or of loss of control over watching [19, 40]. Nevertheless, results are inconsistent across studies as, in addition to thoses who found no gender effect [17, 20, 29, 30, 31, 38*], Exelmans et al. [21] report that binge-viewing sessions lasted longer among men. Similarly, some of the reviewed studies suggest that younger age is

positively associated with overall binge-watching [20, 30, 31], its frequency [29], and problematic series watching [19], while others have not reproduced such correlations [17, 38*]. Finally, while single individuals (in terms of partnership status) were generally more severe binge-watchers [20], educational level was found to be both positively [25] and negatively [19, 30] related to binge-watching. Such discrepancies again underline that current results are highly dependent on the binge-watching operationalization (and measurement) used.

Be this as it may, more areas of commonality amongst the reviewed studies' findings can be identified with respect to binge-watchers' motivations, this time establishing a clearer picture. Consistent with the *Uses & Gratifications* framework asserting that media use is primarily driven by needs satisfaction [42, 43], binge-watchers' engagement in TV series viewing appears to derive from various outcome expectations with a clear preponderance of hedonistic motivations (i.e., entertainment, enjoyment) [17, 29, 31, 32, 37, 40]. The motivational pull of TV series binge-watching seems, therefore, to stem from a first set of drivers that concern the maximization of enjoyable attributes of viewing: better engagement with the content [17], greater fan enthusiam [31], deeper experience of suspense/anticipation [29], and stronger feeling of getting swept away in the story (i.e., narrative transportation) [39]. In accordance with such a « derived-benefits » view of binge-watching, more eudaemonic (e.g., personal enrichment, information seeking) and reward-based motivations have also been found to play a role for binge-watchers' involvement [37, 38*, 40]. At the same time, however, a second cluster of motivational correlates emerged across studies to make binge-watching appear as something rather compensatory: high levels of binge-watching were associated with the motivations of passing time [32, 40], dealing with loneliness [40], and escaping from everyday worries [23, 40], while higher frequency was related to procrastination [38*] and emotion regulation [29] purposes. In a similar vein,

Flayelle et al. [37] found that coping/escapism motivation was specifically linked to problematic binge-watching, thus supporting the hypothesis that problematic binge-watching involves maladaptive coping or emotion-regulation strategies [44]. This line of thinking is in accordance with results showing that problematic involvement in a wide range of recreational activities (e.g., drug use, video gaming, gambling, cybersex) reflects as many different attemps to reduce aversive emotional states [45-47]. With regard to binge-watching, it is moreover noteworthy that female viewers shown more inclination to such purposes [37, 40]. Other motives in seeking gratification relate to the opportunity to bond with others by means of TV series [17, 23, 37], although some studies have not found any association with such social expectations [32, 40]. The current systematic literature review shows, however, that the latter relied on the same quantitative instrument assessing motivations for TV viewing in general (i.e., not specifically applying to binge-watching), which prompts some reservations as to the possible conclusions.

Finally, giving credence to theories of media exposure stating that users' personality is a strong predictor of the intensity of media consumption [48, 49], specific associations between individual differences in personality traits and propensity to binge-watch also emanated. While viewers who get drawn into binge-watching were found to be characterized by insecure attachment [34**], low agreeableness, conscientiousness, and openness [26, 39], they presented, in contrast, high levels of both neuroticism [26, 39], need for cognition and sensation seeking [30, 31]. But above all, the reviewed literature reveals the impulsive personality of binge-watchers. Riddle et al. [24**], for example, found that high impulsivity was related to increased levels of unintentional binge-watching (i.e., occuring unexpectedly), which echoes other findings demonstrating the relationship between self-regulation deficits and binge-watching [34**, 38*]. Such evidence is in line with substantial media research showing that both impulsivity and self-regulation failure constitute significant predictors of

increased (and even excessive/problematic) media use [50-56]. In close connection with the foregoing, the included studies also suggest that heavy binge-watchers reported a higher predilection towards immediate gratification [30], and that the frequency of binge-viewing sessions was related to automaticity [29, 35].

Binge-watching outcomes

In conjunction with the motivational profile of binge-watchers described above, it comes as no surprise that binge-watching is especially gratifying in the light of the review of its associated outcomes, according to which this behavior seems mainly supported by the deepening of viewers' experience (and therefore engagement) during viewing. Coherent with the widely held notion that increased engagement enhances media effects [57], binge-watching was related to higher levels of enjoyment [27, 38*], narrative transportation [32], and identification with featured characters [34**], with whom binge-watchers were also found to develop stronger parasocial relationships [34**]. These conclusions are further corroborated by Erickson and colleagues' experimental findings showing that, of two groups of viewers being asked to watch a TV show under different schedules (traditional episodic versus binge modes of viewing), the ones in the binge-condition experienced higher narrative transportation while forming stronger and lasting parasocial relationships with the series' protagonists [36]. Finally, binge-watching was positively associated with several indicators of well-being via perceived autonomy [27], as well as with usage satisfaction [28] and harmonious passion [26]. This set of results, however, contrasts with studies that failed to identify a link between binge-watching and narrative transportation [34**] or positive gratifications such as hedonic enjoyment [20, 34**]. Moreover, the other experimental study currently available found that individuals who were (experimentally) required to watch TV series episodes back-to-back not only reported significant less enjoyment than those following

a daily or weekly pace of watching [22], but also less enduring content memory [22], which, in itself, is a likely indicator of program engagement.

In parallel to this, a second line of evidence shows a rather uniform picture of outcomes associated with binge-watching, this time in a more negative light. Binge-watching frequency was associated with reduced sleep quality, daytime fatigue and insomnia, with cognitive pre-sleep arousal mediating those relationships [21], while a healthy diet was negatively correlated with overall binge-watching [25]. Another self-report study found that binge-watchers tend to experience a decrease of meaningful and positive affect right after viewing, which led the authors to suggest a post-binge-viewing « show hole », i.e., a feeling of emptiness following show completion [33]. Binge-watching is also associated with obsessive passion [26] and with goal conflicts and emotional distress (i.e., guilt, regret) [23, 27, 30, 35], through the effect of which such viewing practice was, besides, negatively related to well-being [27]. Shim et al. [30] notably showed that, among viewers characterized by a higher preference for instant gratification, post-binge-watching feelings of regret and guilt constitute positive predictors of subsequent binge-viewing sessions. The same observation was made by Panda and Pandey [23] who further commented that viewers may alleviate such negative emotional states precisely by continuing to binge-watch TV series, thus paving the way for a vicious circle that both research teams consider as addictive in nature. Only one study stands in stark contrast to the above claims by identifying regret as a negative predictor of binge-watching frequency [38*], while other findings shed some light on the matter by evidencing the moderating role of the level of attentiveness paid to a show in whether motivations for binge-watching predict decreased or increased later regret [39]. All these preliminary findings are very revealing about how a nuanced understanding is necessary when approaching binge-watching. The two-sided picture resulting from its reviewed correlates thus gives further credit to the fact that media use may imply both positive and negative media effects on users'

well-being [58], which are generally moderated by self-control abilities exerted in those contexts [51].

Mental health correlates of binge-watching

The current systematic review emphasizes that heavy binge-watchers experience psychopathological symptoms such as anxiety (including fear of missing out) [18, 33], depression [20, 34**] — the effect of which is mediated by self-regulation deficits [34**] —, addiction-like symptoms [24**], and problematic Internet use [37], although results are sometimes mixed (e.g., Tefertiller et al. [33] found that depression was associated with a decreased likelihood of binge-watching). Consistent with this, the positive relationship between negative affect and problematic binge-watching [37] continues to argue in favour of the notion of binge-watching as an emotion-focused coping strategy. These associations convey the idea that there are problematic comorbid versions of binge-watching to be considered, for which preliminary assumptions can be made in terms of underlying mechanisms. In this respect, the Interaction of Person-Affect-Cognition-Execution (I-PACE) model [59, 60] provides a sound framework within which the general results of this systematic review can be interpreted. The I-PACE model describes the processes involved in the development and maintenance of the problematic use of online applications of any type (e.g., online gambling and gaming, cybersex, social networking, online shopping) by considering both predisposing variables representing core characteristics of the person (P), affective and cognitive responses to external or internal stimuli (AC), and executive functions, inhibitory control, and the decision to use certain applications/sites (E). According to such a conceptual basis, it may be proposed that the impulsive personality of binge-watchers acts as a predisposing factor which, in combination with misplaced coping mechanisms, interacts with depressive mood to likely potentiate the risk of developing problematic binge-watching

behavior.

Conclusions

As the digitization of TV series puts viewers in control within an unprecedented « all you can watch » culture, binge-watching has become a widespread behavior that has attracted increasing research interest over the last four years. By summarizing and discussing available quantitative data derived from these initial studies, the present overview of the current evidence shows a coherent and nuanced picture where preliminary patterns can be described. Navigating between gratification and compensation, binge-watching appears not to represent a single and uniform behavior but constitutes a complex phenomenon which shows at least two manifestations: (1) a highly rewarding and pleasurable experience that may drive deliberate and harmonious significant viewing involvement performed in response to various needs and desires; and (2) an excessive/problematic behavior not only associated with negative outcomes, but also with a range of risk factors associated with dysfunctional use of technologies (e.g., age, underlying coping motives, impulsivity, automaticity) and diverse mental health conditions. Echoing a recent recommendation made for video-gaming [61], high but healthy engagement in TV series watching should be distinguished from problematic binge-watching to avoid pathologizing this highly popular activity. Additionally, in order to promote healthy patterns of engagement among TV series viewers, future research should inform policy and practices in the development and implementation of strategies to minimize harm associated with problematic use of such emerging technologies. For example, education on potential risks to one's health and well-being (especially among youths), provision of clear user guidelines on appropriate and inappropriate use of streaming platforms, as well as the introduction of in-app tools to aid self-regulation in binge-watching should be proposed [62].

Nevertheless, the current systematic review also demonstrates recurring discrepancies in studies' findings that need to be put into perspective with the particular operationalization of binge-watching and its related assessment. As highlighted in this paper, binge-watching remains an ill-defined construct without consensus regarding its (operational) definition across studies, which use a whole host of assessment methods that continue to impair comparability of data and results. Therefore, this systematic review places a strong emphasis on the current need to structure research efforts devoted to binge-watching to overcome fragmentation and to promote the soundness of this fast-developing research area. To this end, particular avenues for future research are evident including, among others, the development of a common evidence-based definition of binge-watching (e.g., by determining expert consensus through a Delphi technique), and the expansion of the factors investigated (in connection with both unproblematic and problematic related involvement) with reliance on standardized binge-watching self-report measures that have proven to be reliable for use across research teams. Only then will research on binge-watching be able to generate findings likely to best deepen our understanding of this prominent behavioral phenomenon in today's technological landscape.

Compliance with Ethical Standards

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Table 1. Study assessments and total scores using the Appraisal Tool for Cross-Sectional Studies (AXIS), shortened version.

Authors (year)	Scores for each item										Total score	Quality rating
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**		
Pittman & Sheehan (2015)	Y	Y	N	Y	N	N	Y	Y	Y	N	6	Moderate
Conlin et al. (2016)	Y	Y	N	Y	Y	Y	Y	Y	N	Y	8	High
Orosz et al. (2016)	Y	Y	N	N	N	Y	Y	Y	Y	Y	7	Moderate
Ahmed (2017)	Y	Y	N	Y	N	N	Y	Y	N	N	5	Moderate
Exelmans & Van den Bulck (2017)	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	9	High
Horvath et al. (2017)	Y	Y	N	Y	Y	Y	Y	Y	N	Y	8	High
Panda & Pandey (2017)	Y	Y	N	Y	Y	Y	Y	Y	Y	N	8	High
Riddle et al. (2017)	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	9	High
Spruance et al. (2017)	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	9	High
Tóth-Király et al. (2017)	Y	Y	N	N	Y	Y	Y	Y	Y	Y	8	High
Granow et al. (2018)	Y	Y	N	Y	Y	N	Y	Y	Y	N	7	Moderate
Merikivi et al. (2018)	Y	Y	N	Y	Y	Y	Y	Y	Y	N	8	High
Rubenking & Bracken (2018)	Y	Y	N	Y	Y	N	Y	Y	Y	Y	8	High
Shim et al. (2018)	Y	Y	N	Y	Y	N	Y	Y	Y	N	7	Moderate
Shim & Kim (2018)	Y	Y	N	N	Y	Y	Y	Y	Y	N	7	Moderate
Sung et al. (2018)	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	9	High
Tefertiller & Maxwell (2018)	Y	Y	N	N	Y	Y	Y	Y	Y	Y	8	High
Tukachinsky & Eyal (2018)	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	9	High
Walton-Pattison et al. (2018)	Y	Y	N	N	N	Y	Y	Y	Y	Y	7	Moderate
Erickson et al. (2019)	Y	Y	N	Y	Y	N	N	Y	Y	N	6	Moderate
Flayelle et al. (2019)	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	9	High
Merill & Rubenking (2019)	Y	Y	N	Y	Y	N	Y	Y	Y	Y	8	High
Pittman & Steiner (2019)	Y	Y	Y	N	N	N	Y	Y	Y	Y	7	Moderate
Starosta et al. (2019)	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	9	High

Note. N= No; Y= Yes.

Questions related to each item (the main or complementary factors assessed are in italics).

Introduction

(1) Were the aims/objectives of the study clear?
We notably evaluated the clarity of the research question and its relevance in view of the presented literature.

Method

(2) Was the study design appropriate for the stated aim(s)?

(3) Was the sample size justified?
Be it based on previous studies' sample sizes or on statistical calculation.

(4) Was the target/reference population clearly defined? (Is it clear who the research was about?)
We centrally checked whether inclusion/exclusion criteria were specified.

(5) Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialed, piloted or published previously?

(6) Were the methods (including statistical methods) sufficiently described to enable them to be repeated?
We also evaluated the validity and reliability of the measures used.

Results

(7) Were the results presented for all the analyses described in the methods?
We also evaluated the validity of the analyses conducted and results obtained.

Discussion

(8) Were the authors' discussions and conclusions justified by the results?

(9) Were the limitations of the study discussed?

Other

(10) Was ethical approval or consent of participants attained?

Table 2. Description and main results of the studies included in the systematic review.

Authors (year)	**Country**	**Participants**			**Binge-watching assessment**			**Study design**		**Binge-watching correlates**					
		N	Age (M_{age})	Females (%)	Operationalization	Measure	Prevalence (%)	Method	Variables measured	Socio-demographics	Motivations	Personality traits	Positive outcomes	Negative outcomes	Mental health
Pittman & Sheehan (2015) [17]	USA	262	29	62	Watching 2 or more episodes of the same series in a single sitting, or watching 1 or more episodes of the same series for several consecutive days.	Frequency (Fre) Intention (Int) Severity (Sev)	97	Online survey	• Demographics • Programs and platforms used • BW behavior • BW-related motivations (based on previous non-validated measure)	+ Being a woman (Sev)	+ Engagement (Fre, Int, Sev) + Hedonism (Int, Sev) + Social (Sev)				
Conlin, Billings & Averset (2016) [18]	USA	160	35.2	48.8	Consuming multiple episodes of the same TV show in one sitting.	Pace of watching	NR	Online survey	• Demographics • BW behavior • Fear of Missing Out scale • Social media use						+ Fear of Missing Out
Orosz, Böthe & Tóth-Király (2016) [19]	Hungary	1118	25	71.7	NA	PSWS	NA	Online survey	• Demographics • Problematic Series Watching Scale • Amount of free time • Time spent watching	+ Being a woman + Being younger – Education					
Ahmed (2017) [20]	UAE	260	25.8	51.9	Watching more than 1 episode from the	Frequency Duration	44.6	Online survey	• Demographics • Viewing habits	+ Being younger + Being single					+ Depression

					same TV content consecutively in the same session.	Number of episodes (composite score)			• BW behavior • Depression (based on previous non-validated measure) • UCLA Loneliness scale					
Exelmans & Van den Bulck (2017) [21]	Belgium	423	22.2	61.9	Watching multiple consecutive episodes of the same TV show in one sitting.	Frequency (Fre) Duration (Dur) Number of episodes (Num)	80.6	Online survey	• Demographics • Perceived physical health • Exercice level • Bedtime TV viewing • BW behavior • Pittsburgh Sleep Quality Index • Fatigue Assessment Scale • Bergen Insomnia Scale • Pre-Sleep Arousal Scale	+ Being a woman (Fre) + Being a man (Dur)		.		+ Poor sleep quality (Fre) + Daytime fatigue (Fre) + Pre-sleep arousal (Fre)	+ Symptoms of insomnia (Fre)
Horvath et al. (2017) [22]	Australia	51	22.2	57	Viewing of 3 or more hours of programming within a single sitting.	NR	NR	Laboratory experiment	Weekly group [1 episode per week over 6 consecutive weeks] Daily group [1 episode per day over 6 consecutive days] Binge group [6 episodes in a single setting] • Perceived comprehension (immediately after show completion/1 week later/140 days later) • Retention (24h later/1 week later/140 days later)				– Enjoyment – Sustained memory		
Panda & Pandey (2017) [23]	USA	229	NR	56	Watching a minimum of 2-3 episodes of the same series, or at least 1 hour of the same TV series in one sitting.	Intention (created measure)	NR	Online survey	• Demographics • BW behavior • BW-related motivations (based on previous qualitative investigation and non-validated measures) • BW-related outcomes (based on previous qualitative investigation)		+ Social engagement + Escape + Accessibility + Advertising influence			+ Negative gratifications	
Riddle et al. (2017) [24]	USA	171	19.9	75	Watching 3+ episodes of the same TV program in one sitting.	Frequency intentional BW (Fre-In) Frequency unintentional BW (Fre-	98	Online survey	• Demographics • BW behavior (semester weekdays/ semester weekends/ semester breaks) • TV Addiction			+ Impulsivity (Fre-Un)			+ Addiction symptoms (Fre-Un)

						Un)			Scale (items adapted to BW) • Barratt Impulsivity Scale • Grade Point Average					
Sprunce et al. (2017) [25]	USA	500	20.6	57.8	Watching between 2 and 6 episodes in one sitting.	Self-perceived duration ⇒Occurrence last week ⇒Occurrence last month	20 (weekly) 72 (monthly)	Online survey	• Demographics • BW behavior (weekly/monthly) • Physical activity • Diet • BMI	+ Being a woman (weekly, monthly) + Education (monthly)			– Healthy eating (weekly, monthly)	
Tóth-Király et al. (2017) [26]	Hungary	1520	30.1	72.2	NA	SWES	NA	Online survey	• Demographics • Series Watching Engagement Scale • Problematic Series Watching Scale • Series Watching Passion Scale • Time spent watching • Big Five Inventory-10 Item Scale			– Conscientiousness + Neuroticism	+ Harmonious passion	+ Obsessive passion
Granow, Reinecke & Ziegele (2018) [27]	Germany	499	28.2	67	Intense and consecutive consumption of series in a single sitting.	Tendency (created measure)	NR	Online survey	• Demographics • BW behavior • Goal conflicts • State Shame and Guilt Scale (items adapted to BW) • Autonomy (based on previous non-validated measure) • Recovery Experience Questionnaire ('psychological detachment' and 'relaxation' subscales) • Activation-Deactivation Checklist ('energy' and 'tiredness' subscales) • Enjoyment (based on previous non-validated measure)				+ Perceived autonomy + Recovery + Enjoyment	+ Goal conflicts + Feelings of guilt
Merikivi et al. (2018) [28]	China	227	21	77.2	Consuming more than one episode of the same television show in one sitting.	Behavioral involvement (Beh) Cognitive involvement (Cog)	NR	Online survey	• Demographics • BW behavior • Usage satisfaction (based on previous non-validated measure)				+ Usage satisfaction (Beh)	
Rubenking & Bracken (2018)	USA	797	35.5	56.5	Watching 3 to 4 or more 30-minute shows,	Frequency (Fre) Duratio	NR	Online survey	• Demographics • BW behavior • Appointment	+ Being younger	+ Emotion regulation (Fre)	+ Automaticity (Fre)		

[29]					or 3 episodes or more of hour-long television episodes of the same show in one sitting.	n (Dur)			viewing frequency • Emotion Regulation Questionnaire • Brief Self-Control Measure • Self-efficacy • Self-Report Habit Index ('automaticity' subscale) • Suspense/Anticipation motives		+ Suspense/ Anticipation (Fre)			
Shim et al. (2018) [30]	South Korea	714	NR	52.4	Watching multiple episodes of programs in a single sitting or an entire season over the course of a few days.	Tendency	64	Online survey	• Demographics • BW behavior • Media use • Negative attitudes toward BW • Deferment of Gratification Scale (items adapted to BW) • Need For Cognition Scale (items adapted to BW)	+ Being younger – Education		+ Immediate gratification + Need for cognition		+ Negative feelings
Shim & Kim (2018) [31]	South Korea	785	NR	53.1	Watching multiple episodes in a single sitting.	Tendency	70	Online survey	• Demographics • BW behavior • Media use • BW-related motivations (based on previous qualitative investigation) • Need For Cognition Scale (items adapted to BW) • Brief Sensation Seeking Scale (items adapted to BW)	+ Being younger	+ Enjoyment + Efficiency + Fandom	+ Need for cognition + Sensation seeking		
Sung, Kang & Lee (2018) [32]	USA	292	NR	76.4	Watching 2 or more episodes of the same TV series in one sitting.	Frequency Duration Number of episodes Engagement (composite score)	75.8	Online survey	• Demographics • General TV watching behavior • BW behavior • Programs and platforms used • Viewing Motivation Scale • Transportation (based on previous non-validated measure)		+ Entertainment + Passing time		+ Transportation	
Tefertiller & Maxwell (2018) [33]	USA	215	36	46	Consuming a full TV season or series in a relatively small amount of time.	Pace of watching	80	Online survey	• Demographics • BW behavior • Center for Epidemiological Studies Scale of Depression • Brief State-Trait Anxiety Inventory Scale • Social and				– Meaningful affect (after-viewing) – Positive affect (after-viewing)	– Depression + Anxiety

									Emotional Loneliness Scale for Adults ('social' subscale) • Self-control (based on previous non-validated measure) • Emotion/Affect (while-viewing, after-viewing; based on previous non-validated measure) • Hedonic enjoyment and appreciation (based on previous non-validated measure)					
Tukachinsky & Eyal (2018) [34]	USA	167	20	81	Watching at least 3 episodes of a program in one sitting.	Number of consecutive days Number of episodes (composite score)	96.5	Online survey	• Demographics • BW behavior • Attachment style (based on previous non-validated measure) • Center for Epidemiological Studies Scale of Depression • UCLA Loneliness scale • Self-regulation (based on previous non-validated measure) • Narrative Transportation Scale • Enjoyment (based on previous non-validated measure) • Parasocial Interaction Scale • Identification (based on previous non-validated measure)		– Secure attachment – Self-regulation	+ Parasocial relationships + Identification		+ Depression
Walton-Pattison, Dombrowski & Presseau (2018) [35]	United Kingdom	86	30	67	Watching more than 2 episodes of the same TV show in one sitting.	Frequency Duration Number of episodes (composite score)	NR	Online survey	• Demographics • BW behavior • Viewing habits • Intention • Outcome expectations (physical/affective/social) • Self-efficacy • Self-Report Automatic Index (items adapted to BW) • Anticipated regret (based on		+ Outcome expectations	+ Automaticity		+ Anticipated regret + Goal conflict	

								previous non-validated measure) • Goal conflict • Goal facilitation						
Erickson, Dal Cin & Byl (2019) [36]	USA	77	NR	76	Watching multiple episodes, generally 3 or more, of a television program in rapid succession.	NR	NR	Laboratory experiment	Binge-condition [3 episodes in quick succession] Traditional condition [1 episode per week for 3 weeks] • Enjoyment • Parasocial Interaction Scale (immediately after show completion/1 week later) • Narrative Transportation Scale				+ Transportation + Parasocial relationships (after show completion/1 week later)		
Flayelle et al. (2019) [37]	Belgium	6556	24.5	77.6	Watching multiple episodes of the same TV series in one session.	BWESQ	NR	Online survey	• Demographics • Watching TV Series Motives Questionnaire • Binge-Watching Engagement and Symptoms Questionnaire • Positive and Negative Affect Schedule • Compulsive Internet Use Scale • Alcohol Use Disorder Identification Test • Fagerström Test for Nicotine Dependence		+ Emotional enhancement (BW engagement) + Enrichment (BW engagement) + Social (BW symptoms) + Coping/Escapism (BW symptoms)				+ Negative affect (BW symptoms) + Problematic Internet Use (BW symptoms)
Merill & Rubenking (2019) [38]	USA	651	20.5	63.6	Watching 3 or more episodes of television content in one sitting.	Frequency (Fre) Duration (Dur)	89.4	Online survey	• Demographics • BW behavior • Motivated Strategies for Learning Questionnaire ('metacognitive self-regulation' subscale) • Brief Self-Control Scale • Enjoyment Audience Response Scale (items adapted to BW) • Reward watching • Procrastination (based on previous non-validated measure) • Regret	+ Being a woman (Dur)	+ Procrastination (Fre) + Reward watching (Fre)	– Self-regulation (Dur)	+ Enjoyment (Fre)	– Regret (Fre)	
Pittman & Steiner	USA	781	35.4	44.2	Viewing of 3 or more episodes of	Frequency delibera	NR	Online survey	• Demographics • BW behavior		+ Narrative transporta	– Agreeableness		– Regret (HA	

(2019) [39]					a show in a row (or 2 episodes, if it is a longer show) or watching a whole season of a show within a week.	te BW Frequency background BW Frequency accidental BW (composite score)			(higher attentiveness, lower attentiveness) • Big Five Inventory-10 Item Scale • Narrative completion motive • Narrative Transportation motive • Multitasking • Regret		tion	– Conscientiousness – Openness + Neuroticism	BW) + Regret (LA BW)
Starosta, Izydorczyk & Lizińczyk (2019) [40]	Poland	1004	22	85	Watching from 2 episodes a day.	QEBWB	50	Online survey	• Demographics • BW behavior • Viewing habits • Viewing Motivation Scale • Questionnaire of Excessive Binge-Watching Behaviors	+ Being a woman	+ Escape + Dealing with loneliness + Information + Spending free time + Entertainment		

Note. + indicates a positive relationship whereas − indicates a negative relationship; NA= Not applicable; NR= Not reported.

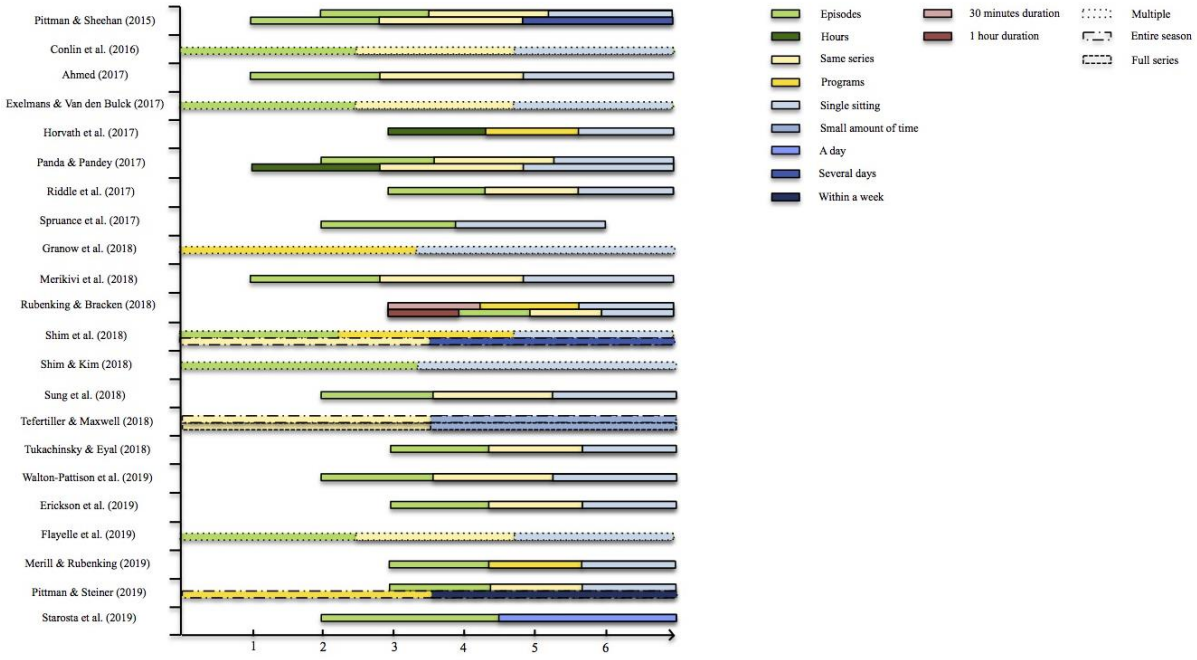

Fig.2 Operationalization of binge-watching used in the studies (22/24) included in the systematic review. Each operational definition is decomposed into its key elements that are color-coded. The x-axis refers to the quantitative cut-offs used where applicable.