THE ROLE OF SEX DIFFERENCES IN THE RELATION BETWEEN SOCIAL MEDIA USE AND SELF-COMPASSION

A PILOT STUDY

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Abstract

Although recent research has pointed to the potential benefits of self-compassion in the context of social media use, relatively little is known about how this relation is experienced by females and males on the state-level. While researchers suggest strong associations between self-compassion and mental health, self-compassion develops differently in females and males. Therefore, the study first aims to explore to what extent a person's self-compassion level and social media use are associated on the state-level is perceived by females and males. A structured and repeated-measurement, online experience sampling study was conducted to investigate this relationship amongst young adults (n = 23), utilizing, the Self-Compassion Scale Short-Form (SCS-SF), a self-developed questionnaire assessing time spent and the number of social media and two state items for social media consumption and one for self-compassion. Fluctuations in social media consumption and self-compassion between individuals were indicated on the state-level. Furthermore, a significant positive correlation between trait-self-compassion and state self-compassion, as well as for trait and state-level of social media consumption, was found. In addition, a non-significant correlation was demonstrated between social media use and self-compassion on the trait-level. The Linear Mixed Model Analysis indicated a non-significant correlation between social media use and self-compassion and thus merely a subtle difference in females and males could be found in this relation, demonstrating a positive correlation for females and a negative one for males. Researchers and practitioners should take the relation between social media use and self-compassion into account in future studies and interventions focused on self-compassion, while in addition investigating the difference between females and males in a deeper way to find the causes behind it.

Keywords: ESM, ecological assessment, social media use, self-compassion, sex

The Role of Sex Differences in the Relation Between Social Media Use and Self-Compassion

Over the last decade, the number of social media platforms and the number of active social media users has grown exponentially. Hence, social media (SM) has become a central component of people's daily life with an estimated three billion social media users worldwide in 2020, accounting for 49% of the world's population (Singh, Dixit, & Joshi, 2020). Therefore, it has attracted a great deal of academic interest in the field of psychology, in order to better understand the impacts that the user may experience as a result of social media usage. In research, SM is generally used as a hypernym that describes a variety of interactive Web applications; making it one of the most important applications of the Internet (Van Looy, 2022). However, it is important to mention that research in the field of social media use is still relatively new. Therefore, until nowadays the huge impact SM has on the different areas on peoples' life is rarely investigated (Mosleh, Pennycook, & Rand, 2022). Additionally, until now no distinguished understanding has existed for general social media use considered on its daily level.

According to previous research, adolescents and young adults are the most active users of social media. International data suggests that 83% of young adults, aged between 18-30 years old use various social networking sites actively multiple times a day (Best, Manktelow, & Taylor, 2014). People use it for communication and as a form of expression to maintain a social identity. That is the reason why users spend so many hours each day on Messenger, Instagram, Facebook, and other popular social networking sites. But as with any form of transformative technology, there are not only positive but also negative aspects.

Even though users continue to update, like and share on platforms, they don't always recognize the effects that social media had on their perceptions of life. Due to the increasing demands of social networking sites, young adults are facing significant pressures and challenges (e.g., toxic social comparison) because they compare themselves to what they are observing and experiencing through social media (Zhao & Zhou, 2020). The Nations Population Fund estimates that there are over 1.8 billion young people who are negatively influenced by daily social media consumption (Best, Manktelow, & Taylor, 2014).

After a couple of decades of weaving social media into social life, researchers came to recognize the alarming effect social media has on people's mental health. Throughout the disciplines of psychology, there is some literature detailing the impacts of social media use on its users (Verduyn et al., 2017).

As a protective factor for mental health, increasing research attention has been given to self-compassion. Self-compassion is understood as not being judgmental toward oneself and being able to feel and connect with one's own suffering on the emotional level (Elices et al., 2017). Researchers demonstrate self-compassion as a buffer against social stressors that individuals are exposed to on social networking sites (Best, Manktelow, & Taylor, 2014). Therefore, self-compassion plays an important role as a moderator between perceived stress from social media and the internalization of pathological symptoms. However, researchers showed that a distinction of self-compassion needs to be made between males and females (Keyte et al., 2021). Studies have revealed that females, from adolescents to young adults, had lower levels of self-compassion than males (Wang et al., 2020).

Almost all previously conducted research has been measured on the trait level, showing a negative correlation between self-compassion and the amount of social media use. In the literature, traits are defined as permanent or long-lasting characteristics (Laborde et al., 2020). Considering the existing body of research, investigating self-compassion in the context of social media use on the trait -level, limitations appeared. Many studies exploring the level of self-compassion in the context of time spent on social media applications made use of retrospective self-reports. That is, applying measurement methods that require participants to reflect upon a past time period and not on the current moment (Curran & Bauer, 2011). Consequently, indications about users' social media consumption could not reflect on the immediate situation. Moreover, studies utilizing such assessments are often cross-sectional, which means they only provide information about the associated measured once in a specific time point in the past (Prinzing et al., 2021).

Recently, researchers have proposed that the relation between social media use and self-compassion is much more complicated than can exclusively be considered on the trait level. Hence, it has become apparent that this relation might fluctuate with certain situations. Therefore, it has become meaningful to investigate it on the state-level (Vrabel, Zeigler-Hill, & Southard, 2018). States are defined by the literature, as momentary and fluctuating feelings or behaviours (Edwards & Potter, 2005). Until recently, research on the relation between self-compassion and the amount of social media use at the state-level has been rare.

Therefore, based on the findings of the previously conducted research, it is proposed that state self-compassion correlates negatively with the amount of social media use on a daily basis which is similar to the negative correlation that can be already indicated on the trait-level.

Self-Compassion on the Trait and State Level in the Context of Social Media Use

The term 'self-compassion' appeared in the psychological literature recently with Neff's (2003) publication of two articles, describing this construct. She operationalized self-compassion on the trait-level as an attitude that is relevant to every personal experience of suffering. It entails three elements: self-kindness vs. self-judgment, common humanity vs. overidentification, and mindfulness vs. isolation (Garcia et al., 2021).

Self-kindness means treating oneself kindly when things go wrong. For instance, when a person fails, those scoring high on self-compassion tend to treat themselves with greater kindness. The second feature, common humanity, is conceptualized as recognizing one's experiences, no matter how painful. This is of importance when people fail, they often feel that their experience is personal (Neff, 2011). The last feature of self-compassion is mindfulness. This is defined according to Morley and Fulton (2016) as an '*intentional present moment awareness without judgment'*. To put this in other words, it means to perceive a situation the way it is without becoming overly engaged with negative or positive emotions that could arise in the situation.

In addition, scholars have recently begun to consider the more complex and dynamic perspective of self-compassion, as they found self-compassion to vary across occasions and change over life spans (Debusscher, Hofmans, & De Fruyt, 2016). However, no scientific definition of state self-compassion can be found in the literature. Hence, the present study compares state self-compassion to observable fluctuations in showing compassion towards oneself tending to vary across situations.

In general, self-compassion is known to perform a self-regulatory function, by facilitating emotion regulation and buffering the effects of stressful experiences. Thus, self-compassion can be considered as one element that enables a healthy relationship to social media. Nevertheless, there are only a few studies on self-compassion related to social media use. That is the reason why self-compassion has not been examined to date as a definite moderator in social media use (Wang et al., 2020). However, theoretically the function of self-compassion and relevant empirical evidence suggest that self-compassion may moderate the predictive effects of social media use. For instance, individuals who use social media platforms may develop harsh judgements towards themselves when they encounter attractive, successful, or socially desirable images (Vogel et al. 2014). Then, self-compassion could play an influential role in encouraging users of social media platforms to be non-judgmental towards themselves and adopt a more compassionate perspective (Kelley et al., 2019). Therefore, possible

connections between self-compassion and social media use on the trait-level can be indicated.

However, little research has been done regarding the variability in state self-compassion in the context of social media use. Thus, it is of importance to explore these temporal relations, offering further insight into the daily self-compassion experience.

Self-compassion and the Role of Sex Differences in the Context of Social Media Use

Little research, to the best of the authors' knowledge, has examined the role that sex play in self-compassion in the context of social media use on the trait-level. In general sex differences in motivations to use social media platforms exist. Women, on the one hand, are found to be more active on social media platforms to build social interaction. For instance, in maintaining relationships and engaging in social interactions (Muscanell & Guadagno, 2012). While men, on the other hand, are more likely to spend their time online engaging in more task and achievement-focused activities (e.g., gaming or getting financial information) (Muscanell & Guadagno, 2012). A study conducted by Kimbrough et al. (2013) substantiates the previously mentioned finding of Muscanell and Guadagno (2012), by showing women developing communication styles for text-based interactions because they communicated more often via several communication platforms than men. Hence, women reported higher feelings of affection and belongingness when making use of social networking sites than men. Male users in contrast utilized social platforms mostly for practical reasons. Social media helps them perform research, gather relevant contacts, and ultimately increase their status (Krasnova et al., 2017).

In general, researchers found no sex difference in the overall amount of internet use, but interestingly there are differences regarding time spent online referring to social media platforms. Studies have shown that a greater amount of time spent on social media could be indicated in females, as they use it to share personal information and reveal their personal lives (Barthrope et al., 2020). Generally, women make more use of social media platforms than men because of a sense of belongingness and for emotional reasons. Studies have shown that people who make use of social media sites for friendships and expressing feelings, have a higher tendency to suffer from depressive symptoms. This is especially the case in females (McCrae, Gettings, & Purssell, 2017). Another study conducted by Yarnell et al. (2019), found that females suffer more from toxic use of social media sites due to their low levels of self-compassion.

Some previously conducted research has revealed significant differences between men and women in self-compassion, indicating higher levels in men than in women. A study

conducted by Petrocchi, Ottaviani, and Couyoumdjian (2014) examined the three dimensions of self-compassion based on sex differences. They found women reporting higher scores on self-judgment, overidentification, and isolation, while men scored higher on self-kindness, common humanity, and mindfulness. Interestingly, regarding social comparison, no difference in sex could be indicated. Barron, Krumrei-Mancuso, and Harriger (2021) examined whether men and women are positive or negatively influenced by social media content. They found females and males equally affected by social media use, even though men possessed higher levels of self-compassion than women. The finding by Barron, Krumrei-Mancuso, and Harriger (2021) was supported by a study conducted by Keles, McCrae, and Grealish (2020), who did not find any difference in sex in the relation between depression and content on social media. Especially, the study of Barron, Krumrei-Mancuso, and Harriger (2021) is of interest since it is expected that someone having high levels of self-compassion would predict to be less vulnerable to social stressors appearing on social media platforms, than those with lower levels.

Nevertheless, the outcomes of the previously mentioned studies are limited to the trait-level. To the author's knowledge no study yet has examined whether the relation between social media use and self-compassion varies between males and females on the state-level. This is done with the intention of filling in the existing knowledge gap inferred from the contradictory findings outlined above.

Current study

Little is known about how young adults experience daily self-compassion in the context of social media use. Therefore, the current study is intended to investigate daily state-level experience of the before mentioned constructs. Furthermore, it is aimed to replicate the measurement of self-compassion on the trait-level based on the data of the current sample. The same investigation is done for trait and state social media use.

Moreover, it is aimed to reassess the relation between self-compassion and social media use on the trait-level. On top of that, how the relation between self-compassion and social media use is perceived by females and males on the state-level, will be investigated.

Five explorative research questions are formulated:

RQ1: To what extent do daily life measurements of self-compassion and social media use (time spent and the number of social media platforms used) fluctuate during one week?

RQ2: Is there a significant correlation between trait self-compassion and average state self-compassion?

RQ3: Is there a significant correlation between trait social media consumption (time+ amount) and its average state-level?

RQ4: Is there a significant correlation between social media use and self-compassion on the trait-level?

R.Q 5: Is there a difference between females and males in the relation between social media use (time spend and the number of social media platforms) and self-compassion on the state-level?

Methods

Design

First, it is of importance to mention that this study is based on a secondary analysis and serves as a pilot study, in order to provide further evidence of the difference between females and males in the relation between social media use and self-compassion. However, sex in this sample is not equally distributed, meaning a higher proportion of women is represented.

One methodology that has been developed to assess immediate experiences in real life is the Experience Sampling Method (ESM). The ESM is a suitable method for systematically studying individuals' daily life experiences, introducing the in-situation sampling of human behaviour, and providing researchers with valid and timely assessments of a person's psychological state (Rintala et al., 2019). Therefore, ESM is a powerful method for understanding psychological phenomena.

Since technology has become more advanced, data collection logistics and reliability have improved with the use of personal digital assistants and smartphone applications (Verhagen et al., 2016). Usually, participants are asked to repeatedly complete short-term questionnaires in response to being reminded by signals. A recent literature review on the use of ESM on a mobile device shows that data collection through smartphones becomes very useful and has been used already for a range of data collection purposes (Hofmann & Patel, 2015). Verhagen et al. (2016), propose that the most effective method of collecting valid real-time data is to conduct a study with a duration of between 7 and 28 days.

Therefore, applying ESM within this study allows for the exploration of the situational experience of self-compassion and social media consumption, including time spent and the number of platforms used, between the participants (Connor & Barret, 2012).

Participants

Of 40 participants who signed up for the study, 17 students needed to be excluded because of providing insufficient data points. Recruitment of potential candidates was done by using two different methods: the convenience-sampling method and the snowball sampling method. The survey was published on the Test Subject Pool (SONA) System of the University of Twente and shared via several social media platforms (e.g., Facebook and WhatsApp) and with social contacts.

The inclusion criteria for the participants for being able to join the current study were the following: firstly, they had to be active on various social media platforms, at least one over the course of the week. Further, it was decided that they needed to be at least 18 years old. Secondly, they had to be proficient in the English language to be able to work with the research application Ethica. This required the possession of a smartphone with a compatible operating system to download the app Ethica. Those, who fulfilled the inclusion criteria, received partial study credits on the Test Subject Pool (SONA) as compensation for their participation. Those invited via social networks did not receive any reward.

The study was conducted from October 12th to November 31st, 2020. The candidates were asked to participate in the study for nine days. Eight of nine days were used to measure self-compassion and participants' social media consumption on the state-level. A time frame of eight days was chosen, as this would provide the researcher with sufficient results regarding fluctuations in social media consumption and self-compassion. Moreover, this measurement frequency would present the researcher with an adequate balance between not burdening participants, while at the same time supplying the researcher with enough valid data (Verhagen et al., 2016).

The final sample consisted of 23 participants, due to the exclusion of 17 students. Two participants were removed because of dropouts, 14 were excluded due to low compliance and one was removed because of insufficiently fulfilling the inclusion criteria. Based on the recommendation of Connor and Lehman (2012), those with a response rate of less than 50% were removed from the sample. In sum, 23 participants from age 18 to 30 *(M_{age}*=22.09; *SD*=3.34) were included in the present study. The panel included six males (26.1%) and 17 females (73.9%) with 18 from Germany (78.2%), two from India (8.7%), and three from other nations (19.1%).

Materials

The online questionnaires were filled in via the mobile application Ethica (https://www.ethica.com). The survey consisted of three components, the first component asked about the participants' demographics (sex, age, nationality), the second component measured trait levels of self-compassion, and participants summed up social media consumption, divided into time spent on social media platforms and the number used. Moreover, a third component was created to assess the daily level of self-compassion and amount of social media use. In addition, this study utilized a screen time measurement tool, which was applicable on iOS and

Android operating systems. This made it possible for the participants to monitor their daily social media activity.

Ethica

Ethica is an online end-to-end research platform, giving researchers the opportunity to quantitatively measure human behaviour, by allowing participants to fill in various questionnaires. Ethica gives the opportunity to make questionnaires accessible at a fixed time of day. This is done by using a variety of reminders. For instance, pop-up notifications, which can be set to remind participants when a particular questionnaire needs to be filled in. At the same time, they also provide a web homepage (ethicadata.com) so researchers could observe participants' data. For practical purposes, the application Ethica can be installed on smartphones using Android or iOS operating systems.

Trait Questionnaires

Self-Compassion Scale Short Form (SCS-SF). The SCS-SF questionnaire was invented by Kristin Neff and consists of 12 items (Appendix A), which can be answered on a 5-point Likert Scale ranging from 1 (Almost Never) to 5 (Almost Always). Scores ranging between 1.0-2.5 represent a low level of self-compassion, 2.6-3.5 is marked as a moderate level and 3.6-5.0 indicates a high level. Items of this questionnaire are for instance 'I try to be understanding and patient towards those aspects of my personality I do not like' and 'When I am feeling down, I tend to obsess and fixate on everything that's wrong.' (Hayes et al., 2016). In general, SCS-SF demonstrates a high correlation with the Self-Compassion Long Form .97 and a high internal consistency of .86. Further, it demonstrates concurrent, predictive, and construct validity (Raes et al., 2011). For the sample of the current study, good reliability (α = .87) is demonstrated.

Overall Social Media Consumption. Three questions related to, at first, the *amount* of time spent on social media platforms, secondly, the *number* of platforms used and third, *which* platforms, were formulated to evaluate the participants' general social media consumption (see Appendix B). In the first question, participants were asked to indicate how many social media platforms they use on a daily basis. This item was formulated as an open question, which allowed the participants to indicate individual numbers. The second question requested the participants to indicate which social media platforms they use on a daily basis. Here, the participants could choose multiple given options. Lastly, the participants were asked to indicate approximately how much time they spent on social media platforms daily. The answer

options were categorized into ‘less than 30 minutes’, ‘between 30 and 60 minutes ‘,’between 60 and 90 Minutes’, and ‘more than 120 minutes’. A similar approach was already used in a study conducted by Ophir, Lipshits-Braziler, and Rosenberg (2020), who measured the association between screen time and depression among adolescent males.

Daily State Questionnaires

State Self-Compassion. State self-compassion was measured by using one state item. By adding the phrase ‘During the last minute’, the item was rephrased into *‘During the last minute, I have been tolerant of my own flaws and inadequacies.’* (see Appendix C). The state question was answered by using a 5-point Likert scale ranging from 1 (Never) to 5 (Always). This was based on the Self-Compassion Scale Short Form, transformed into a state question by the researcher to fit into the present study.

The same methodology was also used in a study conducted by Jung et al. (2018). They picked one trait question from the Amsterdam Resting-State Questionnaire (ARSQ) and reformulated it to a state item.

The split-half reliability for state self-compassion item ‘*During the last minute, I have been tolerant towards my flaws and inadequacies.’* revealed a nonsignificant correlation *(r = .98)*. Thus, excellent internal consistency exists between the state-items.

Daily Social Media Consumption. In order to assess the participants’ daily social media consumption, participants were asked two questions regarding, first, the amount of time spent on social media platforms, and second, the number of platforms they spent time on. At first, the participants were asked to check their current social media consumption via their screen time measurement application. Then each participant was asked to indicate the amount of time spent on social media platforms up until that point in the day, calculated by the measurement application. Next, the participants were asked to indicate which social media platforms they had used since the last survey. Here, again the participants could choose multiple options (see Appendix D).

Screen Time Measurement Tool

Throughout the past decades, several applications have been developed quantifying some aspects of smartphone usage. An approved and tested method that the majority of researchers share is the screen time measurement tool. These offer the opportunity to measure the time spent using a device with a screen, such as computer, smartphone, or another electronic device. Furthermore, daily consumption times of each application, including social media

applications, are assessed, and displayed. In general, most applications keep track of screen time consumptions every minute (Shaw et al., 2020). Thus, screen time measurement tools allow for the opportunity to objectively keep track of social media consumption. Users can keep track of their overall consumption time as well as of application-related consumption. This enables a more objective measurement of the participants' social media consumption.

Next to these advantages, a disadvantage is its following cumulative data. This means, participants can only observe and indicate the total time they spent on social media platforms assessed from the first moment of measurement. As a consequence, the participants cannot indicate the differences in social media consumption they have for each measurement point. Because of its cumulative data, the time spent on social media was calculated manually afterwards for the results section. Even though disadvantages arose the researcher decided to utilize the screen time measurement tool in the present study.

In the current study, every participant was given the choice of using the original screen time measurement function offered on their smartphones. In cases when the participants' smartphones did not offer this function, they were advised to download the application Screen Time from the AppStore or Play Store.

Procedure

Participants were requested to download the 'Ethica' app on their smartphones. First, they had to create an Ethica account and afterwards they were asked to enter the study registration code. On the first page, they were provided with a general overview of the study and what they could expect throughout the next eight days. After reading this, they were asked to consent to their participation; then they received further instructions on how to continue with the survey.

Initially, they were asked to check their smartphones for a screen time tracking feature. When their smartphone did not offer this feature, the participants were asked to download a screen time tracking App, for example, Screen Time. Afterwards, the participants could start to fill in the first survey, namely a questionnaire about their demographics (sex, age, and nationality), the SCS-SF trait questionnaire, as well as the questionnaire about their general social media consumption. Filling in the daily questions beforehand would have an impact on their overall score. Thus, it was of importance for the researcher to deliver the trait questions before the participants got access to the daily state questions. Immediately after completing the two questionnaires, participants received the information that they had filled in all surveys

for that day, and further information would be provided to them on the next day.

On the second day and for the next six days, three state questions were given to the participants. Sessions were set three times per day; a morning, an afternoon, and an evening session. These sessions were set between three-time frames 1) 9:00 a.m. to 11:30 a.m., 2) 2:00 p.m. to 3:30 p.m. and 3) 8:00 p.m. to 9:30 p.m. In order to prevent habitual response patterns, a random starting time was generated. To guarantee a sequential order of the data for the subsequent statistical analysis, the daily state questions were set to expire after 90-minutes. Each survey was presented to the participants through a notification from Ethica. If the participants did not answer after 30 minutes, a second reminder was sent. If the second reminder was not noted either, a third reminder was sent after 60 minutes. If the participants did not answer the survey after 90 minutes, the survey expired automatically. On the final day (day 9), participants were sent a final notification informing them of the end of the study and thanking them for their participation. In addition, the researcher's e-mail address was given so that participants could contact the researchers, who evaluated the responses.

Data Analysis

For the statistical analysis, the data was exported from Ethica and analyzed by using IBM 'Statistical Package for the Social Sciences' (version 27). For visual representations of the individual cases, Microsoft Excel (Office 365) was used. From the sample, the participants with a response rate of over 50% were included in the analysis. This is according to Connor and Lehman (2012), an essential and sufficient response rate researcher need to reach.

Descriptive statistics were used to calculate the means and standard deviations of participants' demographic data (sex, age, nationality). The same procedure was carried out for the SCS-SF and the self-developed trait-questionnaire asking for the number of social media platforms used. Furthermore, boxplots were constructed to investigate fluctuations between persons for social media use in time and number of platforms used and self-compassion on the state-level.

At the beginning of the data analysis, the measured variables had to be recoded and transformed. At first, participants' answers that indicated their social media consumption in time, measured with the help of the screen time measurement tool, were analyzed. As mentioned before, these answers were cumulative. Therefore, the differences in social media consumption between measurement points needed to be calculated manually. The researcher decided to calculate the difference between a measurement point by subtracting the descending

measurement point from the ascending one. This was done because the data of the included participants showed a high compliance rate. Important to mention here is that differences between days were not calculated. Even if a missing data point appeared, still the number of the descending measurement point was subtracted from the number of the ascending measurement point. For instance, in cases where the second measurement point was missing, the first measurement point was subtracted from the third measurement point. This procedure was preferred over imputing data since this could cause more errors in the results. Regarding the number of social media platforms used by participants, the answers participants gave were transformed into total scores. In addition, sum scores for trait self-compassion and the amount of social media use need to be aggregated. Also, mean and sum scores for trait self-compassion and the amount of social media use needed to be computed for each participant. The same procedure was carried out for the state items.

Pearson correlation coefficients were calculated to investigate the associations between variables on the trait level and average state level (PM). This was done to answer the second, third and fourth research questions. In order to determine the associations between 1) trait self-compassion and its average state-level (PM) 2) trait time spent on social media platforms and its average state level (PM) 3) trait number of social media platforms and its average state levels (PM) and finally 4) trait self-compassion and trait amount of social media use. A Pearson correlation value of $r > 0.5$ indicates a strong correlation, $r > .3$ is for a moderate, and $r > .1$ is for a weak correlation (Adler & Parmryd, 2010). Additionally, individual case analyses were conducted to get a more precise overview of the course of social media consumption in relation to self-compassion in individuals on a daily basis.

The fifth research question was answered by making use of a Linear Mixed Model analysis. Firstly, a possible sex difference in the relation between self-compassion, time spent on social media platforms, and the number of social media platforms used, was explored. For this analysis, three variables ‘time spent on social media’, ‘number of social media platforms used’ and ‘self-compassion’ on the state-level were standardized before, in order to work with their z-scores. Z-scores had to be calculated, since it enabled the researcher to compare two scores from different measurement scales (Pain et al., 2022). This helped the researcher in comparing the overall state social media consumption with the state self-compassion. An autoregressive structure (AR1) with time points set as a covariant variable was used. For this, an interaction effect between the overall social media consumption (time + number of social media platforms) and sex was calculated and defined as the predictor variable. State self-compassion was set as the outcome variable.

Results

Descriptives

In total, 23 participants joined in this explorative research. The average response rate was 57.5%. Descriptive statistics can be viewed in Table 1, demonstrating the minimum and maximum scores, mean, and standard deviation of the self-compassion and the variable number of social media platforms used on the trait-level. In addition, frequency analysis was conducted to explore the time spent on social media platforms, categorized by sex. The results are displayed in Figure 1.

Table 1

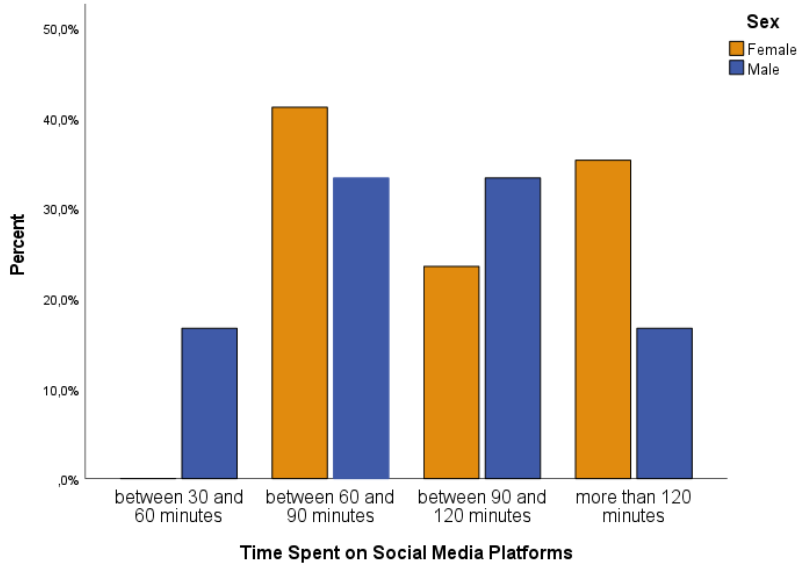
Trait Self-Compassion and Trait Amount of Social Media Use
Descriptives Minimum and Maximum Scores, Mean (M) and Standard Deviations (SD)

Variables	Minimum (possible Minimum)	Maximum (possible Maximum)	M	SD
Self-Compassion Scale Short Form	1.83 (1.0)	3.83 (5.0)	2.94	.61
Number of Social Media Platforms Used	2	5	3.75	1.02

Note. N=23

Figure 1

Frequencies of time spent on social media platforms (measured in minutes) per day categorized by sex



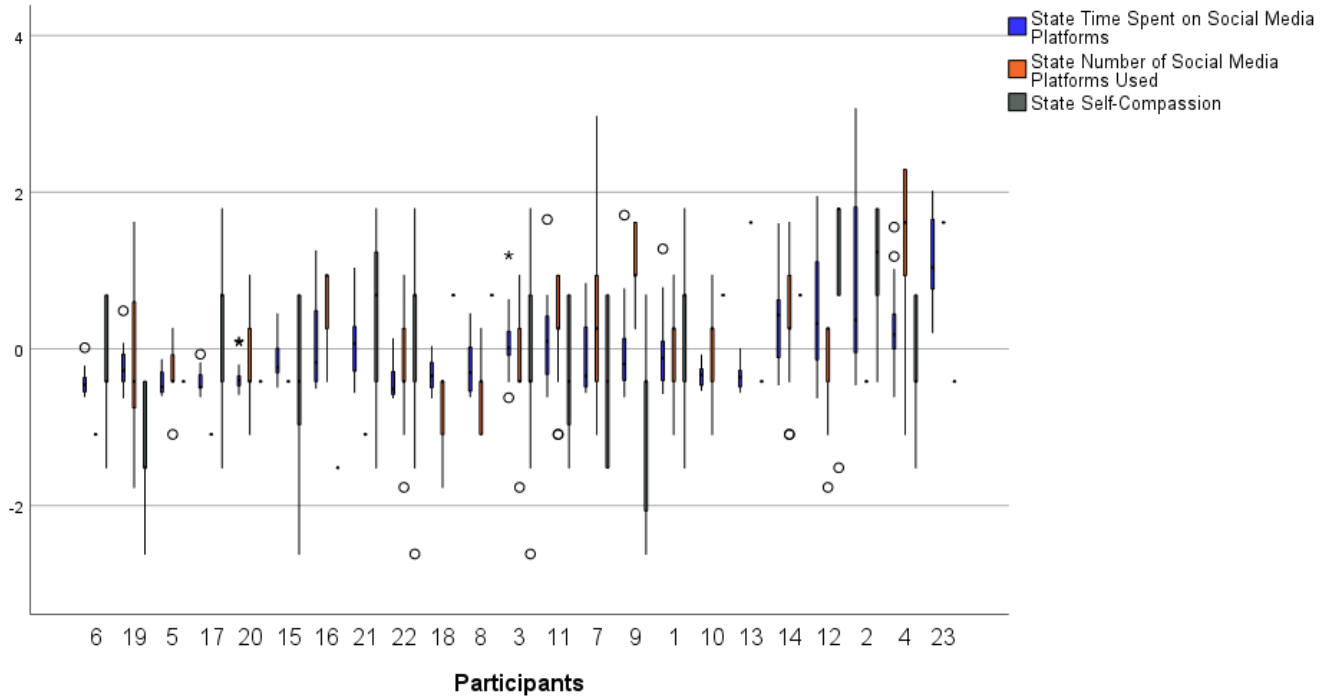
Boxplots are provided below to illustrate the differences between the students' time of social media platforms used, number of social media platforms used, and self-compassion on the state-level, ordered by the mean of self-compassion (See Figure 2). At first glance, no stable pattern between the variables is discernible and irregular fluctuations in social media consumption and self-compassion are indicated. Therefore, no trend can be identified, implying no correlation between self-compassion and social media consumption on the state-level.

The participant with the lowest mean score for self-compassion scored comparatively high for social media consumption in time but used only a few social media platforms (see participant 6). Taking a look at the participant with the highest mean self-compassion score (see participant 23), it can be seen that for this individual, the time of social media use was comparatively high as well as the number of social media platforms used. Participant 9 represents an exception in the sample, by having low self-compassion scores but exhibiting high social media consumption, in time as well as in the number of social media platforms used.

In general, fluctuations between self-compassion and social media consumption are notable, both for those who scored low on the self-compassion scale as well as those who scored high on the mean self-compassion scale. Thus, no clear pattern between social media consumption and self-compassion could be indicated.

Figure 2

Variation of time spent on social media, number of social media platforms used and self-compassion on the state-level for each participant over one week.



Note. Standardized PM scores were used for each variable. Participants are ordered from the lowest to the highest average state-self-compassion with the corresponding levels of time spent on social media, number of social media platforms used and state self-compassion. Outliers are not represented.

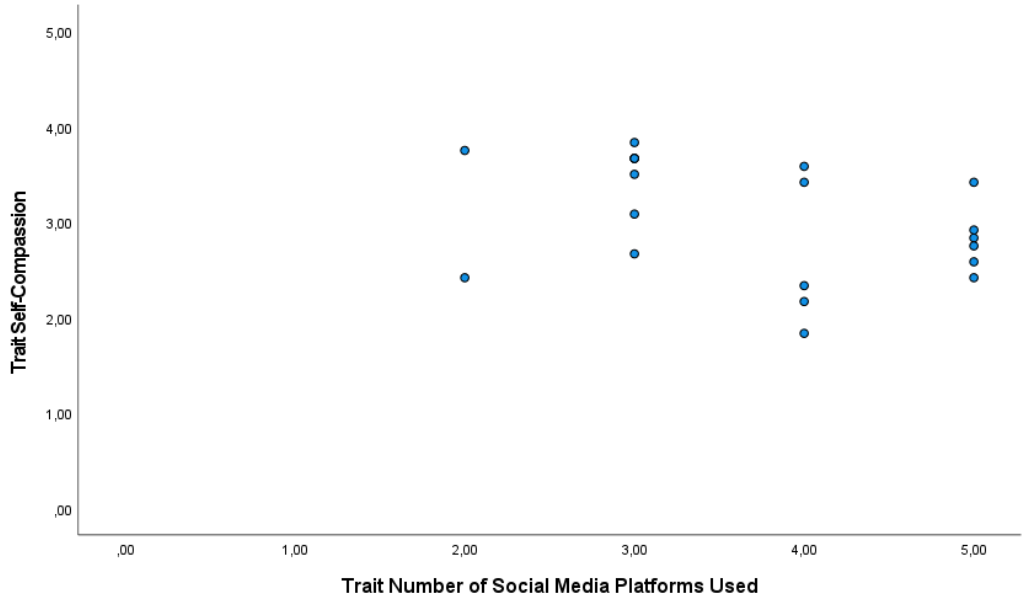
Association between Overall Social Media Use and Self-Compassion

The Pearson correlation between trait self-compassion and average state self-compassion (PM) shows a positive moderate significant correlation (r=.36, p=.01). Moreover, a positive and significant and strong correlation was found between trait amount of time spent on social media and its average state (PM) *(*r= .69, p= .01). Additionally, a significant positive moderate correlation (r = .40, p=.01) for trait number of social media sites used and average state number (PM) of social media sites used is indicated.

Regarding the correlation between social media use and self-compassion on the trait-level, a non-significant negative and weak correlation can be indicated between the time spent on social media platforms and self-compassion (r = -.13) Likewise, a non-significant negative but moderate correlation could be indicated between number of social media sites and self-compassion on the trait level (r = -.37). To get a more precise view of the current correlation a scatter plot will be provided (See Figure 3). As can be seen in the visual representation, no clear pattern between the two variables is visible and therefore they have no strong relationship.

Figure 3

Visual representation of the non-significant negative moderate correlation between trait number of social media sites and trait self-compassion.



Association between State Social Media Use and Self-Compassion

In order to answer the last research question, a LMM analysis is conducted, to assess whether the relation between social media use and self-compassion is stronger in females than in males. The LMM indicates a stronger relation between self-compassion and social media use on a daily basis in females than in males. The standardized coefficient for females was ß=.11, SE=.06, p<.06; 95% CI [-.00, .23] and for males ß = -.05, SE=.02, p<.05; 95% CI [-.09, -.00].

Individual case analysis

To gain a more detailed picture of students' daily social media consumption and state self-compassion over time, three participants obtaining representative scores were selected for further analysis on the individual level. These were selected based on time spent on social media platforms, categorized from the highest time spent to the lowest.

Participant 4, who was a female user, spent the most time on social media over the course of eight days, compared to the other users (M = 81.00, SD = 75.95). The minimum time she spent on social media was 1 minute and the maximum time was 390 minutes. Moreover, this participant used on average 4.65 social media platforms over the course of eight days. The participant's state self-compassion (M = 3.34, SD = .65) indicated average levels over the course of eight days.

Figure 4 illustrates a more precise overview of participant 4's daily state time spent on social media, state number of social media platforms used and state self-compassion on a daily basis, over a period of eight days. It is of importance to mention that time point 15 should be considered as an outlier mistake, as it falls out of the overall pattern of time spent on social media platforms. An evaluation of the data suggests a negative correlation between social media use and self-compassion. This means that when social media use increases, self-compassion mostly remains on the same level or decreases. In general, her social media usage in time and number of platforms used showed more variability than in self-compassion. Hence, no clear relation between self-compassion and overall social media consumption could be indicated.

Figure 4

Participant 4 (female) standardized scores for state time spent on social media (blue), state number of social media platforms used (green) and state self-compassion (red)

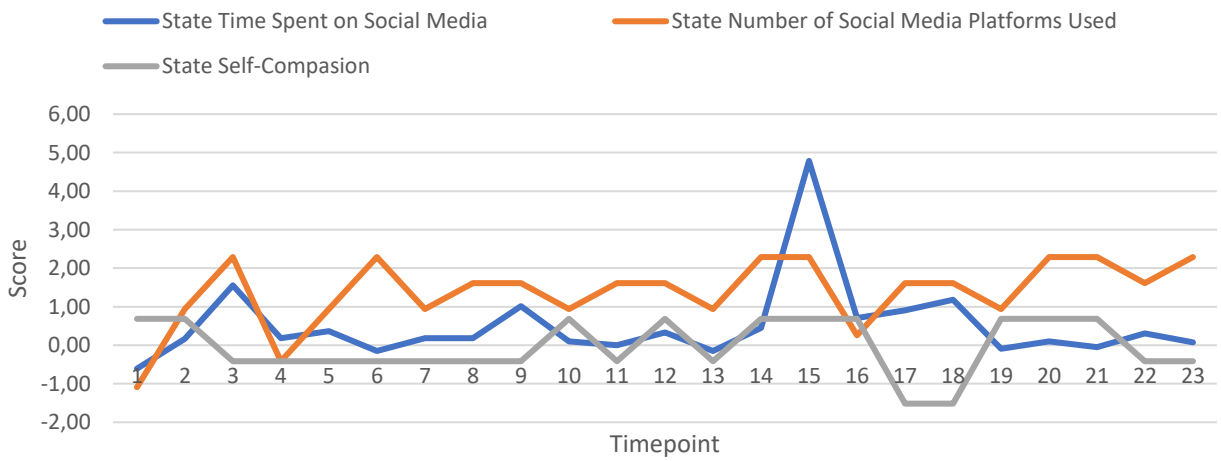


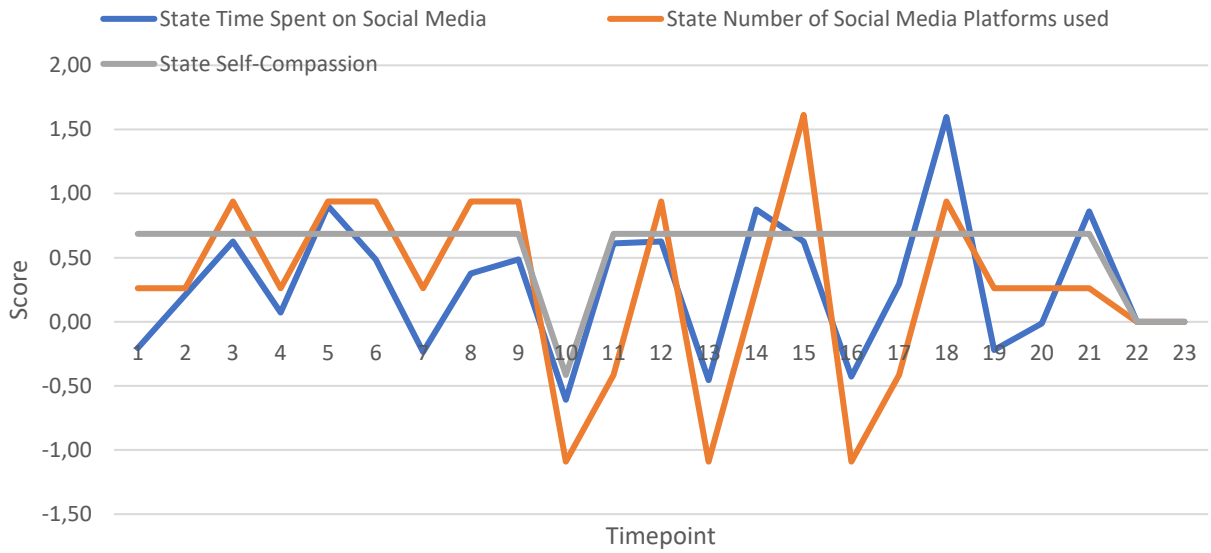
Figure 5 illustrates a more precise overview of participant 14's (female user) daily state social media usage and state self-compassion, over the period of eight days. The participant spent on average 67.14 minutes on social media platforms (M = 67.14, SD = 39.75) with a minimum of 1.0 minute and a maximum 160.0 minutes. Furthermore, she used on average 3.05 social media platforms during this period. Like the previous participant, she also showed moderate levels of self-compassion (M = 3.95, SD = 1.12). Her minimum score for state-self-compassion was 3.0 and the maximum score was 4.0.

As can be seen in figure 5, the graph shows irregular fluctuations in self-compassion, time spent on social media and number of social media platforms used on the state-level over a period of eight days. At first glance, a positive correlation between time spent on social media and the number of social media platforms is indicated. This means, when the amount of time the user spent on social media increased a higher number of platforms was used. However, by taking a look at self-compassion, it can be seen that the user's level remained the same over the measurement period. Time spent on social media and the number of platforms used showed high variability in measurement points, while self-compassion did not fluctuate.

Therefore, it is again indicated that no matter how much variability exists in the amount of social media consumption, it does not have an effect on the user's self-compassion level.

Figure 5

Participant 14 (female) daily standardized scores for state time spent on social media (blue), state number of social media platforms used (green) and state self-compassion (red)



Note. The measurement numbers 22 and 23 are indicated as missing data points. The participant did not fill the survey during those sessions.

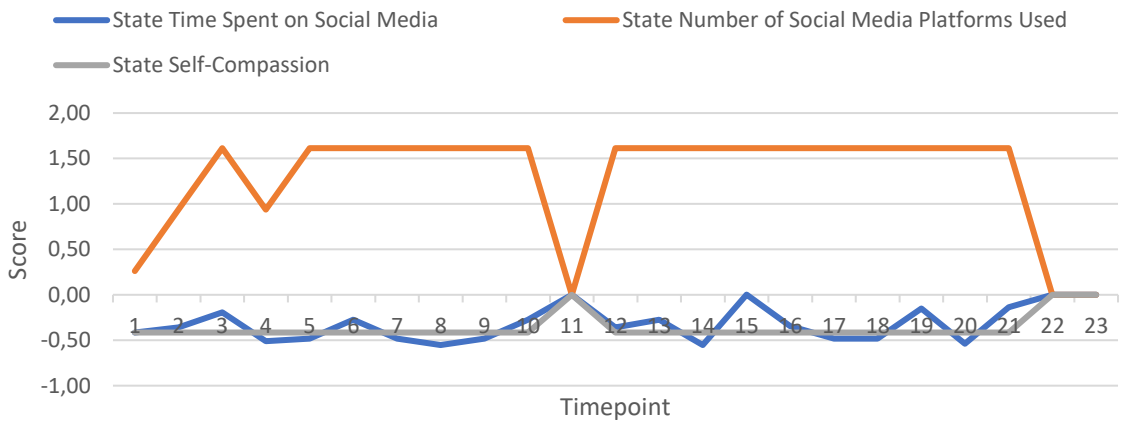
Lastly, participant 13, a male user was selected. He spent the least time on social media over the course of eight days (M = 18.35, SD = 11.48). The minimum time spent was 5.0 minutes, while the maximum time spent was 45.0 minutes. He used 4.8 social media platforms over the course of eight days. As with the other two participants, he also indicated average levels of state self-compassion (M = 3.0, SD = .52). His minimum score on the self-compassion scale was 3.0 and his maximum was 5.0.

In Figure 6, the participant's state self-compassion and his overall social media consumption, including time spent and number of social media platforms used, is visualized. When looking at the graphic illustration below, it can be observed that this participant generally used more social media platforms than the other two over the course of the survey. Moreover, it is indicated that the time spent was relatively low compared to the number of platforms used. The amount of time spent showed the most variability between the measurement points. As with the other mentioned users, the self-compassion level remained the same, and only partial fluctuations could be identified.

In sum, it is apparent that the major change occurs in the time spent, while the number of platforms and self-compassion remains stable for the most time.

Figure 6

Participant 13 (male) daily standardized scores for state time spent on social media (blue), state number of social media platforms used (green) and state self-compassion (red)



Note. The measurement numbers 11, 22 and 23 are indicated as missing data points. The participant did not fill the survey during those sessions.

Overall, no clear relation between these variables became apparent in each of the three individual cases. This means that the self-compassion level developed independently from social media consumption over the eight days of the survey in the three selected individuals. Interestingly, it was the female participants who used social media the most, in terms of time, compared to the male user. Further, it could be concluded that there was a stronger variability in female users regarding the number of social media platforms used than in the selected male participant. Taking into consideration the self-compassion level, it could be observed that the first and the third participant generally began with low levels of self-compassion compared to the selected second user, who made use of social media on an average level. Thus, no clear relations between the three variables were indicated in this case analysis.

Discussion

Given the importance of self-compassion in the context of social media use, the purpose of the current study was to fill the knowledge gap regarding the association between self-compassion and social media use on the state-level. In addition, the question whether this relation is different in females from in males is investigated.

The outcomes of the current study revealed that social media use and self-compassion vary strongly between individuals. Moreover, it could be observed that levels of self-compassion mostly remained on the same level and thus developed independently from social media use. Therefore, no clear negative or positive correlation could be indicated in the relation between social media consumption and self-compassion on the state-level. However, a significant positive strong correlation was examined between trait self-compassion and average state self-compassion. That indicated, individuals scoring high on the Self-Compassion Scale Short-Form (trait-level) normally demonstrate high daily state-levels of self-compassion. The same is investigated for social media consumption, in time spent as well as in the number of social media platforms on the trait- and state-level. Surprisingly, the study revealed a non-significant positive and weak correlation between social media use and self-compassion on the trait-level. However, a stronger correlation was indicated between trait, and state number of social media platforms and self-compassion than in time spent on social media platforms. This means that the former might be more decisive for self-compassion than the latter.

Lastly, the LMM analysis revealed a difference between males and females in the relation between social media use and self-compassion. This outcome means that more social media use predicts higher levels of self-compassion in females. While, in males less social media use predicts lower levels of self-compassion.

Interpretation of the results with previous studies

Self-compassion was not correlated to social media use in the current study. Therefore, self-compassion does not buffer social media users from its harm. In the current research a non-significant correlation between social media use and self-compassion on the state-level could be found. In addition, this is demonstrated by the independent fluctuations between social media use and self-compassion in figure 2. Therefore, no clear pattern between social media use and self-compassion could be observed on the state-level. This implies high levels of

social media use do not predict high levels of self-compassion. This outcome is consistent with a study conducted by Keyte et al. (2021), who also found no correlation between social media use and self-compassion on the state-level. In contrast, research by Liu et al. (2020), who investigated sex and self-compassion as moderating roles in the relationship between peer victimization and mobile phone addiction, found social media use and self-compassion correlating on a daily basis. They identified the relation between peer victimization and mobile phone addiction to be weaker in adults with high levels of self-compassion. However, only limited reference can be made to these results and the present study, as self-compassion was understood as a moderator in the study of Liu et al. (2020).

Due to the non-significant correlation found on the state-level between social media use and self-compassion on the state-level, only a subtle to non-existing difference in sex could be indicated. Higher social media consumption predicts higher self-compassion levels in females on the state-level, while in males the opposite is the case. This means that low social media consumption in males predicts lower self-compassion levels on the state-level. A finding which is aligned with the outcome of the current study is indicated in the research done by Barron, Krumrei-Mancuso, and Harriger (2021), who could not find sex differences in self-compassion in the field of social media usage on the state-level. Males as well as females were equally negatively affected by daily social media use, even though males possessed higher levels of self-compassion than females. Also, no sex differences in self-compassion were found in a study conducted by Iskender et al. (2019), who investigated sex differences in self-compassion, using a sample of 390 university students in Turkey. Consequently, one might doubt whether sex differences have an impact on self-compassion in the context of social media use. A completely different result, which does not confirm the current result was found by Petrocchi, Ottaviani, and Couyoumdjian (2014), who found significant sex differences in self-compassion in the context of social media usage on the state-level. They found women reporting lower levels of self-compassion after social media usage. Social media caused them to suffer from higher levels of self-judgement and overidentification than males. The finding that females possessed low levels of self-compassion in the context of social media use was also confirmed by a study of Nerini et al. (2019). They found a stronger level of overidentification to be associated with the likelihood of internalizing comments on for instance appearance, on social media platforms. Put in other words, in this study females began to compare their appearance with that of others, which lowered their ability to show compassion towards themselves. A possible reason for this behaviour was that the women were carried away with negative emotions about their appearance.

With reference to the relation between social media use and self-compassion on the trait-level, the current study found a non-significant weak correlation between the two variables. This implies that usage of social media does generally not predict self-compassion. This result finds support in Kapitan (2019), who found social media consumption is not significantly correlated with self-compassion on the trait-level. In her study, this relation was measured by levels of social integration, emotional connectedness and integration into social routines.

Finally, the two variables were considered separately on the trait-level and state level. The current study found a significant positive strong correlation between trait social media consumption, assessing time and number of social media platforms, and its average state-level. This means individuals who spent in general a lot of time on social media platforms also demonstrated high social media usage in terms of time on their average level. The same could be identified for the variable, which measured the number of social media platforms used on the general and daily average level. As no previous study has been conducted comparing the experience of social media consumption on the trait- and state-level, a comparable study is used. Austin-McCain (2017) examined the association of social media use with the satisfaction of daily routines and healthy life-style habits in students. Her findings revealed that social media use is substantially related to relaxation and daily activities, including communication via social media platforms as a form of social participation. To be able to associate the finding of Austin-McCain (2017) with the finding of the current study, general social media use is defined as trait behavior, while the daily activities that have been mentioned are considered as daily state behaviour.

Taking into account the variable of self-compassion on both levels, the current study found a positive correlation. This indicates individuals who show in general self-compassion towards themselves show it also on a daily level. This result is supported by a finding of Li et al. (2021), who examined the association between trait self-compassion and average state self-compassion in the context of self-interventions in psychological health. They found that people who had previously possessed a high level of self-compassion improved their daily level of self-compassion with the help of the interventions. In addition to the current study, Li et al. (2020) also indicated a significant and positive correlation between the trait and state level.

In conclusion, it can be said that only a handful of studies exist that investigate the role of self-compassion in the context of social media including differences in sex. This is because it is a relatively new field of study, developing continuously. Ignoring social media use and self-compassion as separate constructs, the role of self-compassion in the context of social

media use becomes even more important, as the study of Liu et al. (2020) confirms. However, it is necessary to reflect on the strengths and limitations of the current study.

Strengths and Limitations

The major strength of the current study is that, to the best of the author's knowledge, it is the first that closely examines the field of sex differences in self-compassion in the context of social media use on the state-level. This was made possible by a close focus on the 'sex' variable, which was measured daily in the relation between self-compassion and social media use.

This helped the researcher to examine the differences between females and males in self-compassion in the context of social media usage. A further strength of the sample was the age span of the participants, since those in the current study were between 18 and 30 years old. This can be considered as an advantage, as those people grew up with social media and use the platforms the most (Best, Manktelow, & Taylor, 2014). As the usage of social networking sites will probably increase in the future due to digitalization, researching this age group and how the relation between social media use and self-compassion develops in males and females might be of further interest in the future as well. Considering the methodology of ESM used in this study can be acknowledged as a further advantage. With the help of ESM this study was able to investigate the difference in the relation between social media and self-compassion in both sexes on a daily level. Thus, a first step was taken in filling in the knowledge gap, regarding the role of sex differences in self-compassion in the context of social media consumption.

Despite this, the results of the current explorative study contribute to the existing research by providing evidence of sex differences in self-compassion in relation to social media use. Several limitations have been identified as well. A first and significant limitation is the small sample size, as well as the fact that sexes are not equally distributed, due to the higher proportion of women represented in the sample. This makes it difficult for the researcher to generalize the results to a larger adult population aged between 18 and 30 years old. In addition, since there is a higher proportion of females in this sample, the results are only representative for females and not for males. Furthermore, the present study did not investigate possible explanations for the revealed sex differences.

A second limitation was the occasional technical issues on the platform Ethica which threatened the validity of the outcomes. Participants reported problems with receiving

reminder notifications, as sometimes no notification popped up for daily questionnaires. Moreover, some participants received a premature notification before the end of the seven days. This was due to an error in setting the duration of the study properly. These technical obstacles might be the reason why the 17 participants had insufficient data points.

A further limitation is the limited reliability of the state-items, due to the small number of state-items. This limitation hindered the researcher in drawing clear conclusions. A possible explanation for these findings could be provided by previously conducted ESM studies measuring state self-compassion. By scanning through various studies, it became apparent that state self-compassion was mostly measured through multiple items (Kelly & Stephen, 2016). Hence, self-compassion consists of several components; assessing daily self-compassion by only one item might not be appropriate. However, in the current study it was measured by one item and therefore this might be the explanation for the non-significant correlation between the single self-compassion item and its trait questionnaire.

Directions for future research

Even though the current study shows several limitations, it also holds important practical implications for future research. Based on the main outcome of the present study, it could be of further interest to investigate the reasons for the sex differences in the relation between self-compassion and social media use on the state-level. This has already been proposed by Yarnell et al. (2015), who mentions this necessity and suggests conducting an analysis to explain sex differences in subscales of self-compassion. By doing increasingly deep research in the field of self-compassion, this kind of subscale analysis may become possible. Another advantage that arises by using this method is that new information might be obtained about why sex differences exist, either by analyzing differences in subscales or by employing more qualitative approaches.

Further, it would be advisable to conduct a long-term study with a larger representative sample, including the analysis of cross-cultural, age, and sex differences in self-compassion related to social media use. Focusing on sex differences in self-compassion in terms of culture, has already been done by Kehn and Ruthing (2013), who found sex differences in self-compassion interacting with age and ethnicity. Therefore, findings with populations that lack diversity in terms of sex, age, or culture should not be generalized to other populations.

As these days, more than two sex groups exist, it would be also helpful to follow the

recommendation of Keutler and McHugh (2022) and to replicate the findings of the current study with a gender ratio that includes people who identify their gender outside of the gender binary (e.g., are non-binary) or identify as a different gender than their sex assigned at birth (e.g., are transgender). Hence a study conducted by Keyte et al. (2021), found that self-compassion interventions were useful in promoting the psychological wellbeing on social media platforms of transgender individuals. This would be a further argument for replicating the current study with participants with different sexual orientations.

Despite the investigation of the state-level, it is also important to examine the relation between the trait-and state level. Kapitan (2019) has argued already, that there is a bigger need for mental health clinicians and researchers to examine the association between self-compassion and social media use on the trait and state level. She suggests that mental health clinicians can use the outcome of no correlation between the two variables to examine more systematic influences on self-compassion, and more of the influence of social media on people as individuals. In her study, she proposes that researchers should focus on systematic factors (e.g., family status) that influence one's level of self-compassion primarily at the trait-level.

Conclusion

The intention of this study was to explore the relationship between social media use and self-compassion in terms of sex differences in order to provide a better understanding of the differences between females and males at the state-level. The current study revealed a non-significant correlation between social media use and self-compassion on the trait and state-level. Further subtle sex differences between females and males were indicated in the relation between social media use and self-compassion on the state-level. When analyzing the contribution of sex differences in self-compassion in the context of social media usage, however, the results were more complex and therefore further research is necessary in this field. Hence, a first step is to follow the recommendation of Keutler and McHugh (2022) and to continue the research into the relations between self-compassion and social media consumption in users with other sexual orientations. This might be helpful for the future development of appropriate self-compassion interventions for social media users respecting their sexual orientation.

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Appendencies

Appendix A

Self-Compassion Scale – Short Form (SCS-SF)

1. When I fail at something important to me, I become consumed by feelings of inadequacy*.
2. I try to be understanding and patient towards those aspects of my personality I don't like.
3. When something painful happens, I try to take a balanced view of the situation.
4. When I'm feeling down, I tend to feel like most other people are probably happier than I am*.
5. I try to see my failings as part of the human condition.
6. When I'm going through a very hard time, I give myself the caring and tenderness I need.
7. When something upsets me, I try to keep my emotions in balance.
8. When I fail at something that's important to me, I tend to feel alone in my failure*.
9. When I'm feeling down, I tend to obsess and fixate on everything that's wrong*.
10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.
11. I'm disapproving and judgmental about my own flaws and inadequacies*.
12. I'm intolerant and impatient towards those aspects of my personality I don't like*.

**Items with reversed scoring*

Appendix B

Overall Social Media Consumption

1. Please indicate how many social media platforms you are using on a daily basis.
2. Please indicate which social media platforms you are using on a daily basis. Note that you can choose multiple options.
    - Facebook
    - Instagram
    - Snapchat
    - TikTok
    - YouTube
    - Twitter
    - Pinterest
    - Tumblr
    - Other
3. Please indicate how much time you spend approximately on social media during a day. Only one answer option is possible.
    - Less than 30 minutes
    - Between 30 and 60 minutes
    - Between 60 and 90 minutes
    - Between 90 and 120 minutes
    - More than 120 minutes

Appendix C

State Self-Compassion – Self-Compassion Scale Short-Form Edited

1. During the last minutes, I have been tolerant of my own flaws and inadequacies.

Appendix D

Daily Social Media Consumption

1. Please check your social media consumption via the application (Screen Time) or your phone's internal screen time measurement overview. Please indicate for how long (in minutes) you have been using social media platforms until now.
2. Please indicate which social media platforms you have been using until now. Multiple answer options are possible.
    - Facebook
    - Instagram
    - Snapchat
    - TikTok
    - YouTube
    - Twitter
    - Pinterest
    - Tumblr
    - Other