BINGE-WATCHING – GOOD OR BAD?

Is the Relationship between Self-control and Academic achievement explained by Binge-watching?

UNIVERSITY OF TWENTE.

Bachelor Thesis Psychology
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01.07.2020, Enschede

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Abstract

During the last years, the consumption of online streaming services like Netflix, Amazon Prime and Hulu has become more popular all over the world. These platforms offer the chance to watch movies and series on any device of the consumer's choice and whenever the viewer likes it. This does not come without consequences: binge-watching can have negative impacts on different areas of a person's life as, for example, on the academic achievement of students. The character trait self-control seems to have a positive impact on the academic achievement of a person. Therefore, the aim of this research was to find out whether self-control explains binge-watching and professional efficacy in students, whether binge-watching explains professional efficacy and whether the relationship between self-control and professional efficacy is explained by binge-watching. The data collection proceeded with an online survey available for students (N=127) which measured the self-control, professional efficacy (as a measure of academic achievement) and binge-watching behaviour of students. Based on the collected data, two different multiple regression analyses were performed, with two different mediating variables conceptualizing binge-watching. The results of this study have revealed that self-control explains binge-watching and professional efficacy, that binge-watching does not explain professional efficacy and that the relationship between self-control and professional efficacy is not explained by binge-watching. Concluding, it can be stated that the findings partly deviate from the initial expectations and from what has already been known about this topic which leads to the implication that future research is needed to examine whether similar findings will be found or whether future studies will generate different outcomes.

Key Words: Binge-watching, self-control, academic achievement, mediation effect, streaming services, professional efficacy

Introduction

Online streaming services like Netflix, Amazon Prime and Hulu have grown enormously during the last few years with respect to the number of users of each of the platforms (Flayelle, et al., 2020). To understand what an online streaming platform offers, the CEO of Netflix, Reed Hastings, explained that Netflix is a video streaming company which presents a variety of movies and series in different genres. Unlike regular TV shows, members of an online streaming service account have access to the offered shows whenever and wherever they want (Dixon, 2013, p. 5). Based on the research of Flayelle et al. (2020), Westcott, Loucks, Downs, and Watson (2018), the following characteristics are some examples of the reasons for the increased usage of online streaming services: the self-explaining usability and the different programs offered by the services which can be watched at any time and on any digital device. These streaming platforms have been integrated into the daily lives of millions of TV consumers. Westcott, Loucks, Downs, and Watson (2018) point out that 55 percent of US households dispose of at least one paid streaming platform in 2017 compared to ten percent in 2009. A comparison between the years 2016 and 2017 in which the authors collected data on average streaming behaviour displays a rise of streaming time during the years of interest of the US population (Westcott, Loucks, Downs, & Watson, 2018).

It is crucial to think about the causes of the growing consumption because the large increase might have negative effects on the user. Hirsen (2015) draws attention to a phenomenon called binge-watching. With this, he refers to the unlimited accessibility of paid streaming platforms, whereby viewers can and do watch multiple episodes of a certain show in a single sitting and, additionally, have the opportunity to watch a whole season in a couple of days (Hirsen, 2015; Matrix, 2014; Pittman & Sheehan, 2015). This leads to younger people watching multiple hours of movies, series and other content streamed online in one day (Matrix, 2014). The frequency of watching a certain show or content can be assessed in different ways as for example by measuring the time spent binge-watching over the last month, over the last week or over one day. The average length of one viewing sitting needs to be estimated in order to find out whether the amount of watching is defined as binge-watching. Finally, the average number of series watched during one session indicates whether the time spent streaming is rather normal or can be classified as binge-watching (Flayelle, 2020). In this research project, the construct of binge-watching is understood as watching more than two episodes of a series on a streaming service in close succession, as defined by Netflix (De Feijter, Khan, & Van Gisbergen, 2016) or consuming more than three hours

straight (Rubenking, Bracken, & Sandoval, 2018).

Pittman and Sheehan (2015) see the reasons for more people binge-watching than ever before in the facts that technology improves and, therefore, makes it possible to consume the content at low costs. They even state that some consumers perceive the high amount of time streaming something online as being normal. Pang (2014) argues that people binge-watch because it is a modest act in which they do not have to concentrate and just have the content delivered to them which is relaxing and whereby people can recharge themselves (Kaplan, 1995). Furthermore, placing a person into a different, spatially divided world, which is not the one the consumer lives in, but still has parallels to the person's everyday life, is an attractive feature of the content delivered by streaming services, which leads to viewers forgetting the here and now and keep on watching (Pang, 2014). As can be seen, different factors cause a rise in peoples' binge-watching behaviour.

Besides the causes, it is important to think about the consequences of the consumption. Based on the article by Flayelle et al. (2020), binge-watching has both positive and negative outcomes on a person's life. Positive consequences are feelings of joy, the identification with protagonists, with whom the consumers build parasocial relationships, as well as the ability of storytelling related to binge-watching. It showed to have a positive effect on a person's well-being due to both, the autonomy a consumer has regarding the program he wants to watch and the selection of the device as well as the satisfying feeling when it comes to the simple and self-explaining usage of online streaming services. This means that the overall handling of online streaming services is easy for most consumers which has positive consequences for the person's perceived contentment. This, again, is related to positive emotions connected to binge-watching, because the people are more willing to use certain online streaming services due to their satisfaction with it.

However, besides the positive sequels, some consequences that binge-watching has on the viewer are rather negative. Flayelle et al. (2020) point out that the quality of a person's sleep suffers under the enormous amount of online streaming. Consumers are exposed to tiredness during daytime and sleep disturbances during night-time. When finishing a series, viewers may experience the feeling of emptiness because they spend a considerable amount of time watching a certain show and might have built a connection to the protagonists, which feels like losing friends after finishing a series. Due to reduced physical movement, the person follows an unhealthy lifestyle and develops a deprivation of enjoyment in other activities as for example social interactions and relationships (Flayelle et al., 2020). Thus, it is to be noted that binge-watching behaviour has both positive and negative consequences.

Beyond the negative consequences concerning streaming services and binge-watching mentioned above, Chambliss et al. (2017) found that besides binge-watching, social media have a negative influence on the academic achievement of students. In their study, the authors do not focus on binge-watching but rather base their research on different kinds of social media usage for example on Instagram, online games as well as communication through text messages. They clarify that there are different factors that demand a student's time and energy, which in turn leads to a student's distraction from fulfilling their academic goals. The study yields that both people who often consume online streaming and people who do not frequently do so stated that the viewing of television could have negative consequences. There is a negative relationship between certain contents offered on online streaming platforms and a person's academic achievement as well as between the frequency of watching television in general and a person's academic achievement. These reports go along with what the authors have found out about the relationship between overall internet usage in terms of entertainment (which includes frequent television viewing) and academic achievement. The results of the study conducted by Chambliss et al. (2017) show that social media activeness and binge-watching are among the most common causes for academic as well as social indulgence. In line with these findings are the outcomes of the study conducted by Vaterlaus, Spruance, Frantz and Kruger (2018) which reveal that binge-watching leads to procrastination and distraction in different areas of the life of the consumer. In terms of academic achievement, a student's sense of responsibility suffers from binge-watching, which can lead to long-term problems at school and in the student's academic career. Overall, binge-watching was found to be a waste of time on things that are less important compared to the academic achievement of a student. In conclusion, binge-watching has an overall negative impact on a student's academic achievement.

There seems to be a conditional factor about binge-watching. Even though it seems that the enormous amount of online streaming has a negative effect on a student's academic achievement, most consumers are not able to stop themselves from binge-watching (Shim, Lim, Jung, & Shin, 2018). Walton-Pattison, Dombrowski and Presseau (2018) state that binge-watching might evoke repentance in a person, however, the engagement in attitude-discrepant behaviour is common (Forrest, King, & Delfabbro, 2016; Krahé & Altwasser, 2006). Examples of behaviour that might be inconsistent with a person's attitude are smoking and alcohol drinking. The dichotomy between a good and at the same time a bad feeling towards an action is mainly responsible for addiction. Even though a person might have negative attitudes towards binge-watching does not mean that he/she is necessarily able to

stop that behaviour (Shim et al., 2018).

This leaves room to think about the role that self-control plays when determining the reasons for binge-watching and the possible consequences on a student's academic achievement. Duckworth, Taxer, Eskreis-Winkler, Galla, and Gross (2019) have conducted detailed research on the concept of self-control and defined it as "the self-initiated regulation of thoughts, feelings, and actions when enduringly valued goals conflict with momentarily more gratifying goals" (p. 374). Self-control can be seen as a part of the personality construct of conscientiousness which includes different personality traits like orderliness, dependability, grit, and the tendency to acquiesce to norms, especially when researching self-control in the educational context (Eisenberg et al. 2014; Park et al. 2017). Examples of self-controlled behaviour are the situations in which a student puts his/her mobile phone to the side or turns of the TV in order to focus on his/her homework which is a self-initiated act. However, even though a person is in power over his/her own self-controlling behaviour, this person may not be aware of it and it can happen in form of a habit, a rule and plans that the person consciously made in the past and thereafter happen automatically when situational cues are present. Self-control is especially important in conflicts of two desirable options, however, one for the long run and the other one only temporally, whereby the temporally choice is the more attractive one at that given moment. In the context of academic achievement, self-control is important because the academic goal is a long-term desire, but the act of studying does not bring joy when confronted with it. The authors found that a higher level of self-control leads to better academic achievements (Eisenberg et al. 2014; Park et al. 2017). Duckworth et al. (2019) explained that there is a specific process in which self-control is exhibited. Elements of a situation become subjects of the person's attention which leads to appraisal and, thereafter, either strengthens or weakens the following response. The more desirable the subjects of the situation are for the person, the less self-control they can exhibit. If the long-term academic achievement is important and valued, the self-control probably increases, and the person is able to manage and suppress the need to for example binge-watch in that specific situation.

As can be seen based on the above-discussed information, the level of a person's self-control seems to explain the amount of time that the person spends consuming online streaming services. Therefore, less self-control explains more binge-watching. Furthermore, binge-watching seems to negatively affect the academic achievement of the respective person. Research is yet needed to find out whether the relationship between self-control and academic achievement is mediated by binge-watching. The three individual relationships have been

thoroughly studied in the past. For example, there is research done on the relationship between self-control and academic achievement as well as the relationship between binge-watching and academic achievement, as the study of Vaterlaus et al. (2018) shows. They found that binge-watching has both positive and negative consequences on a student's academic achievement as it distracts students from studying and, on the other hand, serves as a diversion from stress related to the school and university context. Some studies focused on the influence self-control has on binge-watching. Building on the already existing research, there is still room to conduct research on the exact relation between self-control and academic achievement which binge-watching might explain. This research is relevant because this possible mediational relationship has not been studied yet which makes this research valuable and gap filling. It is not expected that binge-watching completely explains this relationship since there are other factors influencing this relationship as well. It is expected that binge-watching does explain the relationship between self-control and academic achievement to a certain extent and this is the focus of this research. Therefore, the goal of this study is to find out whether the relationship between self-control and academic achievement is mediated by binge-watching. In this research, academic achievement is measured in terms of professional efficacy, which refers to social and non-social facets of vocational achievements (Schaufeli, Martínez, Pinto, Salanova, & Bakker, 2002).

The contribution of this research paper is to move the field of binge-watching forward and to examine the specific consequences it has on the academic achievement of a student in a time in which binge-watching is still a growing trend. This research should help students to know how to regulate their own attitudes towards controlling their behaviour to achieve better academic outcomes. The research questions investigated in this paper are the following:

Is self-control related to binge-watching and to professional efficacy in students?

Is binge-watching related to professional efficacy?

Is the relationship between self-control and professional efficacy mediated by binge-watching?

Methods

Design and Participants

The study consists of a quantitative method approach with a survey being employed. It was ensured that all participants satisfied the inclusion criteria of being a student, having a sufficient understanding of the English language and being 18 years or older. The study sample consisted of 127 participants and Table 1 displays that approximately two-thirds of the participants are female. Furthermore, it stands out that 93.7% of the participants are German and that 93.7% are currently doing their bachelor studies.

Table 1

Descriptive statistics of the participants (N=127)

Item	*Factor*	*Frequency*	*%*
Gender	Male	44	34.6
	Female	83	65.4
Age	18 to 21	66	52
	22 to 25	61	48
Nationality	German	119	93.7
	Dutch	5	3.9
	Other	3	2.4
Educational Level	Bachelor	119	93.7
	Master	8	6.3
Usage Streaming	Less than once a week	9	7.1
Services	Once a week	8	6.3
	2-3 times a week	23	18.1
	Several times a week	47	37.0
	Everyday	40	31.5
Hours TV	Less than one hour	71	55.9
	One hour	24	18.9
	Two hours	18	14.2
	Three hours	4	3.1
	Four hours	7	5.5
	Five hours	2	1.6
	Six hours	1	.8

Usage Streaming Services: How often do you use streaming services?

Hours TV: On average, how many hours do you spend per day watching TV?

Procedure

The survey was composed of seven questionnaires due to the fact that there was a collaboration with two other students who investigated different research questions on the same topic. One student researched the relationship between binge-watching and physical health and physical activity and the other student focused on the relationship between binge-watching and extraversion. The non-probability convenience sampling method was used whereby individuals were recruited by asking them to participate in the study. This was done by uploading the survey on Sona Systems, which is an online survey platform where students can offer their studies and other students can participate in studies and gain credit points for their participation. However, this possibility can only be used by students from the University of Twente and, therefore, in order to ensure data gathering from a variety of students from other universities, another way of contacting possible participants was to share the link to the survey on Instagram and Facebook as well as sending it directly to friends and acquaintances who suited the group of interest. Participation in the survey was voluntary and the participants were selected through non-probability convenience sampling. Beforehand, the attendees were informed about the procedure, the length of the survey and the confidentiality and asked to give consent prior to filling in the survey. This research was approved by the Ethics Committee of the Faculty of Behavioural Sciences at the University of Twente with request number 200468. In case of further questions, the contact details of the three researchers have been provided at the beginning of the survey.

Materials

Demographics

The *demographic information* about the participants was apprehended based on four questions and captured the participants' gender, age, current educational level, and the nationality. Table 1 gives an insight into the participants' demographics.

Self-control

Self-control was measured with the Brief Self-Control Scale (BSCS; Tangney, Baumeister, & Boone, 2004). This scale is based on the 36-item Self-Control Scale (SCS). Dispositional self-control is measured with 13 items (example items: '*I am good at resisting temptation'* and '*I*

wish I had more self-discipline'). The survey offers answer options on a 5-point Likert scale, from 1 (*Not at all like me*) to 5 (*Very much like me*). Scores of nine negatively formulated items from the Brief Self-Control Scale have been reversed by inverting the original scoring scale for the questionnaires. The total score was calculated by taking the average of the scores on the 13 items. There is evidence that the reliability and validity of the BSCS are ensured because the study by Tangney, Baumeister, and Boone (2004) established a high test-retest reliability (.87) and a high internal consistency ($\alpha = .85$). For this study, a good Cronbach's alpha score was found ($\alpha = .80$).

Professional Efficacy

Since it is hard to measure actual academic achievement in a survey, *professional efficacy* was chosen to give an indication to the academic achievement of a student. Professional efficacy is a subjective perception of a student of his/her academic achievement and was assessed by the Efficacy subscale of the Maslach Burnout Inventory-Student Survey (Schaufeli et al., 2002). The inventory measures burnout in students. Three different scales are included in the inventory, namely Exhaustion, Cynicism and Efficacy. For this study, the Efficacy (EF) scale was taken into account which consists of 6 items (example items: *'I can effectively solve the problems that arise in my studies', 'I believe that I make an effective contribution to the classes that I attend'* and *'In my opinion, I am a good student'*). The items are scored on a 7-point Likert scale from 0 (*never*) to 6 (*always*). The scale scores are calculated by summing the item scores and dividing the sum by the number of items. In their study Schaufeli, Martínez, Pinto, Salanova, and Bakker (2002) compared students from three different countries and found Cronbach's alpha scores of .76 for Spain, .69 for Portugal and .67 for the Netherlands. These scores represent a sufficient internal consistency of the measurement instrument as measured with Cronbach's alpha. For the research at hand, a good Cronbach's alpha score has been found ($\alpha = .80$).

Binge-watching

Since there was no existing survey which measured *binge-watching* the way we intended to measure it with suitable items for our purpose, four items were added to measure binge-watching. The answer options for this survey differ for each item. Item one '*How often do you use streaming services? (e.g. Netflix, Amazon Prime Video, etc.)'* is scored on a 5-point Likert scale from 1 (*Less than once a week*) to 5 (*Every day*) with the sub-categories *Once a week, 2-3 times a week* and *Several times a week*. For item two '*On average, how many episodes of a*

series do you watch in one sitting'? the participants are asked to indicate the number of episodes. Item three '*On average, how many hours do you spend using streaming services per day?'* and item four *'On average, how many hours do you spend per day watching TV?'* are scored on a 9-point Likert scale and the participants are able to choose between different answer options from 0 (*Less than one hour*), to 8 (*More than seven hours*) with the sub-categories *One hour, Two hours, Three hours, Four hours, Five hours, Six hours, Seven hours*.

Data analysis

A pairwise deletion approach was used to reduce data loss in the analyses. The statistical program BMS SPSS version 24 was used to analyse the data which were gathered with the aid of the survey and, in turn, to answer the hypotheses. Two of the four binge-watching items have been used to do the analyses, respectively because these two items measure the online streaming consumption of the participants and serve as indicators of binge-watching. Since the items '*On average, how many episodes of a series do you watch in one sitting?'* and '*On average, how many hours do you spend using streaming services per day?'* have a different range of scores, two separate analyses were conducted with each variable serving as a mediator. The other two items specify the overall watching behaviour of the participants.

To calculate the means and standard deviations for each scale, descriptive statistics were performed. These statistics give information about the variables self-control and professional efficacy and the two binge-watching variables. The distributions of the demographical information of the participants were estimated with frequencies and percentages. Furthermore, Pearson correlations between the four variables self-control, binge-watching (number of episodes and number of hours watched) and professional efficacy were calculated. The values of the correlation coefficient range from 1 to -1. A weak correlation is indicated by values between 0 and .3 and a moderate correlation exists when the value is between .3 and .5. A strong correlation is defined by every value above .5 (Cohen, 1989).

The program PROCESS, written by Andrew F. Hayes, was used to analyse whether the relationship between self-control and professional efficacy is mediated by binge-watching. It models multiple linear regression paths in SPSS. PROCESS uses bootstrapping which makes the estimation of the indirect effect from the mediator *binge-watching* to the dependent variable professional efficacy possible. To bootstrap means to take several samples from the original sample which, again, indicate the sample distribution. Finally, the confidence interval for the indirect effect is obtained which indicates the significance of the researched

relationship. The mediation analysis conducted examines the relationship between three variables in three steps, respectively. The first step investigates the relationship between the predictor self-control and the mediator binge-watching. In the second step, the relationship between the predictor self-control and the dependent variable professional efficacy is tested. In the final step, binge-watching is added as a mediator to the model. It is hypothesized that the mediator binge-watching explains the relationship between self-control and professional efficacy and is verified when binge-watching is a significant predictor of professional efficacy, and the prediction of professional efficacy by self-control becomes smaller or is no longer significant. Finally, also the indirect effect should be significant.

Results

The participants' watching behaviour

The watching behaviour is presented in Table 2. It was found that most participants watch two to three episodes in one sitting and that they spend approximately one and a half hour using streaming services per day. The other two items give additional insight into the overall watching behaviour of the participants. Most participants use streaming services two to three times a week and on average the participants watch one hour of TV per day.

Descriptives of binge-watching, self-control, and professional efficacy

Table 2 shows the mean scores with standard deviations of self-control, professional efficacy and binge-watching and the correlations between the variables. Looking at the Pearson correlations in the table, one can see that the binge-watching item *hours spent* has a weak negative significant correlation with self-control and a very weak non-significant correlation with professional efficacy. The binge-watching item *episodes watched* has a weak negative significant correlation with self-control and a weak non-significant correlation with professional efficacy. The directions of the correlations are partly as expected because it was assumed that higher self-control is associated with lower consumption of streaming services and that higher consumption of streaming services is interrelated with lower professional efficacy. However, the number of hours spent consuming streaming services does not seem to affect professional efficacy as expected. Looking at the correlation between self-control and professional efficacy, the two constructs correlate moderately positive. It was expected that

the direction of this correlation is moderate because it was assumed that a higher level of self-control is coherent with a higher level of professional efficacy. Analysing the correlation between two of the binge-watching items it is noticeable that those correlate moderately with each other. The direction of this correlation was expected to be positive. However, a much higher correlation was assumed as both items are aimed to measure the construct of binge-watching.

Table 2

Descriptive Statistics and Pearson Correlations for binge-watching items, self-control and professional efficacy (N=127)

Variables	**Mean**	**SD**	**1**	**2**	**3**	**4**
1.Self-Control	2.7	7.0				
2. Professional Efficacy	3.6	4.1	.498**			
3. Hours spent	1.8	1.0	-.198*	-.045		
4. Episodes watched	2.7	1.6	-.185*	.076	.492**	

**Correlations are significant at the 0.01 level (2-tailed).

*Correlations are significant at the 0.05 level (2-tailed).

SD: standard deviation

Mediation Analysis

Two different analyses were conducted with binge-watching being separated into the number of episodes watched in one sitting and the hours spent consuming streaming services which served as mediators. The analyses are illustrated in Figure 1 and Figure 2. First, the analysis with the number of episodes watched in one sitting as a mediator of the relationship between self-control and professional efficacy is reported. The fit of the overall model can be summarized as $F(1,124)= 23.73$, $p <.01$, $R^2= .28$ which indicates a significant fit of the model. The indirect effect is tested using non-parametric bootstrapping. As can be seen in Figure 1, there was a non-significant indirect effect of the independent variable self-control on the dependent variable professional efficacy through the number of episodes watched in one sitting (IE=-.0193), 95% BCa CI [-0.0439, 0.0009]. The direct effect of self-control on professional efficacy is $b= 0.32$, $p < .01$. The effect of the independent variable self-control on

the mediator is negative and significant and can be summarized as b= -.04, t(125)= -2.11, p= .04.

The fit of the overall model of the analysis with the hours spent consuming streaming services as a mediator of the relationship between self-control and professional efficacy is summarized as F(2,124)= 20.72, p < .01, R^2=.25, which indicates a significant fit of the model. As can be seen in Figure 2, there was a non-significant indirect effect of self-control on professional efficacy through the hours spent consuming streaming services (IE=-.0065), BCa CI [-0.0315, 0.0157]. The direct effect of self-control on professional efficacy is b= .0.30, p < .01. The effect of the independent variable self-control on the mediator is negative and significant and can be summarized as b= -0.03, t(125)= -2.25, p= .03.

The purpose of this study was to find out whether the relationship between self-control and professional efficacy is mediated by the number of episodes watched in one sitting and the hours spent consuming streaming services. As can be interpreted by the results, the indirect mediation effects of both analyses are not significant, which means, that the mediators do not explain the relationship between self-control and the professional efficacy. Self-control is directly related to professional efficacy, but binge-watching might not be directly related to professional efficacy since in the second model this relationship is not significant and the correlations with professional efficacy are very weak and not significant.

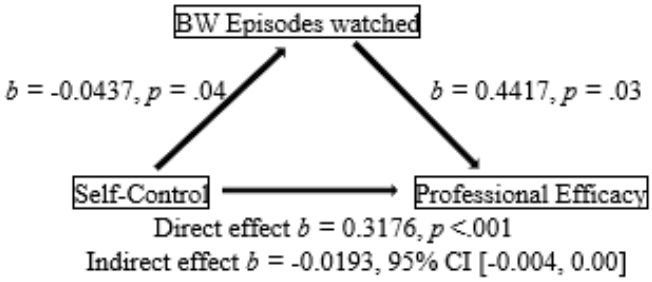

Figure 1
Model of self-control as predictor of professional efficacy, mediated by the number of episodes watched in one sitting. The confidence interval for the indirect effect is BCa bootstrapped CI based on 127 samples.

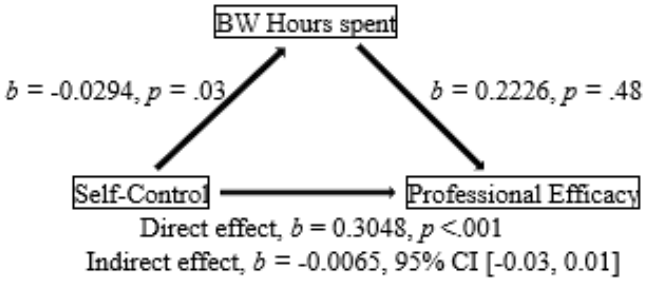

Figure 2
Model of self-control as predictor of professional efficacy, mediated by the number of hours spent consuming streaming services. The confidence interval for the indirect effect is BCa bootstrapped CI based on 127 samples.

Conclusion and Discussion

This research was conducted to find out whether the relationship between self-control and professional efficacy is mediated by either the mediator number of episodes watched, or hours spent consuming streaming services or both.

First of all, we wanted to know whether self-control is related to binge-watching and to professional efficacy in students. We found that self-control and professional efficacy interrelate which means that when self-control increases, professional efficacy increases as well. It was expected that people with higher self-control have actually higher academic achievement and also higher professional efficacy, which is in line with the findings of this research project. Self-control correlates with binge-watching as expected which means that binge-watching goes down as the respected person's self-control goes up. This outcome

answers the expectations because one would think that a person spends less time consuming online streaming services when the person is in control of his/her own behaviour and temptations and can focus on activities with more desirable long-term outcomes. To answer the research question, one can state that self-control is positively related to professional efficacy and negatively to binge-watching. The findings of this research project are in line with the already existing research. By looking at and interpreting the outcomes of the first relationship between self-control and professional efficacy, it is noticeable that these confirm what Eisenberg et al. (2014) and Park et al. (2017) have already found about this construct. All three studies have shown that higher self-control correlated with better academic achievement of a person. Furthermore, the findings of already existing research go along with what the research project at hand has revealed about the relationship between self-control and binge-watching. It was found that higher self-control is related to less binge-watching probably because a person with high self-control is better able to regulate his/her behaviour towards more productive activities, as was found in the studies by Eisenberg et al. (2014) and Park et al. (2017) about academic achievement. It can be concluded that self-control is related to both, binge-watching and professional efficacy, as the findings of this study as well as the findings of already existing research have shown.

Secondly, we wanted to know whether binge-watching is related to professional efficacy and found that there is no correlation between these two variables. This finding is surprising as it was expected that the professional efficacy might suffer under the high consumption of online streaming services and that the professional efficacy decreases considerably. The findings of the study at hand seem to contradict what has been found in already existing research which have shown that binge-watching has a negative effect on academic achievement, meaning that the amount of online streaming services consumption might partly predict the academic achievement of a person. Chambliss et al. (2017) have shown that online activity (social media and binge-watching) belong to the most frequent causes of academic indulgence. Vaterlaus, Spruance, Frantz and Kruger (2018) found evidence that binge-watching operates negatively on a person's academic achievement. The findings from the research at hand may deviate from the expectations and already existing studies as the literature used for other research projects was based on the actual academic achievement of a person, while for the present study a professional efficacy scale was used. Maybe the actual academic achievement of a person differs from the self-assessment and therefore, leads to deviating findings in this research compared to already existing research. The new findings suggest that more research is needed to find out whether the relation

between binge-watching and academic achievement is also found to be very weak in other studies. Future research is necessary to really focus on the construct of academic achievement rather than professional efficacy. This could be done by creating an academic achievement scale or by getting access to existing academic achievement scales.

Thirdly, it was examined whether the relationship between self-control and professional efficacy is mediated by binge-watching. The results of the two analyses are interpreted together. The findings of the analyses show that there is no mediation effect of self-control through binge-watching on professional efficacy. On the one hand, this is surprising because it was expected that binge-watching explains the relationship between self-control and professional efficacy to some extent. On the other hand, the findings are not surprising as there is no correlation between binge-watching and professional efficacy. There is no existing research on this concrete interaction model. However, maybe the findings of this research project deviate from the initial expectations because the self-assessment of a student's professional efficacy and the actual academic achievement of a student differ, which leads to differences in the outcome of the mediation. If the respective student's actual academic achievement had been measured, maybe the expectations would have been satisfied.

Overall, it can be concluded that the present results partly contradict what is already known about individual relationships and what has been expected to be found. This research brought to light information about the interaction between the three variables self-control, academic achievement, and binge-watching and, moreover, revealed that there is no mediation effect of binge-watching on the relationship between self-control and academic achievement.

There are some limitations to this study which should be considered. First, academic achievement was not actually measured by an academic achievement scale but with a professional efficacy scale, since there are no existing academic achievement scales which are publicly accessible. Accessing grade records was not possible in this study and it would have been difficult to use grades because of the different grading systems in different countries. Using a professional efficacy scale to measure academic achievement is a limitation because with professional efficacy, one measures a student's own assessment of their academic achievement, and not the academic achievement itself. Hence, the reported information might be biased or false. For future studies on this specific topic, it needs to be ensured that academic achievement is measured by using the actual grades of students. When the access to student's grades is not possible, using an actual academic achievement scale would be another option. For example, creating an academic achievement scale would ensure more reliable

results, when conducting research on academic achievement. Another possibility would be to get access to existing academic achievement scales when the construct of academic achievement is to be measured.

A second limitation is that, accidentally, a wrong scoring scale for the professional efficacy questionnaire was used. Instead of using the answer options (0) never, (1) a few times a year or less, (2) once a month or less, (3) a few times a month, (4) once a week, (5) a few times a week and (6) every day the answer options (0) never, (1) almost never, (2) rarely, (3) sometimes, (4) often, (5) most of the time and (6) always were used. When thinking about how useful this measure is for assessing actual academic achievement and taking into account the mistake that was made, one could think of it as a limitation, because this scale measures professional efficacy over a longer period of time, whereas the aim of the assessment is to measure the academic achievement of a student at a certain point in time. The scale of the professional efficacy questionnaire might therefore miss the original intention. Future research is needed to correct this mistake and to make sure that the correct scale is used in order to circumvent a distortion of the findings and to be able to compare the level of professional efficacy of the sample of this study with other studies.

Finally, the corona pandemic has probably considerably influenced the gathered data, which can be seen as a limitation. Because of the quarantine regulations which were arranged in March 2020, most people did not go to work, to university or to school. Thus, consuming streaming services became an everyday activity for most students who consumed more series compared to ‘normal’ times before the pandemic. One can expect that this huge consumption had an influence on the student’s reported data since they took part in the study during the time of quarantine. When conducting future research on this topic, one should make sure that the given circumstances are not influenced by a pandemic or other outstanding situation, but rather correspond to normal living conditions. This is important for measuring all variables in their normal environment and to counteract the influence of a given extraordinary circumstance on one variable, which may distort the results.

Besides the discussed limitations, there are some strong points about this study worth mentioning which make this research valuable. One strength of this research project is that an unexplored concept was examined which gives the study a unique and new aspect. Conducting research on a topic which has not been researched before gave room to explore this field without knowing the exact outcome. A second strong point about this study is that the sample size was big enough to work with the gathered information, even though the number of participants that took part in the study was concise. Because of a sufficient sample

size, the analysis and interpretation of the results were possible and making a point about the findings was feasible. Finally, using a quantitative research method is a strength because the gathering of data was convenient since it was possible to publish the study among friends, colleagues, and fellow students. Reaching out to people in person means that there is a relationship between the researcher and participants, at least to some extent. This, again, increases the likelihood of collecting valid and honest information (Carr, 1994), because participants are more motivated to give truthful answers when they have some kind of private connection to the researcher. However, there were also other ways of reaching out to potential participants as for example the Sona System, where no private connection exists and, as already discussed in the limitations, where less truthful information might have been given.

For future studies on this specific topic, it needs to be ensured that all limitations found in this study are removed and corrected. Besides the already discussed suggestions for future studies and to make a more specific point about the researched construct, a bigger and more representative sample should be used, which could, for example, be achieved through spreading the link to the survey on several databases of other universities. This would lead to more truthful and reliable statements about the individual relationships and the overall interaction model since the findings tend to be more representative when the sample size is larger. Furthermore, the correlation between the two items used to measure binge-watching was positive, however, we expected a much higher correlation as both items were aimed to measure binge-watching. A suggestion for future studies would be to make sure to use two or more items that actually measure the same construct, which, in turn, leads to higher reliability of the scale.

Concluding, one can state that this study can serve as a good starting point for examining the relationship between self-control and academic achievement and finding out whether binge-watching serves as a mediator to this relationship. It has been found that self-control seems to influence both, binge-watching and professional efficacy, as a proxy for academic achievement, that binge-watching does not affect the academic achievement of a student and that binge-watching does not explain the relationship between self-control and academic achievement. These results contradict the expectation at the beginning of the study and, hence, future studies are needed to examine this construct with another, better measure for academic achievement. Moreover, the limitations found in this research project need to be corrected by ensuring that academic achievement is measured by using the actual grades of students, by using the correct scales for each questionnaire and by performing research in normal environmental circumstances and not during an outstanding situation. This would

enable the formulation of more meaningful and reliable results in future studies. This research should be pursued because it is a particularly topical subject and this construct concerns a big number of students since binge-watching has become a common activity in students' everyday lives in the last couple of years. This research has been worthwhile because it reveals new findings that do not go along with already existing studies, which arouses a new field of research. These new findings open perspectives and recent insights into this subject matter which is contemporary.

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Appendices

Appendix 1:

Q3 Information letter

Dear Participant:

We are third-year students in the Department of Psychology at the University of Twente conducting research under the supervision of Nadine Köhle and Erik Taal on the relationship between binge-watching and three different outcome variables namely academic achievement, physical health and extraversion. Online streaming services like Netflix and Amazon Prime Video have gained and are still gaining more users each year all over the world. Watching movies and series online has become a weekly or daily routine for a lot of people. Sometimes, people tend to watch more than two episodes in one setting which is called binge-watching and with our research, we are trying to find out how binge-watching is related to the three variables named above.

We would appreciate if you would complete the attached brief survey. Completion of the survey is expected to take about 15 minutes of your time. However, you can withdraw from the survey at any time, without providing a reason. There are no known or anticipated risks to participation in this study. Participation in this project is voluntary and anonymous. Further, all information you provide will be considered confidential.

This study has been reviewed and received ethics clearance through theUniversity of Twente Research Ethics Committee. If you have any complaints about this research, please direct them to the secretary of the Ethics Committee of the Faculty of Behavioural Sciences at the University of Twente (Drs. L.Kamphuis-Blikman P.O. Box 217, 7500 AE Enschede (NL), telephone: +31 (0)53 489 3399; email: l.j.m.blikman@utwente.nl).

For all other questions, please contact:

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Appendix 2:

Q1 Informed Consent

I hereby declare that I have been informed in a manner which is clear to me about the nature and method of the study as mentioned before. My questions have been answered to my satisfaction. I agree with my own free will to participate in this research. I reserve the right to withdraw this consent without the need to give any reason and I am aware that I may withdraw from the survey at any time. If my research results are to be used in scientific publications or made public in any other manner, then they will be completely anonymous as no personal identifying information is collected in the survey. My data will not be disclosed to third parties without my express permission. If I request further information about the research, now or in the future, I may contact

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Franziska Hanefeld (f.hanefeld@student.utwente.nl)
Nicklas Hirte (n.j.p.hirte@student.utwente.nl)

If you have any complaints about this research, please direct them to the secretary of the Ethics Committee of the Faculty of Behavioural Sciences at the University of Twente, Drs. L.Kamphuis-Blikman P.O. Box 217, 7500 AE Enschede (NL), telephone: +31 (0)53 489 3399; email: l.j.m.blikman@utwente.nl).

Q18 I read and understood all the above mentioned and agree to participate in the study. Further, I participate out of my own free will and I am informed that I can withdraw from the study at any time without providing a reason.

- ○ Yes (1)
- ○ No (2)

Appendix 3: Surveys

Demographic Information

Q11 Please indicate your gender

- ○ Male (1)
- ○ Female (2)
- ○ Other (3)

Q12 Please indicate your age in years

Q13 Please indicate your current educational level

- ○ Bachelor student (1)
- ○ Master student (2)

Q14 Please indicate your nationality

- ○ Dutch (1)
- ○ German (2)
- ○ Other (3) _____

Binge-watching

Q26 The following questions are about your usage of streaming services. Please answer them as accurate as possible.

Q7 How often do you use streaming services? (e.g. Netflix, Amazon Prime, etc.)

- ○ Less than once a week. (1)
- ○ Once a week. (2)
- ○ 2-3 times a week (6)
- ○ Several times a week. (3)
- ○ Everyday. (4)

Q8 On average, how many episodes of a series do you watch in one sitting?

_____

Q9 On average, how many hours do you spend using online streaming services per day?

- ○ less than one hour (4)
- ○ one hour (5)
- ○ two hours (6)
- ○ three hours (7)
- ○ four hours (8)
- ○ five hours (9)
- ○ six hours (10)
- ○ seven hours (11)
- ○ more than seven hours (12)

Q10 On average, how many hours do you spend per day watching TV?

- ○ less than one hour (4)
- ○ one hour (5)
- ○ two hours (6)
- ○ three hours (7)
- ○ four hours (8)
- ○ five yours (9)
- ○ six hours (10)
- ○ seven hours (11)
- ○ more than seven hours (12)

13-item Brief Self-Control Scale

Q4 Please indicate how much each of the following statements reflects how you typically are.

	Not at all like me (1)	Not like me (4)	Neutral (5)	Like me (6)	Very much like me (7)
I am good at resisting temptations. (1)	○	○	○	○	○
I have a hard time breaking bad habits. (2)	○	○	○	○	○
I am lazy. (3)	○	○	○	○	○
I say inappropriate things. (4)	○	○	○	○	○
I do certain things that are bad for me, if they are fun. (5)	○	○	○	○	○
I refuse things that are bad for me. (6)	○	○	○	○	○
I wish I had more self-discipline. (7)	○	○	○	○	○
People would say that I have iron self-discipline. (8)	○	○	○	○	○
Pleasure and fun sometimes keep me from getting work done. (9)	○	○	○	○	○
I have trouble concentrating. (10)	○	○	○	○	○
I am able to work effectively toward long-term goals. (11)	○	○	○	○	○
Sometimes I can't stop myself from doing something, even if I know it was wrong. (12)	○	○	○	○	○

I often act without thinking through all alternatives. (13)	○	○	○	○	○	

Professional Efficacy

Q19 Please select the option that is most suitable for you.

	Never (1)	Almost never (2)	Rarely (3)	Sometimes (4)	Often (5)	Most of the time (6)	Always (7)
I can effectively solve the problems that arise in my studies. (1)	○	○	○	○	○	○	○
I believe that I make an effecitve contribution to the classes that I attend. (2)	○	○	○	○	○	○	○
In my opinion, I am a good student. (3)	○	○	○	○	○	○	○
I feel stimulated when I achieve my study goals. (4)	○	○	○	○	○	○	○
I have learned many interesting things during the course of my studies. (5)	○	○	○	○	○	○	○
During class, I feel confident that I am effective in getting things done. (6)	○	○	○	○	○	○	○

Big Five (BFI)

Q5 Here are a number of characteristics that may or may not apply to you. Please indicate for each statement, the extent to which you agree or disagree with that statement. I see myself as someone who...

	strongly disagree (1)	disagree (2)	neutral (3)	agree (4)	strongly agree (5)
Is talkative. (1)	○	○	○	○	○
Is reserved. (3)	○	○	○	○	○
Is full of energy. (4)	○	○	○	○	○
Generates a lot of enthusiasm. (5)	○	○	○	○	○
Tends to be quiet. (6)	○	○	○	○	○
Has an assertive personality. (7)	○	○	○	○	○
Is sometimes shy or inhibited. (8)	○	○	○	○	○
Is outgoing, sociable. (9)	○	○	○	○	○

Physical Health

Q20 During the past seven days how much have you been bothered by the following?

	Not bothered at all (1)	Bothered a little (2)	Bothered a lot (3)
Stomach pain (1)	○	○	○
Back pain (2)	○	○	○
Pain in your arms, legs, or joints (knees, hips, etc.) (3)	○	○	○
Menstrual cramps or other problems with your periods WOMEN ONLY (4)	○	○	○
Headaches (5)	○	○	○
Chest pain (6)	○	○	○
Dizziness (7)	○	○	○
Fainting spells (8)	○	○	○
Feeling your heart pound or race (9)	○	○	○
Shortness of breath (10)	○	○	○
Pain or problems during sexual intercourse (11)	○	○	○
Constipation, loose bowels, or diarrhea (12)	○	○	○
Nausea, gas, or indigestion (13)	○	○	○
Feeling tired or having low energy (14)	○	○	○
Trouble sleeping (15)	○	○	○

Physical Activity

Q30 During a typical 7-Day period (a week), how many times on the average do you do the following kinds of exercise for more than 15 minutes during your free time? (write in each text field the appropriate number)

	Times per week (1)
STRENUOUS EXERCISE (HEART BEATS RAPIDLY) (e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling) (1)	
MODERATE EXERCISE (NOT EXHAUSTING) (e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing) (2)	
MILD/LIGHT EXERCISE (MINIMAL EFFORT) (e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking) (3)	

Debriefing

Q15 Thank you for participating in this study!
To safe your answers, please click on the right.