

All You Can Watch! Will You?
The Association of Video on Demand Watching and Feelings of Guilt Over Time -
An Experience Sampling Method Post-Hoc Research

Master Thesis Positive Clinical Psychology and Technology

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Abstract

Background: The emerging availability of video on demand (VoD) services and amassed content on these platforms, has raised concerns about a phenomenon called ‘Binge watching’ (BW), due to suspected health concerns from the over-indulgence. Among those concerns, feelings of guilt after BW are expected to negatively impact the users. While guilt was observed to be associated with BW in previous cross-sectional studies, still there is a need for research exploring this association more thoroughly over time. The current study investigated whether the amount of VoD watching was associated with feelings of guilt afterwards. Furthermore, it was explored whether the social context while watching (alone or with others) was associated with feelings of guilt afterwards. Finally, it was examined whether the relationship between VoD watching and feelings of guilt was moderated by the social context of watching.

Method: In a post-hoc analysis of a 14-day experience sampling method study (ESM) ($N = 38$, $M_{age} = 23.7$ years, 55% male) the association between the amount of VoD watching and feelings of guilt afterwards were investigated at the within-persons and between-person level. Furthermore, the moderating role of the social context on guilt was examined. These variables were once-daily assessed in a retrospect measure of watching-duration, feelings of guilt afterwards and the social context via smartphone.

Results: Multiple Linear Mixed Models were conducted, and no significant association was found between VoD watching and feelings of guilt afterwards, neither overall ($B = .02$, $p = .20$), nor at the disaggregated within-persons ($B = .03$, $p = .11$) and between-persons ($B = .01$, $p = .98$) levels. The association between the social context of VoD watching and feelings of guilt afterwards was also not found to be non-significant ($B = .07$, $p = .39$). Finally, the social context was not found to significantly moderate the association between VoD watching and feelings of guilt afterwards ($B = 2.8$, $p = .09$).

Discussion: The findings of the current study that VoD watching, feelings of guilt afterwards and the social context are not associated at the group level contradict findings of prior cross-sectional and ESM research. One potential explanation for these findings could be the specific longitudinal research design. Although ESM is capable of momentary assessments, the current study utilized daily retrospect assessments, potentially introducing biases. Further, the social lockdown during SARS-CoV-2 pandemic might have impacted the findings. Nonetheless, the approach of considering individual deviations from regular watching behaviour might provide further research to refrain from over-pathologizing VoD watching and resolve issues of incoherently defined cut-offs.

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Introduction

Over the past decade the way series, TV shows or movies are watched has rapidly and drastically changed. Instead of sticking to a scheduled broadcast or visiting a video store, the emergence of platforms such as Netflix or Amazon Prime Video eased the access towards a program tailored to individuals' demands (Drake, 2020). Video on Demand (VoD) services can be defined as internet-based platforms where the user can access any available content whenever desired for as long as desired if an internet connection is ensured (Granow, Reinercke, & Ziegele, 2018; Ort, Wirz, & Fahr, 2021).

Although linear television is by no means fully replaced by VoD services, for some users the formerly primary medium television is developing into a secondary medium (Mikos, 2020). Predominately for younger persons VoD watching is argued to be the new norm of watching (Flayelle et al., 2020). In a study by Kupferschmitt (2015) 20% of the sample reported daily VoD service use, occasional use was reported by 98% of the participants between 14 and 29 years. By the end of 2020 worldwide VoD subscriptions raised to an estimated 959 million, 47 million subscriptions to VoD services were recorded in 2020 (Stroll, 2021). For 2020 and 2021 the growth of users was argued to got further prompted by the SARS-CoV-2 pandemic as consumers all over the world were confined to their homes where most leisure activities are executed (Mikos, 2020; Stroll, 2021).

The fast-increasing popularity of VoD watching has also sparked interest in scientific research, even before the start of the pandemic. The focus of these investigations has been primarily on the potentially pernicious reasons and consequences emerging from problematic VoD watching patterns (Flayelle et al. 2020). Overall traditional television and VoD watching may overlap in terms of content and motives to use. However, in contrast to traditional TV watching, the self-determination of VoD streaming platforms may accelerate the negative consequences (Granow et al., 2018). Flayelle et al. (2020) put forward that the unrestricted availability of seasons, instead of waiting until the next episode is broadcasted, may lead to over-usage, putting forward to separate VoD and linear television. Further, the convenient access may also facilitate over-consumption, a relationship known for various (addictive) habits (Ort et al., 2021; Trouleau, Ashkan, Ding, & Eriksson, 2016).

Binge Watching

The phenomenon of excessive watching of series and other audio-visual content in the era of VoD services has become commonly known as 'binge watching' (BW; Flayelle et al,

2020). BW is both framed as a popular term describing the joy of indulgence and as a potential threat to binge watchers' (mental) health in the literature (De Keere, Thunissen, & Kuipers, 2020; Rubenking & Bracken 2018). The term 'binging' connotes a potentially harmful or psychopathological behaviour (like binge-eating or binge-drinking). However, unlike these concepts, BW lacks a clear conceptualization and definition (Flayelle et al., 2020; Rubenking, Bracken, Sandoval & Rister, 2018). This issue is also reflected in the literature review of Flayelle et al. (2020) that summarized the main definitions of BW. Quantity of watched episodes, session-wise watching, and duration were identified to operationalize BW, however, also these categories were inconsistently defined. The lack of a consensual definition impedes the reproducibility and comparability of studies and outcomes (Flayelle et al., 2020).

Predictors and outcomes of BW

Flayelle and colleagues (2020) identified different factors that may engender BW and distinguished positive and compensative facilitators for BW. On the one side of the spectrum, users might BW to compensate for negative emotions. Examples could be to counteract feelings of loneliness and boredom or distracting oneself from the worries of everyday life to regulate negative emotions and states (Flayelle et al. 2020, Rubenking, 2018). Especially when the viewers perceived to be deeper involved in a show, better restorative experiences of well-being were reported due to perceived escaping from stressors (Panda & Pandey, 2017).

On the other side of the spectrum, watching for more positive reasons like higher gratification were identified to prompt BW and perceived well-being (Flayelle et al., 2019a). Binge watchers reported relaxation, deeper involvement in the story, autonomy, and more entertainment due to satisfaction of curiosity and character identification as reasons to BW again (Rubenking, Bracken, Sandoval, & Rister, 2018). Finally, users may build social bonds with peers by discussing shows and spending time with them while watching together, which may lead to BW (Hofmann et al., 2012; Rubenking et al., 2018).

However, Flayelle and colleagues (2019a) or Starosta and Izydorczyk (2020) call for a more holistic view on BW as positive consequences were under-researched. Research should refrain from over-pathologizing risks and consequences of BW with a confirmatory approach and transition towards a more balanced, explorative, and longitudinal methodology (Flayelle et al., 2019a; Starosta & Izydorczyk, 2020).

Nevertheless, previous research did indeed suggest that BW may involve consequences similar to other behavioural addictions such as negative effects on the (mental) health or the social environment, perceiving a lack of control, neglecting duties, or feeling guilty (Starosta & Izydorczyk, 2020). Further frequently reported negative consequences of BW were sleep-related problems, problematic dieting, and negative affect have been identified as potentially harmful consequences of problematic involvement in VoD watching. Several studies identified that prolonged sessions of VoD watching were associated with feelings of guilt afterwards (Flayelle et al., 2020; Ort et al., 2021; Starosta & Izydorczyk, 2020).

Feelings of guilt after VoD watching

Feelings of guilt often result to the recognition that personal or societal standards have not been met or violated (Kugler & Jones, 1992). The intensity of the guilt response may differ depending on the context, intention, or behaviour of the individual, making it a flexible, state-like construct. Although frequently measured as a trait, as a stable guilt perception that differs between persons, guilt may also fluctuate within individuals over time as it is impacted by contextual or momentary factors. Thus, measuring guilt as a state has been widely accepted to provide deeper insights into the interpersonal dynamic nature of this construct (Otterbacher & Munz, 1973; Kugler & Jones, 1992). However, in recent studies investigating the association of VoD watching and guilt, guilt was foremost measured as a trait-like characteristic due to the cross-sectional designs (Granow et al., 2018; Panek, 2013).

In student populations, Reinecke, Hartman and Eden (2014) and Panek (2013) found procrastination by using media, VoD services being among them, to be associated with feeling guilty afterwards. It was observed that longer online video watching correlated with less time spent on schoolwork and subsequently more feelings of guilt. The study suggested that perhaps the constant availability of media is a temptation for students in general, but especially for those low in self-control, which led to feelings of guilt. Goal conflicts might thus be a consequence of impaired self-control by giving in towards own impulses and not following personal or societal standards (Reinecke et al., 2014).

Although feeling guilty is commonly perceived as unpleasing, it is associated with functional outcomes to counteract and cope with the emotional distress by adaptive or reparative actions (Baumeister, Stillwell & Heatherton, 1994; Rüscher et al., 2007). Therefore, non-chronic guilt may be associated with positive outcomes like learning or adaptive

behaviours relieving the dysphoric feeling to the own values. Nonetheless, chronic guilt may have detrimental effects on the well-being. Chronic guilt is a common symptom in depression. To circumvent feelings of guilt, avoidance behaviours are a common reaction to guilt. This may create a spiral of perceiving even more guilt and negative feelings while being incapable to perceive positive ones due to the avoidance (Baumeister, Stillwell & Heatherton, 1994; Bybee & Quiles, 1998). Consequentially, the original positive effects that can be perceived after VoD watching might be impeded by feelings of guilt when viewers watched more than initially aimed.

Social context as a moderator between VoD watching and guilt

A potential moderator of the relationship between VoD watching and guilt afterwards might be the social context while watching, depending on whether the user watched alone or in company of other peers. For instance, watching within the social context may be facilitatory to VoD watching by maintaining social bonds or sharing an interest (Hofman et al., 2017; Rubenking et al., 2018). Nonetheless, this relationship remains to be further explored (de Feijter, Khan, & van Gisbergen, 2016; Hofmann et al., 2012). As guilt may also be impacted by the social standards one has to adapt to, it might lead to higher or lower levels of perceived guilt (Baumeister et al., 2014).

Hence, it might be more acceptable to watch for prolonged sessions with peers rather than being confronted with negative prejudices that might be provoked by excessive media use (Reinecke et al., 2014). Moreover, this could also be considered as time that has been wisely spent since no social contact was neglected and positive experiences triggered (Jenner, 2017). Thus, less feelings of guilt after VoD watching may be provoked if the user watched with others. On the contrary, when watching excessively alone, social interactions may get dismissed. This might lead to symptoms commonly associated with depression such as feeling guilty and social withdrawal (Flayelle et al., 2020; Ort et al., 2021) which may be especially the case for VoD watching since this is frequently done alone. De Feijter et al. (2016) found that at 77% of the incidents people used a VoD service, the participants watched alone. The neglected social contact or perception that the time spent on VoD watching could have been spent more effectively, for instance on social interactions, has been found in prior studies to trigger feelings of guilt or regret (Jenner, 2017).

Experience Sampling Method

Sensitive measures are required to capture the dynamic states like guilt or time-varying contextual factors such as social interaction or watching behaviour. However, systematic reviews by Flayelle et al. (2020) and Starosta and Izydorczyk (2020) pointed out that previous investigations on predictors and outcomes of BW were almost exclusively based on self-reported, retrospective surveys with cross-sectional designs.

There are, however, several relevant limitations to these designs. Firstly, cross-sectional surveys measure behaviours and feelings simultaneously, potentially introducing recall biases. Therefore, fluctuations of behaviours, feelings, or contextual moderators, and thus changes within individuals over time remain undetected with this method. Consequentially, no inferences can be drawn to the state-like dynamic nature of these variables. Secondly, cross-sectional designs do not allow to separate the between-person associations of behaviours and feelings from within-person associations. This may result in failing to detect relationships on the within-person level, missing out to understand the underlying nature of these variables and drawing erroneous inferences (Curran & Bauer, 2011). To illustrate, longer watching may have more negative effects on some individuals than others. As such, inaccurate, or biased measures may be introduced particularly for dynamic constructs like behaviour or perception (van Berkel, Ferreira, & Kostakos, 2017). Thirdly, cross-sectional studies cannot capture varying factors that may also be time-dependent such as the social context. Finally, as in cross-sectional studies the variables of interest are measured only once, the directional nature between the variables cannot be explored (Granow et al., 2018; Reinecke et al., 2014).

Longitudinal intensive measurement designs may be suitable to sensitively capture interactions between fluctuating constructs and may overcome the limitations of cross-sectional research (Flayelle et al. 2019). The Experience Sampling Method (ESM) measures such experiences in the here-and-now in everyday life for instance, through self-report or passive measurement. For implementation of ESM designs in the participants' natural environment, the smartphone became the most prevalent device for data collection (Myin-Germeys et al, 2018). Smartphones and ESM software are now widely available and affordable, prompting increased implementation of the design due to lower obtrusiveness and higher convenience for the participants (van Berkel et al., 2017). Over a (longer) period, targeted variables, like behaviour, feelings, or thoughts are collected depending on the demands of the measured construct and ecological validity needed (Csikszentmihalyi & Larson, 2014; Myin-Germeys et al., 2018). With ESM more dense information about the

participant is collected over time, which has three advantages for measuring VoD watching and the associations to guilt.

Firstly, this information can be used to draw conclusions about both between-person and within-person associations of behaviours and feelings, enabling more in-depth analyses and allowing more specific conclusions on the individual (Curran & Bauer, 2011). Secondly, the sampling schedules could help to reduce recall biases, as variables are more closely collected to the moment of occurrence. Thirdly, ESM studies measure the targeted variables at multiple occurrences, providing richer insights on how variables may fluctuate over the course of the day but also in a more longitudinal nature (Myin-Germeys et al., 2018). Since VoD is available whenever demanded, watching behaviours and guilt might also be impacted by contextual factors that differ within or between days.

The low-cost and non-intrusive measurement technique of ESM enables capturing data in uncontrolled environments (Cordeiro, Castro, Nisis, Nuno, & Junes, 2021). Hence, ESM may be a well-suited measurement contemplating the nature of VoD watching. These insights from the ‘real life’ may be valuable for a thorough explorative investigation of VoD watching as prompted by Flayelle and colleagues (2019a). This could provide a more detailed insight compared to previous, mostly cross-sectional, and confirmatory studies and add to the current knowledge in the research field of VoD watching.

Aim of the study

In sum, the relatively young field of research on BW requires further exploratory and longitudinal investigations on its impact on the users. Reviews on existing literature suggest that research on BW should refrain from generalizing binge-watching as problematic per se (Ort et al., 2021) or over-pathologizing viewing behaviours (Flayelle et al., 2020). Potential outcomes of BW could be investigated on a more exploratory and individual level by using longitudinal study designs such as the ESM. The current research aims to further investigate the association between VoD watching and feelings of guilt afterwards over the course of two weeks.

This is done by probing the three following research questions: (RQ1) How is the amount of VoD-watching associated with feeling guilty afterwards at the between- and within person level? (RQ2) Is watching alone vs watching with others associated with feelings of guilt afterwards? (RQ3) Is the social context of watching a moderator for the association of VoD-watching and feelings of guilt after watching?

Methods

This study concerns a post-hoc analysis of data collected by Bushmeyer (2020), Erkers (2020), Lehmkuhler (2020) and Preißler (2020) between the 9th and 22nd April 2020 within the scope of their bachelor's projects. Extensive descriptions of the original research design and measurements can be found in the respective theses. The setup of the original study concerned an ESM study that measured daily VoD watching and feelings of stress, depression, anxiety, and well-being. The current study focuses on the daily VoD watching behaviour of younger adults and their perceived momentary guilt after using a VoD service. Next to that, the social context in which the participants used the VoD service is considered. The study received ethical approval by the BMS *Ethics Committee of the University of Twente* (200366).

Design

The *Ethica Data* (Ethica Data, 2020) platform, which enables remote data collection and monitoring in the participants' natural environment, was used for designing the study and administering the daily questionnaires. The corresponding Ethica App was used by the participants to fill in the repeated measurements. On the *Ethica* website, the researchers set up the study with notifications and questionnaires. Interval contingent sampling was used to measure participants' behaviours and feelings. Participants received random prompts to fill in the questionnaire within a fixed schedule, aiming to decrease chances of mental preparation (Connor & Lehmann, 2012; Myin-Germeys et al., 2018). Figure 1 shows how over the two-week long assessment the once daily 'behaviour assessment' of VoD watching in retrospect and two daily 'state assessments' of momentary feelings were sampled. Once per day the behavioural assessment, measuring the VoD watching behaviour of the prior day, was triggered between 10 a.m. and 10.30 a.m. Participants could respond to it within 10 hours. A reminder was scheduled for 1.5 hours after the initial notification for the case that the questionnaire was not filled out by then.

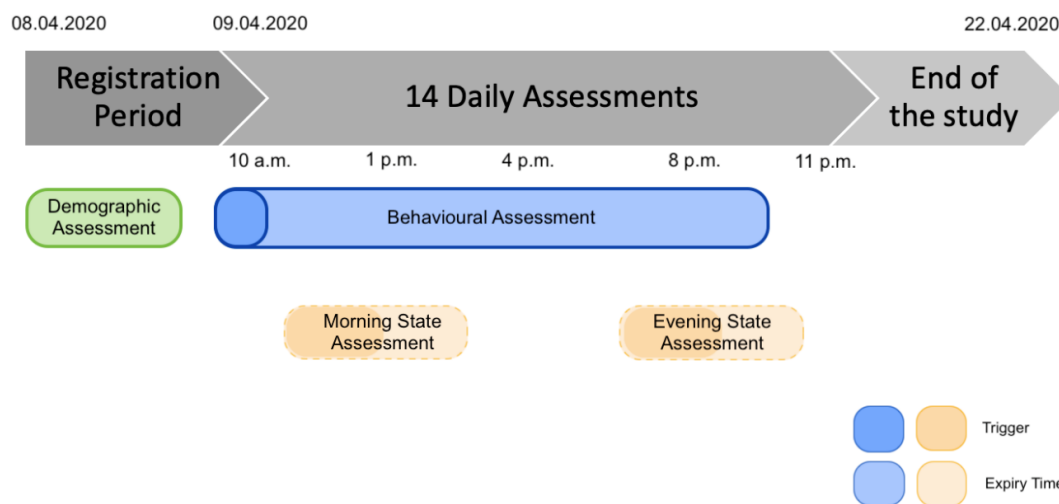


Figure 1. Study design and questionnaire prompting scheme.

Participants

In total 42 participants were recruited through convenience sampling in the researchers' social environment, meeting the goal of an approximate sample size of 40 (Lehmkuhler, 2020). Requirements for inclusion were that the participants exceed the age of 18 and possess proficient English skills (Appendix A). In the original study, three participants were excluded from analysis due to not achieving the recommended response rate of 40% of the measurements (Conner & Lehman, 2012). One additional participant was excluded that did not finish any of the evening assessments. Thus, the original study had a sample size of 38. The rather young sample ($M_{\text{age}} = 23.7$; $SD = 5.3$) was considered suitable for the aim of the study as VoD watching was found to be more popular among the younger population (Panda & Pandey, 2017). Although for sample sizes in psychology this is a rather small sample, for ESM studies smaller samples are generally considered sufficient as multiple measures are taken from one participant, providing power to the study despite a small participant sample size (Conner & Lehman, 2012). The median sample size of ESM studies are 19 participants (Van Berkel et al., 2017).

Materials

Participants received the different questionnaires in the *Ethica* App (Version 157) on their smartphones. The App prompted four different questionnaires, of which the demographic questionnaire (Appendix B1) was only presented once, at the beginning of the study. The other questionnaires were one daily 'behaviour assessment' with eleven questions

concerning their VoD watching behaviour and feelings of guilt after watching (Appendix B2). Additionally, two daily ‘state assessments’ (Appendix B3 & B4) in the morning, and evening were prompted (see Figure 1). For this post-hoc study the relevant items were collected in the ‘behaviour assessment’ and are elaborated below. Thus, the state assessments and the according assessment scheme were not further elaborated in the methods, however, the items and schedule can be found in Appendix B3, B4 and Figure 1.

Demographic assessment

Basic information on age, gender, nationality, and occupation were assessed. Besides that, the researchers assessed which VoD-services the participants utilize and if they were used at least once per week.

Guilt with respect to VoD watching assessment

The variable of guilt with respect to VoD watching was assessed once per day within the ‘Behavioural assessment’. First participants had to answer the item (Q1) “Did you watch a series on a video-on-demand platform such as Netflix or Amazon Prime Video yesterday?” functioning as a filter question. For those answering ‘No’ the behaviour assessment ended. For those answering ‘Yes’, ten further questions concerning VoD watching were asked. The ninth question asked, “After that, did you feel guilty for watching?”, if answered with ‘No’, the questionnaire was ended. If answered with ‘Yes’, further questions were enabled. The tenth question asked, “To what extent did you felt guilty?” and could be answered with options ranging from ‘slightly guilty’, ‘moderately guilty’, ‘very guilty’ and ‘extremely guilty’.

Length of VoD watching assessment

The variable VoD watching measures the length of estimated watching time in hours per day. This variable was asked once daily in the ‘Behavioural assessment’ as fourth question (Appendix B2). Participants could answer the item “Please indicate the number of hours you watched.” by typing in the number of their estimated duration in hours.

Social watching context assessment

With the eighth question in the behavioural assessment (Appendix B2) the social context in which the participant used the VoD service was assessed. The answering options to

the item “In what kind of context did you watch?” were either ‘alone’, ‘with friends’, ‘with the family’ or ‘with a partner’. Also, this item was assessed once daily.

Procedure

Participant recruitment was initiated on the 30th of March 2020. To ensure synchronous participation for the study duration of two weeks, participants were informed via mail when exactly to start and received further information on their tasks during the participation in the study. Until the 9th of April 2020 the participants could register themselves in *Ethica* and download the corresponding App after an invitation to the platform. After accepting the invitation, the participants first gave informed consent, were asked to fill in a baseline assessment and the demographic questionnaire in the App. From then on, the daily data collection was conducted for two weeks and ended on the 22nd of April 2020.

Fit of the Dataset

For multiple reasons this dataset was considered to fit the aims of this post-hoc research well. Firstly, the study oversampled a rather young population ($M_{\text{age}} = 23.7$; $SD = 5.3$) representing the typical audience of VoD-providers (Flayelle et al., 2020). Still, some older participants were included reflecting the broadly based targeted group of the VoD-providers (Stoll, 2021). The size of the sample met the commonly recommended guidelines for ESM studies (van Berkel et al., 2017). Besides these practical attributes of the sample, the study also measured for a commonly recommended lengths of two weeks, allowing for detailed analysis of fluctuations that can be subsequently compared (i.e., weekend vs. weekday), reducing the chances to measure an outlier-week of the participant (Connor & Lehmann, 2012; van Berkel et al., 2017). Thus, the frequent measures may produce a more nuanced picture of the association of guilt and VoD watching than a single assessment. Daily assessments also provide the advantage that these measures are also sensitive to the specific social context in which the participant is using the VoD-service. For instance, the participants may be more likely to watch with the family on the weekend. The original study also measured the social context while watching daily, enabling statistical testing of the interaction of guilt after VoD watching, duration of watching and the social context.

Data Analysis

The data were post-hoc analysed using the IBM Statistical Program for Social Science (SPSS; Version 24). Microsoft's Excel was used for the visualizations. Descriptive statistics were calculated to obtain the demographical information of the sample.

Multiple Linear Mixed Models (LMM) were utilized to investigate the three research questions. LMM are a suitable method to analyse ESM data for several reasons. Firstly, multi-level models, such as LMM, can handle the nested structure of the dataset as the responses are collected multiple times for each participant, and thus nested per participant. Models that do not consider this nested structure, average the measures out and thus information would be lost in the further data processing (Connor & Lehmann, 2012).

Secondly, due to the longitudinal design, participants frequently miss filling in questionnaires. Maximum likelihood estimation in LMM can account for those missing values by estimating the most-likely response of the participants based on previous responses (Scollon, Prieto, & Diener, 2009). For all LMM's first-order autoregressive (AR1) covariance matrixes with homogenous variances were utilized to analyze the nested data structure. The model assumes that those measures taken timewise closer together have a higher correlation than measurements that were taken further apart. Participant numbers were used as 'subjects' and the timepoint (in days) was set as the repeated measure.

To test the overall association between the amount of VoD watching and feelings of guilt afterwards, and the association of these two variables on the between- or within-person level, a new guilt variable was constructed. The current study only focusses on feelings of guilt after watching VoD, for this, a variable considering these specific instances was required. Therefore, all measurement points where a participant did not use a VoD service were excluded from further analyses. In a second step, the responses of the item whether one felt guilty were entered as 'no guilt' for the case participants responded 'No'. These incidents were combined with the item assessing the extent of guilt. The new variable resulted in a score range from zero to four.

The overall association, with the still aggregated variable of the length of VoD watching, was obtained by entering the watching time mean as a fixed factor and guilt after VoD watching as the outcome variable in an LMM. Additionally, z-scores were calculated for both the VoD watching time and the guilt afterwards to obtain standardized regressions estimates. These scores, respectively for the standardized and unstandardized were entered in an additional LMM. To disaggregate the within- and between-person associations between VoD watching amount and feelings of guilt, person mean, and person mean centred scores

for the duration of VoD watching were calculated. With this method, these effects can be well disaggregated within the model (Curran & Bauer, 2011). The person mean scores (for between-person association) were obtained by calculating the mean score of the watched lengths across all measurement points for each participant. The person mean centred score (for the within-person association) was obtained by subtracting the person mean score from each time-specific measurement of the length watched. Again, standardized z-scores were calculated for guilt after VoD watching. These scores, respectively for the standardized and unstandardized, were entered in a LMM with the person mean and the person mean centred both as the fixed covariates and guilt after watching as dependent variable. In total, six LMMs were performed to obtain both standardized and unstandardized overall associations and disaggregated within- and between person associations respectively.

To test the potential association between the context (alone vs. others) in one was watching VoD and guilt, the context variable was dummy coded (Alone = 1, with friends/family/partner = 0). One LMM was used with the social context as a fixed factor and the new constructed guilt variable as the dependent variable.

Finally, to analyse the potential moderated association between VoD watching and feelings of guilt afterwards through the social context, one LMM was used. The previously constructed guilt variable after VoD watching was set as dependent variable. The previously constructed context variable and length of watching as fixed covariates separately and the interaction of both variables as a third fixed covariate.

Results

Participants Characteristics

The age of the sample ranged between 18 and 51 years, most of the participants were from Germany (92%). Slightly more males participated in the study (55%). The majority participants were students (58%), other occupations can be found in Table 1 below.

Table 1.*Demographics of the Sample (N = 38).*

	<i>N (%)</i>
Gender	
Male	21 (55.3)
Female	17 (44.7)
Nationality	
Dutch	1 (2.6)
German	35 (92.1)
Other, European	2 (5.3)
Occupation	
Apprentice	3 (7.9)
Employed full-time	9 (23.7)
Employed part-time	1 (2.6)
Pupil	1(2.6)
Student	22 (57.9)
Other	2 (5.3)

Associations on the Between-and Within-Individual Level of Perceived Guilt

LMMs were conducted to receive estimated frequencies and distributions of the investigated variables to obtain an overview of the variability within these constructs over the two weeks on the group level. Figure 2 illustrates that guilt fluctuated only a little on the group level, between 0.1 and 0.3 (on a scale from 0 to 4), peaking on a Sunday and being lowest on a Wednesday with a mean score 0.11 ($SD = .01$) for the participants in the two weeks. The VoD watching duration ranged between a minimum mean of 1.5 hours (Saturday) and maximum mean of 3.5 hours (Monday) with a mean watching time of 2.1 hours ($SD = 1.17$) on the group level for the two weeks. Based on Figure 2, VoD watching duration and the guilt afterwards did not appear to be clearly correlated over time at the group level.

LMM confirmed that there was no significant overall association between VoD watching and feelings of guilt afterwards (Table 2). Also, no statistically significant effect was found for the association of the number of hours watched on the feelings of guilt afterwards neither on the between-person level ($p = .98$) nor at the within-person level ($p = .11$). Thus, when participants watched longer than others in the sample, they did not feel

more guilty than others. Also, when participants watched more than they usually did, they did not feel significantly more guilty (see Table 2).

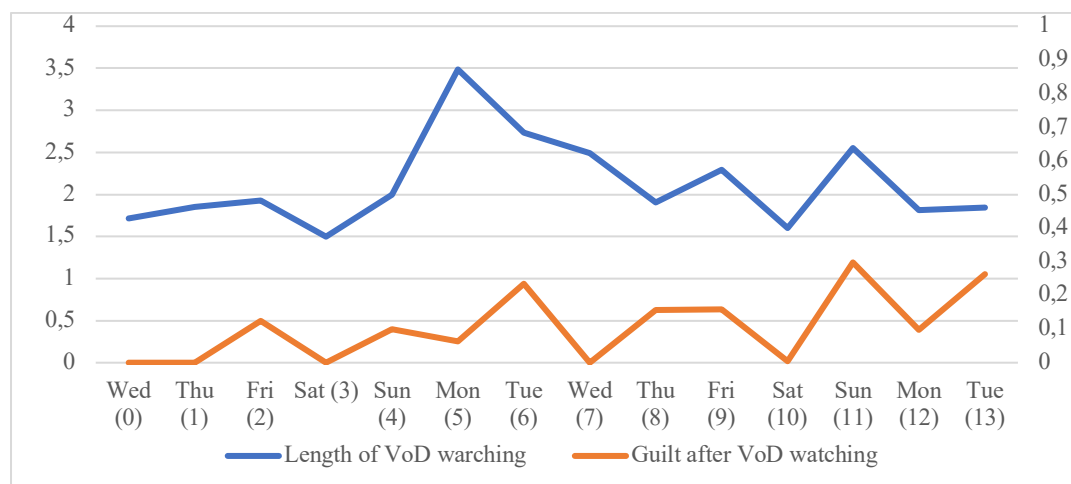


Figure 2. Mean scores for feelings of guilt (right y-axis) and watching time (left y-axis) during the two weeks.

Table 2.

Overall, Between- and Within-Individual Differences of Perceived Guilt After VoD Watching.

	<i>Estimate (SE)</i>	<i>B (SE)</i>	<i>t (df)</i>	<i>p</i>
Overall Hours	.02 (.06)	.08 (.01)	1.28 (252.22)	.20
Hours - Person Mean (Between-person)	.01 (.02)	.01 (.07)	0.02 (107.69)	.98
Hours - Person Mean Centered (Within-person)	.03 (.01)	.09 (.01)	1.58 (280.33)	.11

Guilt and Social Context

To obtain an overview of how frequently participants used VoD services in which social context and how this differed over the period of two weeks, four LMMs were conducted for each context possibility per day. Figure 3 shows that the participants mostly watched alone (67% of the time) with only little variation over time ($SD = 7\%$). However, on the weekends participants tended to watch more with others. One LMM with the social context as fixed factor found no significant association between the social context of VoD watching and feeling guilt afterwards [$F(1, 244.80) = .74, p = .39$] with a small

unstandardized Estimate of .05 ($SE = .06$), indicating that if a participant watched alone ($M = .03$), the guilt after watching was not higher than if the person watched together with someone else ($M = .03$).

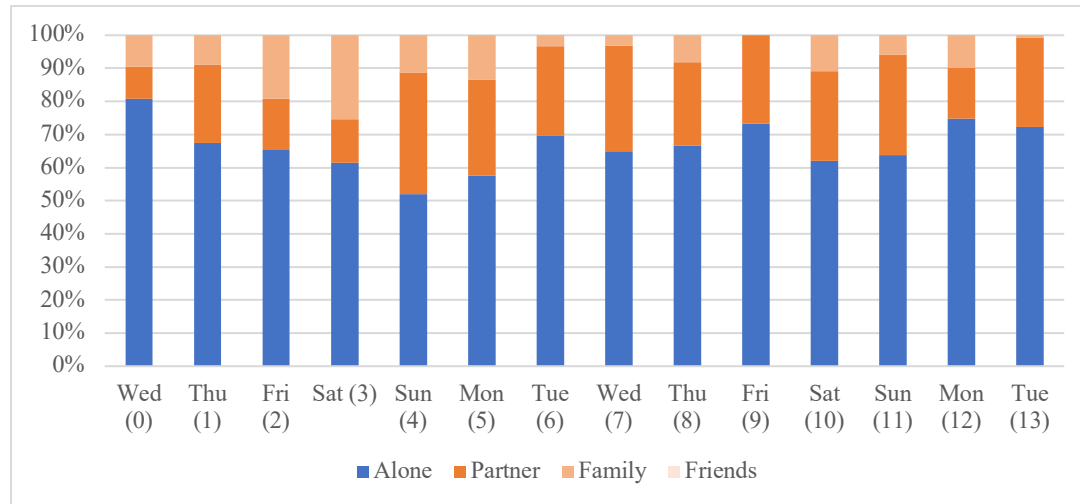


Figure 3. Distribution of using VoD in the social context (Orange) or alone (Blue).

VoD Watching and Feelings of Guilt Moderated by the Social Context While Watching

A final LMM found that the social context also did not significantly moderate the association between length of VoD watching and feelings of guilt afterwards [$F(1, 272.90) = 2.88, p = .09$] with an Estimate of .06. Watching with someone else or watching alone had no significant effect on the association of VoD watching and feelings of guilt afterwards. Thus, feelings of guilt after VoD watching were neither significantly higher nor lower, when the participants watched alone or together (see Table 3; Figure 4).

Table 3.

Results of the Linear Mixed Model with Hours and Social Context While Watching on the Previous Day as Fixed Factors and its Effect on the Perceived Guilt.

	Estimate (SE)	t (df)	p	95% CI
Hours watched	-.26 (.09)	-.74 (272.07)	.37	-0.09 to 0.03
Context	-.07 (.03)	-.88 (270.28)	.45	-0.26 to 0.12
Interaction Hours watched and Context	.06 (.03)	1.70 (272.90)	.09	-0.01 to 0.01

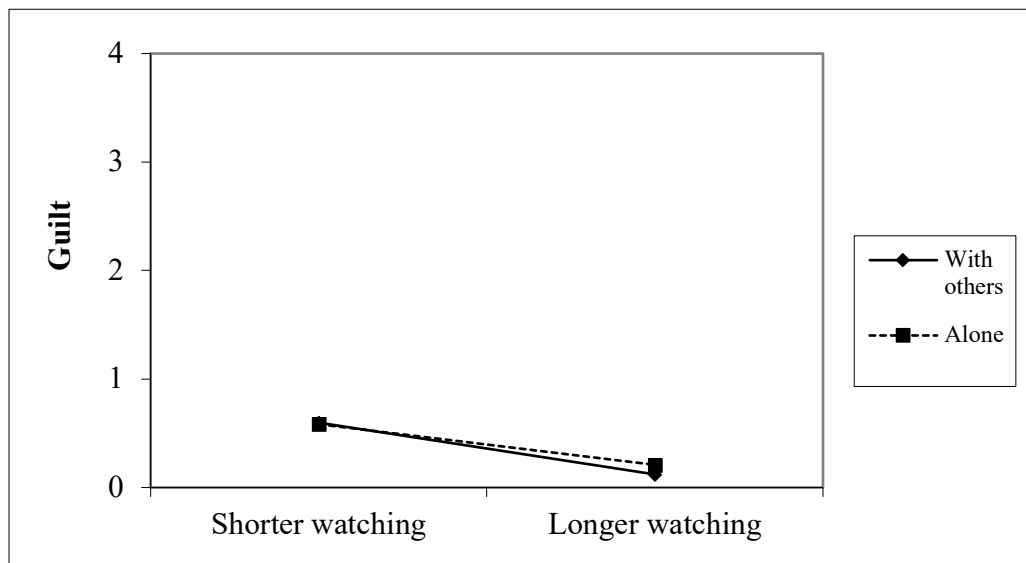


Figure 4. Interaction plot of the interaction between VoD watching and guilt afterwards with the social context as a moderator.

Discussion

This post-hoc study aimed to further explore the association between VoD watching and feelings of guilt afterwards. The study found no association between VoD watching and feelings of guilt afterwards, neither on the overall group level nor between- or within-persons. Furthermore, the social context of watching (alone vs. together) was not significantly associated with feelings of guilt. Finally, the association of VoD watching and feelings of guilt afterwards was also not moderated by the social context of watching. These findings do not only stand in contrast to previous cross-sectional studies (Granow et al. 2018; Panek, 2013) but also to the original ESM study (Lehmkühler, 2020).

Since the call for longitudinal research of VoD watching is rather recent (Flayelle et al., 2020; Starosta & Izydorczyk, 2020) and ESM is only lately more widely utilized, it lacks comparable studies. To date, the study of Lehmkühler (2020) is the only one that investigated the association of VoD watching and guilt in a longitudinal design. However, although the identical ESM dataset was used in both studies, results indicate contrasting findings. While Lehmkühler (2020) found weak increased feelings of guilt the next day after BW, the current study found no significant association. Accounting for this incongruence might be the assessment of the association. Lehmkühler (2020) used the more frequently triggered ‘state assessments’ referring to the general extent of guilt in the moment of assessment and the

retrospect 'behaviour assessment' measure for the length of watching the prior day. Although the state assessment provided through the frequent assessment a more dynamic perspective on guilt, this might not be necessarily assessing the consequence of VoD as it did not differentiate between VoD induced and general feelings of guilt. Thus, it might be at question how much of the responded guilt might be explained by the VoD watching on the prior day.

The current study exclusively investigated the incidences when participants used a VoD service the prior day and used one item assessing the extent of guilt afterwards. Nevertheless, the current study, in turn, might be affected by relying on the retrospective 'behaviour assessment' of the prior day in the morning. Thus, the first limitation of the current study is that participants might have had time to cognitively re-assess their both their behaviours and feelings of the previous day. It could be that the participants might have over-watched and felt guilty because they neglected duties or the need for sleep. Thus, the guilt directly after watching might be at its peak. However, when reporting in the next morning, the experienced negative consequences may not be that vivid or acute anymore. Thus, experienced guilt may be reported lower in retrospect and could perhaps thus explain the low levels and little variability in the measures of guilt.

To avoid such biases, future research should assess the watching and feelings more thoroughly for instance by more frequent assessments with filtering questions or hybrid sampling techniques. Ecologically, sampling triggers could be sent out when certain Apps on the smartphone have been closed and assess the desired constructs like guilt (Myin-Germeys et al., 2018). However, this again might be a source for systematic missing data for the incidences when participants stream on other devices than their smartphones or when the Apps is used nearly before sleeping.

The way the guilt item was assessed might be a second reason for the contrasting findings in the original and current study. This might be reflected in the extent of guilt participants reported. While Lehmkuhler (2020) found a mean guilt of .45 (morning) and .36 (evening), the current study found a mean guilt score of .11. Since participants had to first discriminate whether they felt guilty in the current study, and were then asked to what extent, the 'state assessment' solely asked for the extent of guilt. Thus, participants might have contemplated the extent of guilt in the current study and were less likely to indicate guilt. Decisions, where a filtering question might inhibit insights, should be carefully considered in future studies to balance the burden and systematic missing data (Myin-Germeys et al., 2018).

The current study also contrasted findings of cross-sectional studies that dominate the VoD/BW research field. In the college-student dominated samples by Granow et al. (2018) and Panek (2013), moderate strong associations between the amount of watching and increased feelings of guilt have been found. This contrast might be accounted for by the distinct research designs. Both studies suggested that the guilt might have been induced through goal conflicts and loss of self-control, between the need for immediate gratification and long-term goals. However, both studies mentioned that cross-sectional designs might have introduced recall errors as the memory of an experience can differ from the actual experience (Granow et al., 2018; Panek, 2013; Zajchowski, Schwab & Dustin, 2017). As humans display the tendency to maintain coherent narratives about themselves, frequently the ‘remembered self’ dominates over the actual experience. The ‘remembering self’ summarizes and interprets experiences from the episodic autobiographical memory in the proximal past to make sense of the world and self, stable across the time (Kahneman & Riis, 2005). Creating a coherent narrative by re-interpreting experiences may be likelier in cross-sectional studies, for instance, due to social desirability, particularly in sensitive topics such as the incongruence of goals. Therefore, the indication for the length of watching might be biased (Granow et al., 2018; Panek, 2013).

ESM measurement, however, yields the advantage that through multiple proximate assessments the information is collected nearer to the experience, reducing recall biases (Myin-Germeys et al., 2018; Reinecke et al., 2014). Nonetheless, the extent of such biases within one day of retrospection in VoD watching and guilt remains at question and should be further investigated.

Remarkably, the remembering self is also an important factor and future research may need to restrain from pounding on precise assessment. Although research aims to collect data as accurately as possible, the remembering self should not be primarily seen as distorted memory. The way individuals make sense of themselves, their world and their (in-) stability over time is an important predictor for future behaviour (Kahneman & Riis, 2005). Thus, just as accurate momentary measures, may provide valuable information on such associations. Hence, the remembering-self should not be neglected and could be assessed in mixed-method designs. For instance, participants could provide more qualitatively whether they subjectively felt as if they watched longer than usual and which motivations and consequences this had. Finally, this could then be compared to the more objective assessment of length, and it could be compared to what extent the remembering-self impacts future watching behaviour.

Next to the non-significant association of length of VoD watching and feeling guilty afterwards (RQ1), also the association between the watching context and guilt was non-significant (RQ2). Subsequently, the context also did not moderate the association between VoD watching and feelings of guilt afterwards (RQ3). A potential explanation might be that the dataset was obtained during the social lock-down in the first wave of the SARS-CoV-2 pandemic in 2020. As introduced, due to the pandemic, subscriptions to VoD services increased. But also, the watching time was likely to extend within the users as the focus of the leisure time shifted towards the home (Mikos, 2020). Thus, VoD watching might have been one of a very limited set of activity options that could still be executed. Therefore, participants might have felt less guilty. For instance, the perception to should have used the time more wisely might have occurred less intense as there was not a lot to miss out, which was commonly reported to be a reason to feel guilty after VoD watching (Jenner, 2017).

Furthermore, since guilt is also impacted by the social norms and standards the altered contextual behaviour might have become a desirable social norm. Thus, fewer feelings of guilt may have occurred as limited social interaction were enabled and desired. Additionally, although also observed in pre-pandemic studies, participants used VoD services mainly alone (67% of the incidents in the current study) (Granow et al., 2018; de Feijter et al., 2016). This finding however might also be confounded by the social lock-down measures, restricting social contact (i.e., no participant responded to have watched with a friend). Watching alone therefore might have not contributed to higher feelings of guilt as it might have been used as a strategy to maintain social bonds. Naturally, this pandemic-related limitation restricts the generalizability of the finding on pre-or post-pandemic times. Hence, follow-up studies to counteract this third limitation of the study are recommended to be conducted when social distancing is not obligatory anymore. Although it should be considered that it is likely that a rebound of social interaction will follow the revival of social interaction.

The fourth limitation of the current study is the possibility that the frequent assessments in the current study may have led to an intervention effect due to participant reactivity. This general limitation of longitudinal intensive measurement designs should be considered as the participants have to actively reflect on their behaviours and experiences over a set course of time (Conner & Lehman, 2012). For instance, when monitoring the length of VoD service use and perceiving it to be beyond socially acceptable norms, participants might have adapted their length of watching and induced more self-control.

The fifth limitation for inferences from the current study is the higher educated sample (58% students). Even though this sample represents the potential at-risk group for

BW with respect to age (Panda & Padney, 2017), the schedule that university students follow may not represent the general population. Students might be enabled to use VoD services more flexible and thus may have more time to average out BW sessions and thus perceive fewer goal conflicts. Investigations of more heterogeneous samples might yield important information on various occupations or characteristics of groups within the society.

Longitudinal intensive measurement enables the investigation of associations of fluctuating behaviours, thoughts, and feelings on micro-and- macro level, associations over time as well as between- and within-individuals. The applicability of the profitable of ESM is only touched on in the current study and demonstrates how ecologically it can be used. ESM may be an appropriate strategy to overcome some limitations that cross-sectional designs had in prior studies. It may aid in resolving the issue of finding a coherent definition of BW, as this has impeded the comparability and reproducibility of previous studies (Flayelle et al., 2020). This approach may be more sensitive to the individual's context and might indicate what can be defined as BW. For instance, an indication might be when an individual deviates more than usual from the own viewing pattern instead of comparing individuals to each other and a general norm value. To the researcher's knowledge the current study is the first that statistically disaggregated the within- and between participant associations between VoD watching and feelings of guilt.

Although the current research investigated the association both between- and within-participants, the statistical analyses were still performed at the group level. To clarify, this means that the current study tested the associations on the group level, where individual trajectories of the length of watching or guilt afterwards are fitted in one regression line for all participants. Meaning, that all participants with either positive or negative associations at the individual level are again grouped in the end, potentially averaging each other out. Thus, the term 'individual level' or 'within-person association' should be carefully considered to avoid misleading conclusions.

Nonetheless, this disaggregation may point out a robust and objective way of defining BW, a construct where a cut-off for over-indulgence may be idiosyncratic. This method might thus be an alternative to the approaches by Granow et al., (2018) and Panek (2013), who conceptualise BW as a usage pattern relative to the regular watching time of the individual. However, as longitudinal datasets group the data points within persons, also case studies or true N-of-1 statistical analyses could be conducted with the current data set to obtain detailed insights on extreme cases (McDonald, Vieira, Johnston, 2020). Further

associations, such as whether specific reasons for watching or the content led to more guilt may be explored.

ESM may help researchers to understand dynamic constructs in the targeted population in terms of variability or mechanisms on the individual and group level. However, this method should not be seen as golden research standard due to limitations like participant-burden or -reactivity (Myin-Germeys et al., 2018). Rather, previous data-collection methods and longitudinal intensive measurement could complement each other and provide different pictures of associations to contribute to the overall knowledge.

VoD watching in student-dominated samples was previously found to be weakly (Lehmkühler, 2020) or moderately associated (Granow et al., 2018; Panek, 2013) with feelings of guilt. Even though in the current study no significant associations between both constructs were found, the prior studies neither gave the direct implication that longer VoD watching impacts feelings of guilt detrimentally. These findings contribute to the suggestion by Flayelle and colleagues (2019b; 2020) to restrain from over-pathologizing VoD/BW watching.

Conclusion

This post-hoc analysis aimed to further investigate the association between VoD watching and feelings of guilt afterwards and whether the context in that the participants watched played a moderating role. Against common assumptions, it was found that the length of VoD watching was not associated with feelings of guilt after watching. Neither was this association found when participants watched longer than ‘regular’ for themselves nor longer than the rest of the sample. Furthermore, the context of watching had no moderating effect on this association. These insights contribute further to the existing, but still limited, literature on the contemporary topic ‘VoD watching’ by contradicting the recent conclusions and thus adding to a new perspective on the field. Sampling characteristics and the impact of the SARS-CoV-2 pandemic are likely to have impacted the conclusions of this study. Future research addressing these limitations will hopefully contribute to a more balanced view on the new and multifaceted topic of BW/VoD watching, a phenomenon that has and will lastingly shape consumption of audio-visual content.

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Appendices

Appendix A: Informed Consent

Welcome to our study about Video-on-Demand (VoD) watching behaviour!

Thank you for your time and support! Please read the following information carefully.

The aim of this research is to investigate the use of video-on-demand (VoD) streaming services. With your participation in this research you will help to make a contribution to the scientific knowledge of VoD watching behaviour.

You can participate in this study if you are at least 18 years old and are proficient in English. This application (Ethica) is used over a two-week period to respond to daily questionnaires. For the study's purpose, it is important that you answer the questions in a given time frame. So, you should make sure that the notifications on your mobile device are switched on, since you receive notifications on that device within these time frames.

As part of the study, you will first receive a questionnaire concerning your demographics and a baseline questionnaire that need to be filled out once before the actual study starts. From tomorrow on, April 9, you will receive three short daily questionnaires consisting of 10-15 questions over a period of two weeks that will take you 3-5 minutes each. The daily assessments will focus on your behaviours, moods and feelings with regard to your VoD watching behaviour. After the two-week period you will receive a final questionnaire to fill in.

Besides the time invested and a slight disruption of your daily life, we do not expect that you will experience any disadvantages from this research. The participation in this study is voluntary. If you wish to withdraw from this research, you can do so at any time without giving a reason.

Moreover, your answers will be treated confidentially. All personal data (e.g., e-mail, age, gender, etcetera) will be anonymised and will not be published and/or given to a third party. The study has been approved by the Ethics Committee of the University of Twente, and is thus compliant with internationally recognised guidelines on ethical research.

If any questions or concerns arise before, during or after your participation, do not hesitate to contact the researchers, Johanna Lehmkuhler, Robert Preißler, Dino Erker, or Olivia Buschmeyer (see contact information in your earlier received e-mail). You can also contact us, if you are interested in the outcomes of the study.

I have fully read and understand the text above and I am willing to participate in this study.

Appendix B – Questionnaires***Appendix B1: Demographics***

Welcome to our study about VoD watching behaviour! Thank you for your time and support! Before the daily questionnaires start, we would like to get some basic information about you.

1. Please indicate your gender.
 - Male
 - Female
 - Other (or do not wish to answer)
2. How old are you?
3. What is your nationality?
 - Dutch
 - German
 - Other, European
 - Other, non-European
4. Please indicate your current occupation.
 - Pupil
 - Student
 - Apprentice
 - Employed full-time
 - Employed part-time
 - Unemployed
 - Other

As you were informed beforehand, we would like to investigate your video-on-demand (VoD) watching behaviour. This does not mean linear television, but streaming platforms such as, for example, Netflix. The following questions are meant to explore your usage of these services to watch series, shows or/and movies.

5. Please mark the VoD streaming services that you usually use to watch series, shows, or/and movies. Multiple answers are possible.
 - Netflix
 - Amazon Prime Video
 - Hulu

- Disney+
- Maxdome
- Sky Home
- Youtube
- Other

6. Do you use one of these services at least once a week?

- Yes
- No

Appendix B2: Behaviour assessment

Hey there! Now we'd like you to answer some questions concerning your video-on-demand watching behaviour.

1. Did you watch a series on a video-on-demand platform such as Netflix or Amazon Prime Video yesterday?

- Yes
- No

2. At what time of the day did you watch the series? Multiple answers are possible. For example: You watched from 6 p.m. until 11 p.m., mark evening and night.

But: The times only serve approximate orientation. If you started watching at 5:55 p.m., for example, you do not have to mark “afternoon”.

- Morning (6 a.m. - 12 p.m.)
- Afternoon (12 p.m. - 6 p.m.)
- Evening (6 p.m. - 11 p.m.)
- Night (11 p.m. - 5 a.m.)

3. Did you watch for more than 1 hour?

- Yes
- No

4. Please indicate the number of hours you watched.

5. Please indicate how many episodes you watched. If you watched more than 20 episodes, choose 21.

6. What type of content did you watch?

- a. Comedy
- b. Thriller
- c. Documentary
- d. Horror
- e. Action
- f. Drama
- g. Romance
- h. Adventure
- i. Animation
- j. Mystery
- k. Science-fiction

l. Fantasy

m. Other

7. What was your reason for watching? *Multiple Choice

a. Entertainment

b. Boredom/nothing else to do

c. Stress

d. Interest/Curiosity

e. Escape from reality/distraction

f. Procrastination/Avoidance of other responsibilities

g. Information seeking

h. Peer activity (watching with friends/family)

i. Relaxation/taking a break

8. In what kind of context did you watch?

a. Alone

b. With friends

c. With family

d. With partner

9. After that, did you feel guilty for watching?

a. Yes *enables following items

b. Not at all.

10. To what extent did you feel guilty?

a. Slightly guilty

b. Moderately guilty

c. Very guilty

d. Extremely guilty

11. Please mark the reason for your guilty feeling

o I watched more episodes or for a longer time than I wanted / planned to.

o I neglected other obligations that I should have fulfilled.

o I neglected other free-time activities that I wanted to pursue.

o I neglected bodily needs, for example sleep.

o I think that I wasted time or could have spent that time more wisely/useful.

o Other, namely... *enables Free-Form Text Question

Thank you for answering the questions. See you later!

Appendix B3: Morning State Assessment

Good Morning! We'd just like you to answer some questions about your recent moods and feelings. Have a nice day!

1. On a scale of 0 to 10, with 0 being no stress and 10 being the worst stress possible, what number best describes your level of stress right now?
2. Please indicate to what extent you experienced the following feelings within the past hour.
 - o Low/sad mood
 - Not at all
 - Slightly
 - Moderately
 - Strongly
 - Extremely
 - o Low energy/fatigue
 - ...
 - o Feelings of guilt
 - ...
 - o Problems with concentration
 - ...
 - o Sleeping problems in the last night
 - ...

Appendix B4: Evening State Assessment

Hey! We'd again like you to answer a few questions concerning your current moods and feelings. Thank you!

1. On a scale of 0 to 10, with 0 being no stress and 10 being the worst stress possible, what number best describes your level of stress right now?
2. Please indicate to what extent you experienced the following feelings within the past hour.
 - o Low/sad mood
 - Not at all
 - Slightly
 - Moderately
 - Strongly
 - Extremely
 - o Low energy/fatigue
 - ...
 - o Feelings of guilt
 - ...
 - o Problems with concentration
 - ...
3. Next, there are some statements about feelings and thoughts. Please tick the box that best describes your experience of each during the day.
 - o Today, how often have you felt nervous, anxious or on edge?
 - Not at all
 - Several times
 - More than half of the day
 - Nearly all day
 - o Today, how often have you not been able to stop or control worrying?
 - ...
 - o Today, how often have you felt down, depressed or hopeless?
 - ...
 - o Today, how often did you have little interest or pleasure in doing things?
 - ...

4. Next, there are five statements that you may agree or disagree with. Please indicate your agreement with each item by choosing the answer that suits your agreement on the statement based on your momentary feeling the most. That means your answer should reflect how you feel about a particular statement right now. Please be open and honest.

- o In most ways my life is close to my ideal.
 - Strongly disagree
 - Disagree
 - Slightly disagree
 - Neither agree nor disagree
 - Slightly agree
 - Agree
 - Strongly agree
- o The conditions of my life are excellent.
 - ...
- o I am satisfied with my life.
 - ...
- o So far, I have gotten the important things I want in life.
 - ...
- o If I could live my life over, I would change almost nothing.
 - ...