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The relationship between self-compassion and state anger: An Experience Sampling Study

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Bachelor Thesis

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Abstract

Background. Research on ways how to handle anger effectively has recently begun to introduce self-compassion into practice. Trait self-compassion has already shown to be associated with decreased trait anger. However, no study has specifically investigated daily associations of self-compassion and anger and how the state constructs interact with the trait components. These insights could provide effective means on how to target uncontrolled anger appraisals most effectively. **Objective.** The present study explored the association between trait and state self-compassion and state anger for one week. Additionally, the strength and disaggregation (between- or within-person) of the association between state anger and state self-compassion was investigated. **Method.** The study was conducted using an online experience sampling method with 34 college students. To assess trait self-compassion and anger, the Self-Compassion Scale- Short Form and the Aggression Questionnaire were used. State anger was measured using two items, and state self-compassion was measured with one item. The participants had to answer questions about how self-compassionate or angry they felt at a given moment four times a day over seven days. **Results.** No association could be found between trait self-compassion and state anger since the results showed a non-significant negative weak association. A significant moderate negative correlation was found between state anger and state self-compassion. For both the momentary and the trait-like association a weak and negative association was found. The anger level at a particular time point is influenced by the average state self-compassion level as well as the self-compassion level at that time point. **Conclusion.** State anger does not seem to be associated with trait self-compassion, but it was significantly associated with state self-compassion. This shows that in designing interventions to decrease or control anger, the emphasis should be on state self-compassion as a possible part of the intervention strategy. The present research, therefore, contributes to a growing body of evidence suggesting that state self-compassing has an effect on state anger, although the generality of the current results must be established by future research.

The relationship between self-compassion and state anger: An Experience Sampling Study

Everyone experiences it from time to time, the feeling of anger. It can be triggered as a response to many things, such as an argument with a friend, challenging situations, or merely everyday hassles (Hamdan-Mansour, Dardas, Nawafleh, & Abu-Asba, 2012). Some people may experience more anger in response to such situations and get profoundly affected by it, whereas other people might handle anger differently. Several studies have already investigated different constructs that might be associated with anger (Lerner & Tiedens, 2006; Lievaart, Franken, & Hovens, 2016; Szasz, Szentagotai, & Hofmann, 2011). These studies are of great importance since uncontrolled high levels of anger over a long period can have tremendous negative outcomes for the health and social life of an individual (Hamdan-Mansour et al., 2012).

One construct that has been recently associated with anger is self-compassion. Self-compassion can best be described as reacting in a kind and accepting way towards oneself, even when experiencing difficult or distressing situations (Neff, 2003). Research on the relation of self-compassion and anger is still very scarce, but the studies that have been conducted up to now all identified a negative association between self-compassion and anger (Fresnics & Borders, 2016; Grodin, Clark, Kolts, & Lovejoy, 2019; Reis et al., 2015). People high in self-compassion tend to show lower levels of anger when reappraising an unpleasant situation (Fresnics & Borders, 2016) and less defensive reactions when receiving feedback. These studies highlight that self-compassion could be useful for interventions that are aimed at decreasing problematic levels of anger (Leary, Tate, Adams, Allen, & Hancock, 2007).

Nevertheless, up to now, no study analysed the relationship between anger and self-compassion in daily life and over a longer time. Both constructs have not only a trait but also a state component whose level can fluctuate during the day (Kelly & Stephen, 2016; Quinn, Rollock, & Vrana, 2014). Especially fluctuating levels of state anger can generate serious problems when the individual does not possess the necessary skills to control possible negative responses (Szasz et al., 2011). That heightens the need to explore constructs like self-compassion, which can be used to control situational maladaptive anger appraisals. It could be that varying degrees of self-compassion lead to a better or worse acceptance and management of negative emotions (Kelly & Stephen, 2016). With more knowledge about the effects of state and trait self-compassion on state anger, it would be possible to create better-targeted interventions which could also be applied directly to manage momentary uncontrolled anger

appraisals. To get an overview of the constructs in general and about existing research on the trait and state levels, the following sections will describe them in more detail.

Self-Compassion

Self-compassion was first introduced by Neff (2003) and can best be described as being kind towards oneself even when one experiences failure or suffering. Reacting to a situation in a self-compassionate way implies to view it in an emotionally neutral and non-judgmental manner without disconnecting from the experience itself. This means that one is encouraged to accept the situation without disregarding the negative or remaining committed to positive emotions tied to it (Neff, 2003). Furthermore, Neff (2015) described self-compassion as consisting of three different components. Each of the components has a positive and a negative side that represents the compassionate and non-compassionate behaviour.

The first component is "*self-kindness vs. self-judgment*". It entails being kind and understanding of oneself and accepting one´s imperfections. Instead of judging oneself for possible mistakes, self-kindness offers a way to calm oneself down and decrease distress. The next element is "*common humanity vs. isolation*". Considering an event in a common humane way implies that one´s own experiences are not different or isolated from the experiences of the human world. It describes the realisation that everyone has their shortcomings, and one is not alone in their experiences. It creates a feeling of connectedness to other people due to a shared understanding. Neff (2015) defines "*mindfulness vs. over-identification*" as the last component of self-compassion. Mindfulness means to perceive a situation the way it is without becoming overly engaged with potential negative or positive emotions that could arise in the situation.

Overall, self-compassion is considered to serve as a part of the emotion regulation strategies of acceptance and positive reinterpretation. Therefore, higher self-compassion levels are associated with more adaptive coping skills and less negative affect in response to failure, stress, or confrontation (Leary et al., 2007; Waring & Kelly, 2019). This seems reasonable considering the three components of self-compassion and their effect on the perception of and response to various situations. Rather than shifting the responsibility of an adverse event away or getting overwhelmed by the harmful effects, people high in self-compassion tend to accept the thoughts and their accountability for the situation and take a more objective view and put the problems in perspective. This adaptive way of coping leads

to less extreme responses or shame to negative or stressful situations, as well as a more accurate self-evaluation following these events (Neff & Germer, 2017; Leary et al., 2007).

Besides the effects self-compassion has as a part of emotion regulation strategies, it also has positive effects on psychological well-being, possibly because it helps to regulate negative emotions and shift them into a more positive or neutral direction (Leary et al., 2007; Terry & Leary, 2011). High trait levels of self-compassion have been associated with decreased levels of depressive symptoms, anxiety, fear of failure, and rumination. Additionally, higher levels of self-compassion also result in increased levels of happiness, optimism, and perceived competence and motivation (Neff & Germer, 2017). Because of its well-being increasing properties, clinical practice has begun to introduce self-compassion as a part of the treatment strategies (Held, Owens, Thomas, White, & Anderson, 2018). It was recently introduced into the treatment of PTSD patients to lower anger symptoms (Grodin et al., 2019) but has also found wide adaptation in interventions for depressive symptoms and anxiety (Bakker, Cox, Hubley, & Owens, 2018; Connolly-Zubot, Timulak, Hession, & Coleman, 2019). Given these points, it becomes clear that trait self-compassion is already well established as a construct to increase well-being and regulate one´s emotions

In contrast to trait self-compassion, research on state self-compassion is still scarce since it has been considered mostly a trait variable in the literature. Nevertheless, the scant studies have indicated that state self-compassion can reinforce well-being and emotional regulation too. A study by Leary et al. (2007) demonstrated that higher levels of state self-compassion led to a decrease of experiencing negative emotions following the reappraisal of an unpleasant event. Other than that, studies on state self-compassion have mostly focused on its relationship with body satisfaction and health-promoting behaviours. They showed that on days where the level of self-compassion was higher, people tended to be more satisfied with their own bodies, less concerned about their eating habits, and reported less stress (Kelly & Stephen, 2016; Li, Deng, Lou, Wang, & Wang, 2019). These results indicate that state self-compassion has similar well-being increasing, and emotion regulation properties as trait self-compassion.

Unfortunately, so far, research has not explored the association between state self-compassion and other constructs besides body satisfaction and health-promoting behaviours. Li et al. (2019) stressed the importance of further research on state self-compassion. They explained that with more research on both the state and trait components, new interventions could be created that are more targeted towards different situations. Current interventions are

only aimed at increasing the trait level of self-compassion, which often takes several weeks of training. With more knowledge about state self-compassion and its response to different contexts and constructs, there would be the possibility to create brief interventions people could use immediately to transform negative emotions into more positive or neutral ones.

Anger

Anger is described as one of the basic emotions humans can experience several times during the day. It can be triggered as a response to challenges, stressors, or annoyances. Kassinove and Sukhodolsky (1995) characterise anger as a "multidimensional construct that encompasses physiological, cognitive phenomenological, and behavioural variables". This shows that the experience of anger can affect people´s daily lives and responses to several situations on various levels. Anger is defined further as consisting of two components, namely, state and trait anger. The two components and the relation to each other are thoroughly described in the state-trait theory of anger of Spielberger (1983). Trait anger is considered to be a personality trait that is stable over time. It can be understood as something like a baseline of how people feel every day. That means that some people have a generally higher and stable anger level, whereas others might have a generally lower trait level of anger (Lievaart et al., 2016). State anger, on the other hand, is supposed to serve as an affective state that fluctuates over time in response to different situations and can vary in magnitude and duration. (Quinn et al., 2014).

Depending on how frequently and intense anger is experienced, it can have tremendous outcomes for physical and mental health, as well as the social environment of people (Hamdan-Mansour et al., 2012). High trait anger has been associated with a higher tendency for aggressive behaviour, suicidal ideation, low self-esteem, and low perceived social support as well as alienation in school, university, or life in general (Quinn et al., 2014). All of these can severely impact the well-being and the quality of life of a person (Hamdan-Mansour et al., 2012).

Interestingly, state anger has found to be highly influenced by the levels of trait anger. High levels of trait anger have been associated with higher and more enduring levels of state anger. This influence of trait on state anger, in turn, led individuals to react more intensively to situations that involve anger as well as to cope in a more maladaptive way with anger provoking situations (Quinn et al., 2014). Furthermore, state anger can shape the interpretation of situations or information. Often, situations can have multiple meanings, and

people with a higher level of state anger interpret events more negatively than when having a low level of state anger (Gordon, Chesney, Reiter, & Walla, 2016). Surprisingly, anger makes people also more optimistic about their success in a given situation. It alters their perception of control and certainty about an event and thus, shapes their judgement and decision-making. This leads to greater risk-taking and approach behaviours because individuals feel more confident about their own possible success (Gordon et al., 2016; Lerner & Tiedens, 2006).

Nevertheless, functional and controlled state anger can also help individuals to complete their goals because of heightened motivation and the associated optimism about their success (Szasz et al., 2011). The control of state anger is dependent on the emotion regulation strategies an individual uses. Repression of anger does not lead to a decrease of anger, whereas cognitive appraisal proved effective in reducing state anger (Szasz et al., 2011). In conclusion, this shows that state anger does not only have negative attributes. With more research about coping strategies and constructs that lead to a control of state anger, people could learn to use their anger for beneficial purposes, such as greater motivation or increased optimism, as mentioned above.

Self-Compassion and Anger

As it has been shown before, self-compassion and anger are both somehow related to emotion regulation strategies. Self-compassion serving as a strategy to manage one´s own emotions more effectively (Leary et al., 2007; Wu, Chi, Zeng, Lin, & Du, 2018) and anger as an emotion that needs appropriate and adaptive coping strategies to control for negative outcomes (Szasz et al., 2011). Research on self-compassion has already outlined possible reasons why high levels of trait self-compassion could lead to low levels of trait anger. People high in self-compassion do not defend themselves following an adverse event, nor do they try to avoid the event at all (Waring & Kelly, 2019). Thus, they refrain from anger suppression (anger-in) as well as anger expression (anger-out) as a coping mechanism following an unpleasant situation. Instead, they try to see the whole picture and accept their responsibility. This leads to a better evaluation of the event and of themselves and, consequently, to fewer strong emotional reactions (Leary et al., 2007; Mill, Koots-Ausmees, Allik, & Realo, 2018). Additionally, because of the common humanity component, they realise that all humans have imperfections and make mistakes. This allows them to feel more empathy towards people they might be angry at, as well as towards themselves. As a result, they can reduce the impact negative emotions can have on themselves and, thus, decrease anger levels that would arise as

a response to those (Leary et al., 2007; Wu et al., 2018).

Besides the apparent association between the trait components of self-compassion and anger, no study up to now has focused on state anger and its association with trait and state self-compassion over a longer period. It could be that both constructs show a similar association over time since state anger has a strong association with trait anger and thus, could be influenced by trait self-compassion (Quinn et al., 2014). In support of this, Leary et al. (2007) demonstrated that high state levels of self-compassion at a given moment lead to a decrease of negative emotions following an undesirable event. Also, first studies about using compassion to handle anger lead to a decrease in PTSD patients´ anger symptoms and a subjective feeling of greater control over anger appraisals (Grodin et al., 2019). Additionally, a study by Smallen (2019) made use of momentary self-compassion exercises to counteract anger appraisals. The results showed that the exercises led to greater control of anger and helped to put the situation in a different perspective. Considering the results of the studies up to now, state self-compassion seems to act as a buffer against the negative aspect of anger and thus, lowering state levels or supporting the control of anger, similar to the trait association.

However, given the lack of research between the two state levels, this is just an assumption. Findings that argue against this generalisation from group-to-individual are shown in a study by Fisher, Medaglia, and Jeronimus (2018). They pointed out that one should be careful with generalizing interindividual results to intraindividual ones. On a between-person level anger and self-compassion might demonstrate this negative association but on an individual within-person and momentary level, it could be that the result will be very different. Within-person measurements focus on variations within one person and not between several persons. Since people and especially their emotions are highly individual, conclusions made on a group level cannot be surpassed on individual levels. It could be that some individuals do not display an association between anger and self-compassion at all or that their association is positive. The difference of within-person measurements should be considered and resulting from this, it is difficult to make a precise prediction if the within-person association will be analogous to the between-person association.

Current study

The current study investigates the state levels of anger in association with the state as well as trait levels of self-compassion over a longer time. First, it will be examined separately how the trait and state levels of self-compassion and the state levels of anger are associated. It

is hypothesised that the state levels will show a similar negative association as trait self-compassion and trait anger (Quinn et al., 2014). Nevertheless, since intraindividual measurements differentiate from interindividual ones (Fisher et al., 2018), this is only a prediction, and different results would be within the realms of possibility as well. Second, it will be explored if the association between state self-compassion and state anger is trait-like or a momentary/ state-like association. It is hypothesised that both associations could be found since state self-compassion leads to decrease of negative emotions at a given moment and high self-compassion leads in general to more adaptive coping in response to negative situations (Leary et al., 2007).

Methods

Participants

These are the criteria by which the sample was collected: they had to be a student or a student who was working as well. Additionally, they had to be proficient in the English language and possess a Smartphone to be able to download the app Ethica (explained below) to participate in the study. Participants who did not fulfil these criteria were excluded from the sample before the data analysis started. In total, 18 of the participants were excluded. The final sample comprised 34 participants between the ages of 20 and 25 (M_{age}=21.26; SD_{age}=1.26). Twenty-five of them were female, and 9 were male. Thirty-three of the participants were German, and one was of another nationality. Twenty of the participants were students and 14 students who worked as well.

All participants participated voluntarily and had to give informed consent before they were able to start with the study. The study was approved by the ethical committee of the Behavioural & Management Sciences faculty of the University of Twente (Request-Nr. 200371).

Materials and Methods

The online questionnaire was created using the website of the online research platform Ethica (https://ethicadata.com/). The survey consisted of four trait questionnaires and four daily questionnaires with six questions each in total. The questionnaires with which the trait levels have been assessed were the Self-Compassion Scale-Short Form (SCS-SF), the Aggression Questionnaire, the Big Five Questionnaire, and the AB5C Personality Inventory.

The present study was part of more extensive research. Consequently, only the SCS-SF, the Aggression Questionnaire, and the three relevant daily questions are described more in detail.

Online Research Platform Ethica

Ethica is an online research platform that can be used as a web app or downloaded as a mobile app on Android or iOS devices. One can use it either as a researcher to construct a variety of different questionnaires using different functions of the platform or as a participant to participate in studies. Ethica provides the function to trigger questionnaires on different days at several times a day. Every time a questionnaire is triggered, the participants receive a push notification on their smartphones that reminds them to complete the survey. One is also able to install automatic reminders, which will remind the participant automatically to complete a questionnaire if they have forgotten to finish it. Additionally, it is possible to set expiration dates for the questionnaires to ensure that a measurement would take place during the intended time frame. For the present study, a three-day pilot study was administered with two participants who tested the survey, the accuracy of the notifications, and the usability in general.

Trait Questionnaires

Self-Compassion Scale- Short Form (SCS-SF). The Self-Compassion Scale- Short Form was invented by Kristin Neff and consists of twelve items (see Appendix A) in total (Raes, Pommier, Neff, & Van Gucht, 2011). The questionnaire can be answered by using a five-point Likert Scale ranging from 1 (*Almost Never*) to 5 (*Almost Always*). A higher score indicates a higher level of self-compassion. The twelve items of the questionnaire are further divided into six categories, each category consisting of two items. Three of the categories represent positive constructs, and the other three negative ones. The three positive categories are Self-Kindness, Common Humanity, and Mindfulness. An example question of the positive category is, *"When something upsets me, I try to keep my emotions in balance".* The three negative categories are Self-Judgement, Isolation, and Over-Identification. An example question of this would be *"I'm disapproving and judgemental about my own flaws and inadequacies"* (Raes et al., 2011).

Total scores between 1.0-2.5 represent a low level of self-compassion, 2.6-3.5 a moderate, and 3.6-5.0 a high level of self-compassion. The short form of the scale represents a high correlation with the long-form (.97) and has a high value for internal consistency (.86) (Raes et al., 2011).

The Aggression Questionnaire. The Aggression Questionnaire was invented by Buss and Perry (1992) and is divided into four different subscales, namely, Physical Aggression, Verbal Aggression, Anger, and Hostility. For the present study, only the subscale Anger was used. This subscale consists of seven items in total (see Appendix B) and was measured with a five-point Likert Scale ranging from 1 (*extremely uncharacteristic of me*) to 5 (*extremely characteristic of me*). The sum score of the seven items ranges from seven to 35. A higher score indicates a higher level of anger, whereas a lower score represents a lower anger level (Buss & Perry, 1992). The Aggression Questionnaire showed to have good reliability and validity. Internal consistency ranges from .72 to .88, and scores from Cronbach´s alpha ranged from .83 to .91 across different samples. The test-retest reliability was also good with an estimate of .72 (Hornsveld, Muris, Kraaimaat & Meesters, 2008).

Daily Questionnaires

To prevent habituation of the responses of the participants, the individual items of the daily questionnaires were ordered differently every time.

State Self-Compassion. State self-compassion was measured using a single item *"During the last minutes, I have been tolerant of my own flaws and inadequacies"*. This question could be answered using a five-point Likert scale ranging from 1 (*Never*) to 5 (*Always*). The question is derived from the original Self-Compassion Scale- Short Form and was transformed to be suitable as a state question. A study by Li et al. (2019) used the same approach since they used multiple original questions from the SCS-SF and transformed them into situation based questions. The validity of the single item used here will be discussed in the results section.

State Anger. State anger was measured by using two items, namely, *"I am mad right now"* and *"I feel irritated right now"*. The participants could answer the questions by using a five-point Likert scale from 1 (*Not at all*) to 5 (*Very much so*). Other studies (Borders & Lu, 2017; Fresnics & Borders, 2016; Hamdan-Mansour et al., 2012) have used single or multiple questions depending on the type of study, which were very similar to the ones used in the present study. The validity of the items will be discussed in the results section.

Design and Procedure

An experience sampling method was used to measure the daily experiences of anger and self-compassion over one week. The survey was constructed using the online platform Ethica. The data collection took place during April 2020. After receiving ethical approval, the distribution of the survey started. This was done by using a convenience sampling method. The survey was shared on the Test Subject Pool BMS (SONA) System of the University of Twente and by distributing it via several social media platforms and social contacts. Participants on SONA received one credit point as compensation. Participants who did not use the SONA System did not receive any compensation. The whole study took nine days in total for each participant. To join the study, participants had to download Ethica on their phone and create a participant account by using their email address and a password. Next, they had to insert the specific participation code (1116) to find the study and join it. Here, they immediately had to give their online informed consent to participate in the study and were informed that they would receive more information soon. This day (day 0), they did not have to complete any surveys yet.

On the first day (day 1), the participants were informed about the procedure of the study, for instance, that the app will send them notifications as soon as a survey is ready to be completed, to turn on their notifications on their phones, and what to expect the next few days. After this first welcome notification, the participants received five different notifications for the four different trait questionnaires and one general questionnaire that asked questions about their gender, age, nationality and occupation during the day (see Appendix C1). If the participants forgot to finish one of these questionnaires, the system reminded them automatically to finish the missing survey. During the next seven days (day 2-8), they had to answer four questionnaires (see Appendix C2) consisting of the same six questions. The questionnaires were triggered between 9-10 am, 12-1 pm, 4-5 pm, and the last one was triggered between 8-9 pm. For every survey, the participants received a notification that the survey is ready for them to be completed. After 30 minutes, they received a second reminder that a new survey was available (see Appendix D). If the participants did not answer the survey within the intended timeframe, it automatically expired 60 minutes after the first notification. On the last day (day 8), the participants received a final notification after answering the last questionnaire. This notification stated that this was the end of the study and thanked the participants for their participation. Additionally, the email addresses of the researchers were stated with the endorsement to contact them in case of any questions.

Data Diagnostics

The data were analysed by using IBM SPSS Statistics (Version 24). All participants that fulfilled the inclusion criteria and had a response rate of over 40% were included in the analysis. The response rate was set to 40% to ensure a large enough sample size and enough measurement points to generalise the results. To get an overview of the data, descriptive analyses were performed for age, gender, nationality, occupation, and trait self-compassion, and trait anger to estimate the means and the distributions across the sample. Furthermore, Little´s Missing Completely at Random (MCAR) test was conducted to analyse the pattern of missing data and to check whether the data were missing completely at random. For state anger and state self-compassion, the average level over seven days per participant was calculated by using person means (PM). By using the PM, it is possible to conduct between-person analyses. Additionally, the person mean-centred scores (PM-centred) were estimated for each participant for all measurements of anger and self-compassion to perform within-person analyses. The scores show the differences between the mean scores of state self-compassion and anger and the individual measurement point (Curran & Bauer, 2011).

Furthermore, Cronbach´s alpha was calculated to determine the reliability of the SCS-SF and the Aggression Questionnaire within the sample of this study. A Cronbach´s alpha > .9 shows excellent reliability, > .8 good, > .7 is acceptable and > .6 is questionable. An alpha score < .6 is considered as unacceptable (Taber, 2017). Next, to assess the internal consistency of the single state items, the split-half reliability was calculated for each of the three state items individually. Additionally, to determine the validity of the single items for state anger and state self-compassion, Pearson Correlation analyses between state anger (PM) and the Aggression Questionnaire, and between state self-compassion (PM) and the SCS-SF were conducted. The resulting correlation coefficients r were interpreted by using the common effect size interpretations of Cohen (1988): r > .50 demonstrates a strong effect, r > .30 a moderate effect and r > .10 a weak effect.

To determine the association between trait self-compassion and state anger (PM), and state self-compassion (PM) and state anger (PM), Pearson Correlation was used (Curran & Bauer, 2011). Next, to explore if the relationship between self-compassion and anger is trait-like (between-person) or state-like (within-person), a multigroup Linear Mixed Model (LMM) analysis was performed. To be able to perform a LMM, the variables of state anger, PM self-compassion, and PM-centred self-compassion had to be standardized. Next, the standardized

raw score of state anger was used as the dependent variable and the standardized scores of PM self-compassion and PM-centred self-compassion as the fixed independent variables.

Results

Participant Flow

In total, 53 participants signed up for the study. Eleven participants had to be excluded because the response rate was lower than 40%. Furthermore, an additional seven participants had to be excluded since they identified their occupation as being *"other"*. Therefore, they did not meet the inclusion criteria of being a student or a working student. Lastly, one participant had to be excluded since this person was below the age of 18.

Descriptive Statistics

The mean, minimum and maximum scores of trait anger and trait self-compassion can be seen in Table 1. The Shapiro Wilk Test showed that trait anger was normally distributed ($W = .95$, $p = .50$) as well as trait self-compassion ($W = .97$, $p = .18$). Compared to the norm scores, the mean scores for both trait components indicate an average level of this trait. The results of Little´s MCAR indicated that the data were missing completely at random, $\chi^2 = 826.32$, $p = 1.00$. The percentage of missing values across the 28 measurement points varied between 5.9 and 38.2%. In total, 176 out of 756 (18.9%) measurement points were incomplete. Across the missing values and the different measurement points, no clear pattern of missing data could be indicated (see Appendix E).

Next, reliability analyses were performed to determine the internal consistency of the SCS-SF and the Aggression Questionnaire within this sample. The Aggression Questionnaire showed good reliability with a Cronbach´s alpha of .80. The Cronbach´s alpha of the SCS-SF showed good reliability, too, with an estimate of .85. Additionally, the internal consistency of the single state items was tested as well. The split-half reliability for the state self-compassion item was good with an estimate of .88. The split-half reliability for the state anger item *"I am mad right now"* was good with an estimate of .89, as well as the state anger item *"I feel irritated right now"* with a result of .81.

Correlation analyses between state self-compassion (person means) and the SCS-SF (trait self-compassion) were conducted and resulted in a weak and non-significant correlation ($r = .27$, $p = .12$). The same analysis was performed with state anger (person means) and the

Aggression Questionnaire (trait anger) and resulted in a weak and non-significant correlation too (r = .02, p = .89).

Table 1

Minimum and Maximum Scores, Means and Standard Deviations of Trait Self-Compassion and Trait Anger

Variables	N	Minimum	Maximum	Mean	Std. Deviation
Self-Compassion Scale- Short Form	34	1.9	4.3	3.1	.64
Aggression Questionnaire	34	10	27	18.6	4.9

Data Analysis

The negative association between trait self-compassion and trait anger could be confirmed by performing a bivariate Pearson correlation. A significant moderate negative correlation was found between the two variables (r = -.49, N = 34, p < .001). This means that higher trait levels of self-compassion are associated with lower levels of trait anger. Next, correlation analyses were performed between trait self-compassion and state anger (PM) and state self-compassion (PM) and state anger (PM). The results of trait self-compassion and state anger (PM) showed a non-significant weak negative correlation (r = -.03, N = 34, p = .88). In comparison, the correlation between state self-compassion (PM) and state anger (PM) showed a significant moderate negative correlation (r = -.36, N = 34, p < .001). These results indicate that a higher average state level of self-compassion is associated with a lower level of average state anger, but that the levels of trait self-compassion and average state anger are not associated with each other.

To determine if state anger is dependent on the average self-compassion level (i.e. trait-like, between-person association) or on the state self-compassion (state-like, within-person-association) a Linear Mixed Model was conducted. The results showed a significant but weak between-person association (β = -.14, SE = .03, p < .001), and a very similar significant weak within-person association (β = -.17, SE = .04, p < .001).

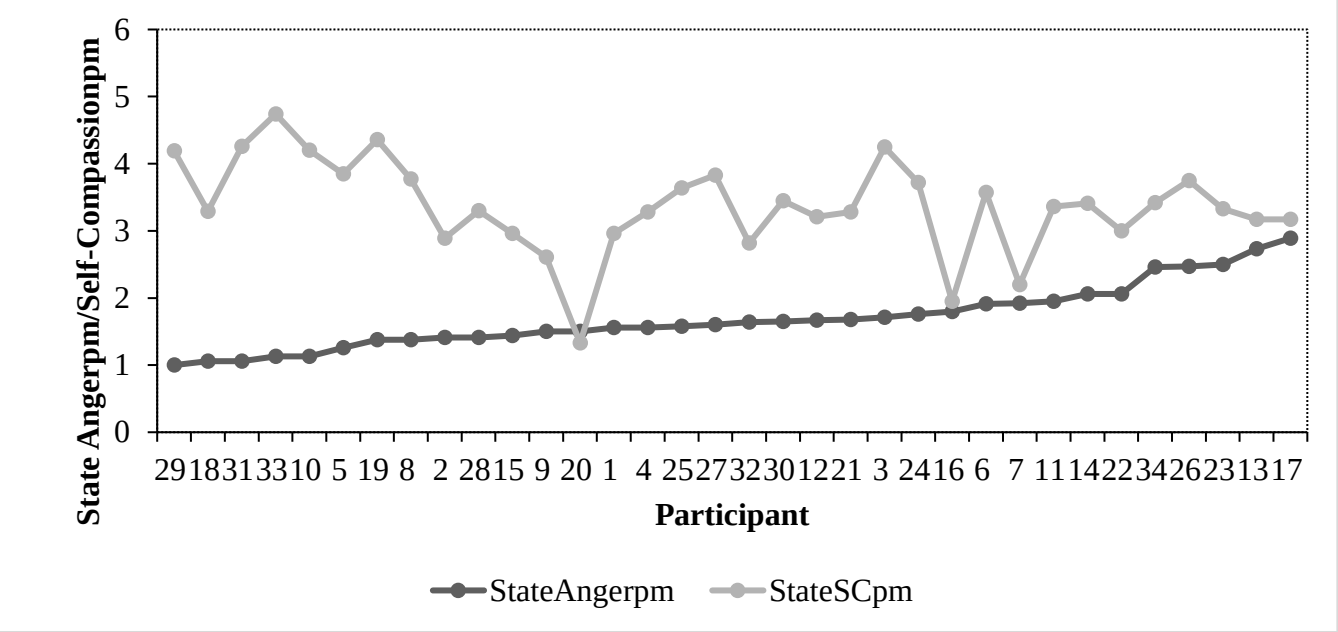
Visual Analysis of Individual Cases. To visualise the association between state self-compassion and state anger over one week, a visual representation of the average levels for

both components per participant and two illustrations of two participants have been illustrated individually.

Average State Anger (PM) and State Self-Compassion (PM). The average scores of state anger and self-compassion for every participant indicate that in general, the sample had rather high average levels of state self-compassion and lower levels of average state anger (see Figure 1). Average state anger ranged from a maximum of 2.89 to a minimum of 1. In contrast, the average state self-compassion showed a minimum of 1.33 and a maximum score of 4.74. As one can see, the higher the average level of state anger, the lower the average state self-compassion level.

Figure 1

Average levels of state anger and self-compassion per participant



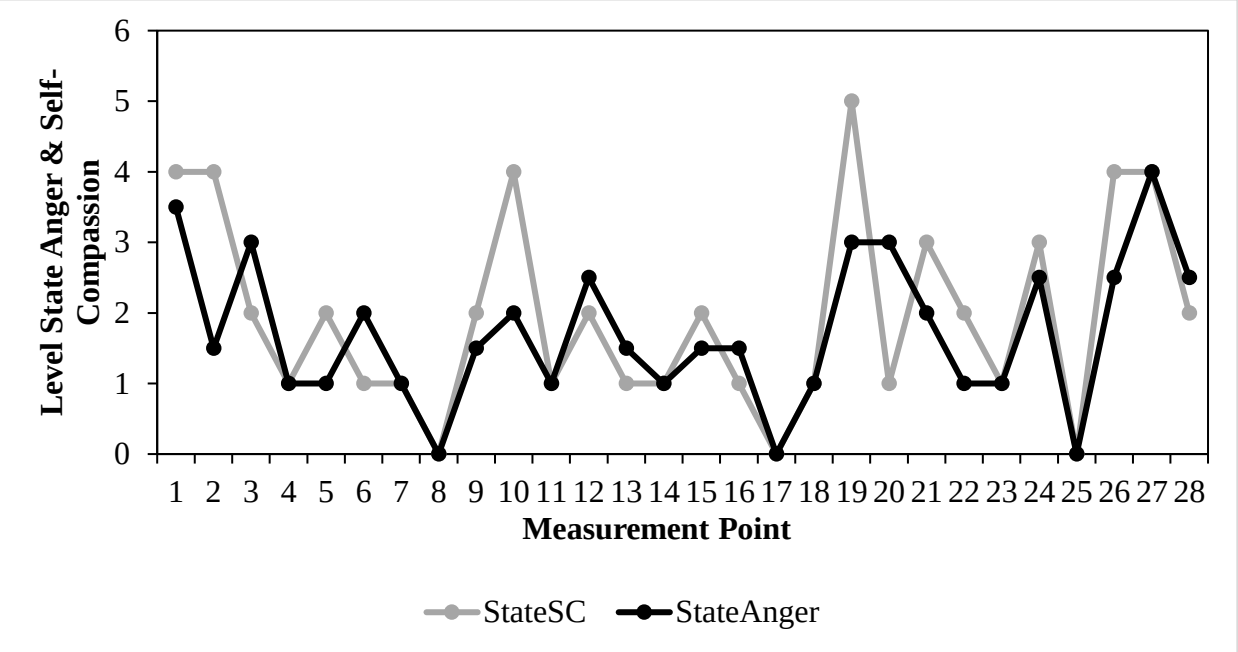
Note. Scores are ordered from the lowest to the highest level of average state anger with the corresponding state self-compassion levels per participant.

Participant 26057. This participant had a moderate level of trait self-compassion (2.75) and a low trait anger score (14). As it can be seen clearly in Figure 2, both state levels fluctuate notably during the week. Additionally, the levels of self-compassion are lower than the average level for the participants in general. Also, the negative association of the state levels can be seen. As soon as state anger increased, state self-compassion decreased. Nevertheless,

three exceptions can be seen at time points 23, 24, and 27 when both levels either increased or decreased simultaneously.

Figure 2

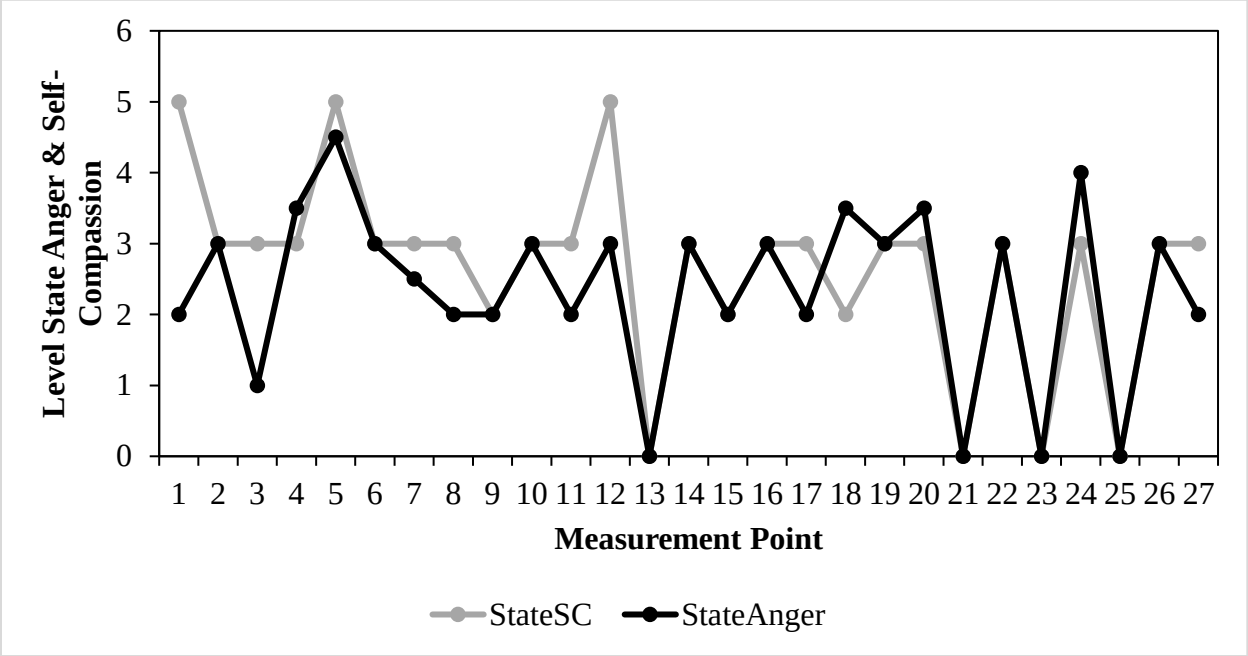
Levels of state self-compassion and anger of participant 26057



Participant 26076. This participant showed a medium score of trait self-compassion (3.08) and a high score for trait anger (26). Figure 3 shows that both state self-compassion and state anger varied a lot during the week. Furthermore, most times, levels of state self-compassion decreased when levels of state anger increased. Nevertheless, during time points 5, 12, and 24, both constructs increased simultaneously.

Figure 3

Levels of state self-compassion and anger of participant 26076



All in all, in each of the two visual representations of the individual participants, the negative association between state anger and state self-compassion was displayed. Furthermore, the participants showed rather high levels of state self-compassion and lower state anger levels, even when they had a high level of trait anger like participant 26076 or a lower level of trait self-compassion.

Discussion

The purpose of this study was to gain a first understanding of daily feelings of anger and its association with trait self-compassion and state self-compassion over one week. The results showed no significant relationship between the daily levels of anger and trait self-compassion. In contrast, the results confirmed that daily levels of state self-compassion and state anger are moderately negative associated with each other. Furthermore, the negative association between state anger and state self-compassion is a weak momentary-, as well as a trait-like association.

Trait and State Questionnaires

To be able to interpret the results correctly, the association between the trait questionnaires and the corresponding state items was tested. It showed that the trait questionnaire for anger is not associated with its state item since the results were not significant, and the estimate close to zero. Nevertheless, the internal consistency for both questionnaires separately was very high. Consequently, they seem to measure something different, even though both provide a good measure of anger individually. One possible explanation could be provided by looking closely at the content of the questionnaires individually. Here, it becomes apparent that the anger subscale of the Aggression Questionnaire measures a more expressive and behavioural state of anger as questions like *"When frustrated, I let my irritation show"* demonstrate. In comparison, the state items measure anger more from an emotional position. This indicates that the trait questionnaire measures anger from an anger suppression (anger-in) and anger-expression (anger-out) perspective, which describes more the expression of anger or behaviour rather than the experience of anger (Mill et al., 2018). Since these are two distinct parts of anger, it would provide a possible explanation for the almost non-existent relationship between them in the present study.

Furthermore, the trait questionnaire for self-compassion and the corresponding state item showed a non-significant and weak association. This is somewhat surprising since the state item originated from the SCS-SF that was used here and was just transformed into a situational item as it was done in the study of Li et al. (2019). Nevertheless, taking a closer look at the ESM studies on self-compassion, it shows that state self-compassion was always measured by using several items and not just one (Li et al., 2019; Thies & Kordts-Freudinger, 2019). This could be due to the three components of self-compassion that might not be measured appropriately by using only one item. Regarding the state item in the present study, this belongs predominantly to the self-kindness component. Thus, it might not represent the whole construct of self-compassion and hence, does not have a significant correlation to its trait component in the present study. In the following interpretations of the main findings of the study, the exact meanings and differences of the state and trait results need to be considered.

Self-Compassion and State Anger

The present study shows that trait levels of self-compassion are not associated with the state levels of anger. In contrast, the state levels of both constructs show the same association that was found between trait anger and trait self-compassion. This indicates that based on a high trait level of self-compassion, it cannot be assumed that the daily state anger will show a low level. In contrast, a high mean state level of self-compassion indicates that state anger levels are low. The missing association between trait self-compassion and state anger contrasted with what was expected based on the literature. Although no previous study examined the relationship between these two components before, the suggestion of a negative association was based on the negative association between trait self-compassion and trait anger, and the strong influence of trait anger on state anger levels as described in Spielberger´s state-trait anger theory (Spielberger, 1983, Quinn et al.,2014). It was suggested that the association between trait self-compassion and anger could be surpassed on state anger based on the strong influence of trait anger on its state component. Furthermore, since trait self-compassion leads to a decrease of negative emotions and the impact negative emotions have (Leary et al., 2007; Wu et al., 2018), it was assumed that it influences state levels of anger in the same manner. Despite these promising directions, the association of the trait components could not be generalised to the state-trait level association, but the state-state association shows the same result as the trait-trait association.

A possible explanation for this could be provided by the so-called state-trait discrepancy or intensity/impact bias (Buehler & McFarland, 2001; Thies & Kordts-Freudinger, 2019; Wilson & Gilbert, 2005). These theories point out that people generally tend to over-or underestimate how they would react in a specific situation. Thus, when assessing trait components, this could lead to an over-or underestimation of one's responses. The responses to trait assessments are heavily influenced by people´s own subjective beliefs about their reactions to certain events. And these beliefs could be deviant from what they would actually experience. Consequently, it seems reasonable that state measurements provide a more accurate estimate than trait assessments since state assessments occur right at the moment and are thus less influenced by one's own beliefs about their emotion than trait assessments (Thies et al., 2019).

Adapting this to the present study, this could indicate that on a trait basis, the association between self-compassion and anger could be confirmed because there might have been an over-or underestimation of how angry or self-compassionate a person would react and

this resulted in the correlation. However, on a trait-state level, state anger might result in less intense or even more intense results since it is not as strongly subjective to the intensity or impact bias as its trait component. These varying intensities of trait anger and state anger could explain why state anger and trait self-compassion are not associated with each other, even though the association of the trait and state components separately could be proven.

Taken together, these findings indicate that trait levels of self-compassion and state anger simply do not have the same direct association as state anger and self-compassion. In the few studies that exist so far about the reduction or control of anger appraisals, momentary self-compassion or compassion exercises were used to regulate the state anger levels. Similar to trait self-compassion, state self-compassion led to a decrease of negative emotions following a painful event and, thus, could also support the control of momentary anger or the effect it has on the individual (Grodin et al., 2019; Smallen, 2019). Since anger is an emotion that is generally difficult to control and somewhat unpredictable (Hamdan-Mansour et al., 2012), it could be that momentary self-compassion is more effective because it can be adapted in the same moment and as a response to the same situation, whereas trait self-compassion could serve as a more indirect influence. But this would need further investigation to see if this assumption can be proven.

Within- and between-person association

Besides the investigation of the association between the different state and trait levels, the daily association between state self-compassion and state anger was analysed more in-depth. Here, it was examined if the negative association between the state levels is a trait-like association or more a momentary and state-like association. It was assumed that the association could be both trait- and state-like. The results of this research provide supporting evidence that the association between the state components is both trait-like and momentary, even though the association is weak for both cases.

The trait-like association shows that individuals with higher average self-compassion show lower state anger and vice versa. Additionally, people with momentary higher (or lower) self-compassion scores than their average score, also show lower (or higher) state anger scores at that particular point in time. This pattern of results is consistent with what was expected based on the literature. First, people who are in general higher on average state self-compassion show a better capability to evaluate unpleasant events and their accountability for it in an objective manner. This, in turn, led to fewer negative emotions in response to those

situations, since those people do not get strongly affected by the negative aspects of the situation anymore, nor do they use maladaptive coping mechanisms like anger-in or anger-out behaviour as a response (Leary et al., 2007; Mill et al., 2018; Waring & Kelly, 2019).

The within-person association can be supported in a similar manner. This result is consistent with Grodin et al. (2019) work on anger management of PTSD veterans. In this pilot study, the participants had to adopt various self-compassion exercises when they experienced anger appraisals. These were supposed to soothe their arousal and provide a greater awareness of their experiences. The results showed that these direct momentary exercises lead to an increase in their internal control of anger, as well as a decrease of inwards experienced anger. This matches the results of the present study quite well since the state anger item measured more the emotional than the expressive component of anger. Thus, both studies focused more on the beneficial effects self-compassion has on the emotional elements of anger, such as the inner experience or internal control, rather than its effects on anger-out behaviours. Even though Grodin et al. (2019) took a more directive approach by directly applying self-compassion exercises to state anger, one can draw similar conclusions based on both studies. Direct self-compassion exercises, as well as normal momentary state self-compassion, are negatively associated with the inner experiences of anger.

Looking at this momentary association, it seems that once people become aware of their anger arousal, they start to use the self-compassion exercises and accordingly, increase state self-compassion. Nevertheless, the level of state self-compassion would still be low at the beginning moment, whereas the anger level would be high. If one looked at the momentary association at a later moment, the continuous use of self-compassion would lead to a higher level of state anger, and consequently, to a lower level of state anger since they show a negative association. Based on the result of the present study, no causality can be assumed here, but this could provide one possible explanation of how the association can be captured across different moments.

Similar to Grodin et al. (2019), a study of Smallen (2019) showed that increasing one´s self-compassion by using different exercises in an anger-provoking situation, has proven beneficial. It did not necessarily lead to a decrease of anger itself, but rather to acceptance and objective view on the situation. This might also explain why the results in the present study show only weak estimates. It would be possible that average self-compassion, as well as momentary self-compassion, does not lead to a decrease of anger levels themselves but more to different handling of emotions of anger. Instead of becoming consumed by those

feelings, people could accept them without getting too affected by the harmful components of anger. Thus, levels of anger would stay the same but would have less effect on the individual.

These findings highlight that average levels of self-compassion, as well as momentary self-compassion are both negatively associated with emotional state anger. Nevertheless, since the association is quite weak, these findings should be interpreted with caution, and further analyses should be made to determine if state anger actually decreases or if self-compassion affects more the effect anger has on the individual.

Limitations and strengths of the study

There are some potential limitations concerning the results of the present study. To begin with, the first limitation is that the trait questionnaires and state items of both constructs seemed to measure something different. This makes it harder to interpret the results correctly and draw clear inferences. Especially for anger, it should be ensured that both questionnaires measure the same component of anger, for instance, only the emotional component. That way, more precise conclusions could be drawn based on a clear connection of the state with their trait components. Another possible limitation is that the response rate was rather low, with an estimate of 40%. Even though response rates vary highly across ESM studies, as displayed in the literature review of Berkel, Ferreira, and Kostakos (2017), a higher response would have also led to more measurement points that could be used in the study to give a more coherent picture of the interaction of the state components over one week. Therefore, it is more difficult to generalise the findings to a larger population since many of measurement points are missing for some participants.

Nevertheless, the study has some strengths as well. First, because this study used an experience sampling method, it has high ecological validity since it measures precisely how angry or self-compassionate people felt in a given situation. Next, it was the first study to the author´s knowledge that investigated the association between the trait and state components of anger and self-compassion directly, as well as the momentary- or trait-like associations. Accordingly, it filled a literature gap and provided the first attempt for further and more detailed research on the association between anger and self-compassion.

Practical Implications and directions for future research

Despite these limitations, this study provides some theoretical and practical implications. First, it was the first study investigating the state and trait levels of self-

compassion and anger directly. Thus, it provides a more in-depth insight into the association of the different components and how they might interact with each other. If, as the research suggests, there is an association between state self-compassion and anger, there is a need for future research that explores this association more in-depth. The study already indicates that in the design of interventions, great emphasis should be paid on using state self-compassion as an element that could lower or help with controlling state anger levels. This could help with the design of several interventions in clinical settings but also practices in everyday life. As it was mentioned by Li et al. (2019), interventions for self-compassion are mostly based on several weeks of training. However, especially a concept like anger shows a clear need for brief and immediate interventions. With further research, it could be possible to create such brief interventions with a greater understanding of the interaction of the state and trait components.

In terms of future research, it would be useful to disentangle the emotional and the behavioural component of anger and do separate analyses with self-compassion on each component. If it would be made sure that the state and trait items measure the same construct, a more coherent picture of the interaction between them could be drawn. In the present study, the results of emotional state anger and state self-compassion already confirmed a negative association, but the effects self-compassion has on expressive anger (anger-out) are still unclear. Robins, Keng, Ekblad, and Brantley (2012) showed that self-compassion exercises are beneficial in decreasing aggressive anger expression. Similar to emotional anger, self-compassion did not suppress anger but led to a different view on the anger-provoking situation. Nevertheless, in this study, the association was not measured over a more extended period, nor was the emphasis on the trait and state components separately. Consequently, a clear need can be seen to separate the different components of anger and conduct individual analyses for them. As a result, one could get a clearer picture of how the trait and state components for emotional anger and expressive anger interact with self-compassion separately.

Regarding this suggested change in the study, it would be useful to use a different trait questionnaire for emotional anger, for instance, the subscale “Anger-In” from the State-Trait Anger Expression Inventory (STAXI) of Spielberger (1983). This subscale measures a more emotional component of anger than the Aggression Questionnaire used in the present study. Additionally, the subscale “Anger-Out” from the STAXI could be used for the trait component of the expressive anger item since this subscale measures anger that is directed

outwards. With these changes, the results of the current study on the association of emotional anger with self-compassion could be confirmed and strengthened by ensuring that the right trait and state components of anger are used and measured. Additionally, one could get a first insight into the association of expressive state and trait anger with self-compassion over a longer time and could determine if the same negative association could be found here as well.

Furthermore, it would be interesting to examine what effect state self-compassion has exactly on state anger. As mentioned before, because of the relatively weak association, it could be that self-compassion does not lead to a decrease but better control of the anger levels. A possibility to examine this would be to use a mixed-methods approach. On the one hand, one could determine if there is any causal relationship between the two constructs, which would show that state self-compassion does or does not decrease state anger. Additionally, surveys with open-ended questions could be provided for the participants in which they have to describe their inner experience of anger more thoroughly when applying self-compassion. Consequently, it could be determined if anger would stay the same, and only the control increased or if the participants would feel less angry. Combining the quantitative method of determining causality and the qualitative method of open-ended questions, provides a better insight into how the association works could be provided.

Besides this, the study should be replicated because it was the first study that investigated self-compassion and anger on this level. Thus, additional research is required to either confirm or refute the findings of the current study. In addition to that, since this study was conducted during the Corona pandemic, it is vital to assess the state and trait levels again when people are engaging in their normal, everyday life activities. Even though the average trait and state levels of the present study were similar to the estimates of other studies (Li et al., 2019; Respondek, Seufert, & Nett, 2019), confirming the present results by additional research would be advisable to be able to make more generalised statement about the association.

Although the generality of the current results must be established by future research, this study provides novel evidence of the association between the state and trait levels of self-compassion and state anger that can be used for further research.

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Appendices

Appendix A

Self-Compassion Scale- Short Form

**Items with reversed scoring*

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*.

Appendix B

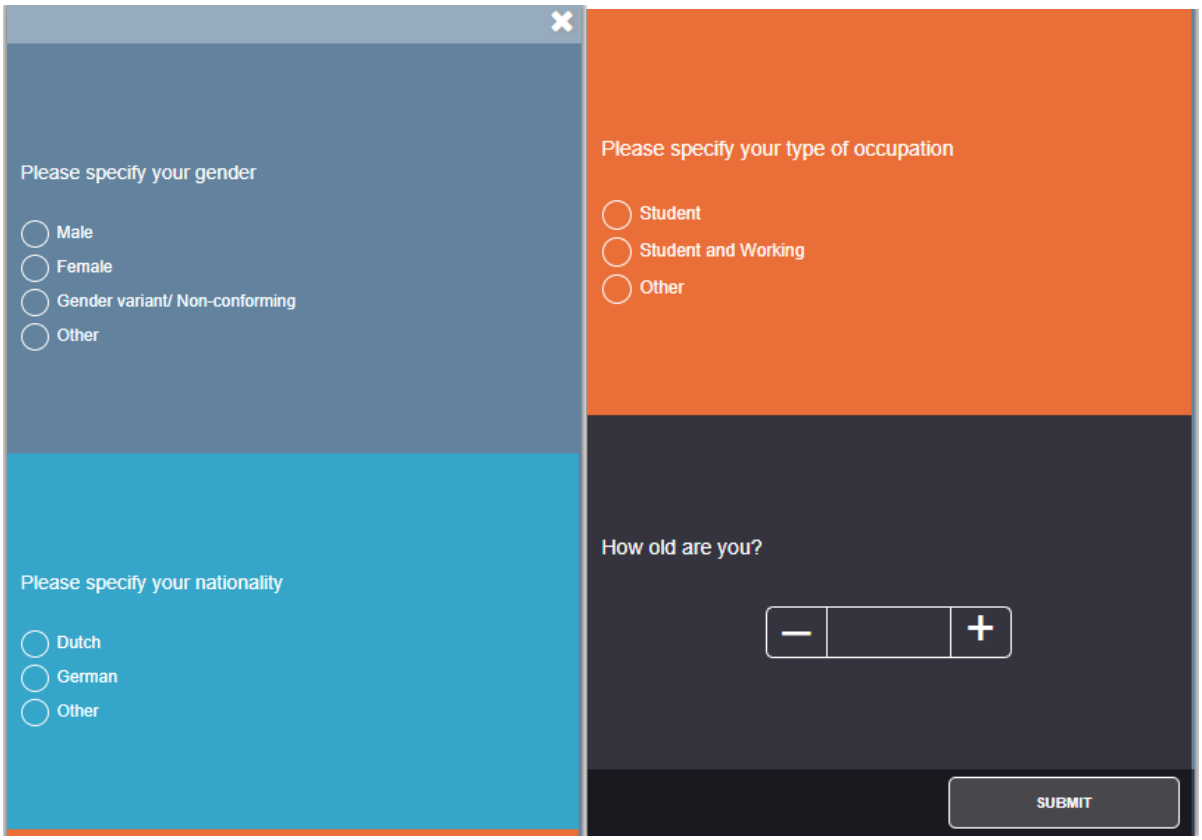
Aggression Questionnaire

1. I flare up quickly but get over it quickly.
2. When frustrated, I let my irritation show.
3. I sometimes feel like a powder keg ready to explode.
4. I am an even-tempered person*.
5. Some of my friends think I’m a hothead.
6. Sometimes I fly off the handle for no good reason.
7. I have trouble controlling my temper.

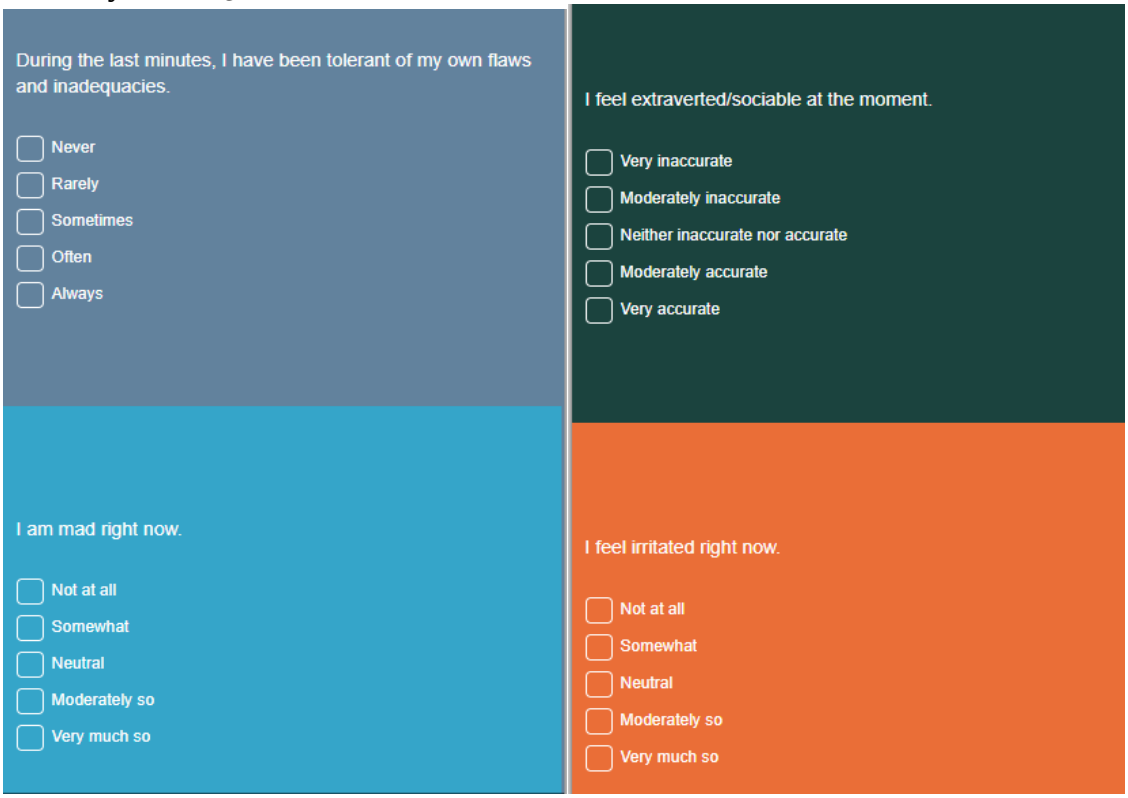
Appendix C

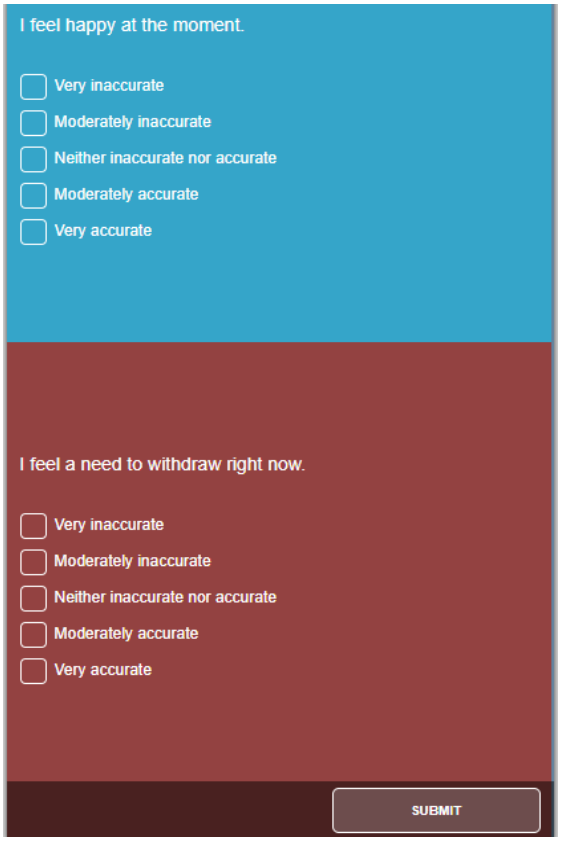
Ethica

C1 General Information



C2 Daily ESM Questions





Appendix D

Push Notifications

Table D1

Timing of Push Notifications

Time	**Push Notification**
After starting the study	Welcome to our study. We have some important information for you. Please read it carefully!
Day 1: 9am – 10am	Hello :) We would like to have some general information about you. Please fill in the questionnaire Hey there, the first survey is ready for you. Please take some time to complete it.
12am – 1pm	The second survey for today is ready. Please take some time to complete it.
2 pm – 3 pm	Another survey is ready for you! Please take some time to finish it :)
4pm – 5:30pm	The last survey for today is ready for you. Please take some time to complete it.
Day 2 – 8: 9am – 10am	Good morning! Please tell us how you feel this morning :)
12am – 1pm	Hello, we hope you are fine. Here is the 2nd questionnaire of the day :)
4pm – 5pm	Good afternoon :) Please tell us how you feel right now!
8 pm – 9 pm	Hello again. This is the last questionnaire for today :) Please tell us how you feel and have a good night!
If not done already: 30min. after the first trigger	If you haven´t done it already, please tell us how you feel right now :)
Day 8: 9pm – 9:30pm	You have completed the last questionnaire for this study. Thank you for your help :)

Appendix E

Missing Values Analysis

Table E1

Univariate Statistics

	N	Mean	Std. Deviation	Missing Count	Missing Percent
State_SC.1	25	3.9200	.81240	9	26.5
State_SC.2	29	3.5172	1.02193	5	14.7
State_SC.3	29	3.3448	1.07822	5	14.7
State_SC.4	31	2.9677	1.22431	3	8.8
State_SC.5	31	3.2903	1.10132	3	8.8
State_SC.6	30	3.3667	.99943	4	11.8
State_SC.7	32	3.3438	1.18074	2	5.9
State_SC.8	32	3.5000	.98374	2	5.9
State_SC.9	23	3.4348	.84348	11	32.4
State_SC.10	28	3.2143	1.22798	6	17.6
State_SC.11	28	3.1786	1.41562	6	17.6
State_SC.12	28	3.5000	1.17063	6	17.6
State_SC.13	24	3.3333	1.27404	10	29.4
State_SC.14	26	3.2692	1.25085	8	23.5
State_SC.15	28	3.6786	1.02030	6	17.6
State_SC.16	26	3.4231	1.20576	8	23.5
State_SC.17	24	3.4167	1.31601	10	29.4
State_SC.18	29	3.6552	1.04457	5	14.7
State_SC.19	25	3.2400	1.05198	9	26.5
State_SC.20	24	3.3333	1.23945	10	29.4
State_SC.21	27	3.2963	1.13730	7	20.6
State_SC.22	25	3.2800	1.10000	9	26.5
State_SC.23	27	3.3704	1.07946	7	20.6
State_SC.24	27	3.2963	1.26536	7	20.6
State_SC.25	22	3.2727	1.16217	12	35.3
State_SC.26	21	3.2857	1.30931	13	38.2
State_SC.27	28	3.4286	.95950	6	17.6
State_SC.28	27	3.3704	1.07946	7	20.6
State_Anger.1	25	1.7200	.99037	9	26.5
State_Anger.2	29	1.5000	.65465	5	14.7
State_Anger.3	29	1.9655	1.01710	5	14.7
State_Anger.4	31	1.4677	.71805	3	8.8
State_Anger.5	31	1.6290	.93066	3	8.8
State_Anger.6	30	1.7333	.95352	4	11.8
State_Anger.7	32	1.5781	.76316	2	5.9

State_Anger.8	32	1.4063	.64053	2	5.9
State_Anger.9	23	1.7391	.86431	11	32.4
State_Anger.10	28	1.6607	.81710	6	17.6
State_Anger.11	28	1.6071	.82054	6	17.6
State_Anger.12	28	1.6250	.96825	6	17.6
State_Anger.13	24	1.5833	.86811	10	29.4
State_Anger.14	26	1.5962	.84875	8	23.5
State_Anger.15	28	1.6429	.93152	6	17.6
State_Anger.16	26	1.5000	.66332	8	23.5
State_Anger.17	24	1.5833	.61972	10	29.4
State_Anger.18	29	1.4310	.63702	5	14.7
State_Anger.19	25	1.7400	.87939	9	26.5
State_Anger.20	24	1.6250	.89988	10	29.4
State_Anger.21	27	1.6296	.64439	7	20.6
State_Anger.22	25	1.4800	.56789	9	26.5
State_Anger.23	27	1.8704	.93637	7	20.6
State_Anger.24	27	1.6111	.80064	7	20.6
State_Anger.25	22	1.7045	.86821	12	35.3
State_Anger.26	21	1.6190	.63057	13	38.2
State_Anger.27	28	1.8929	1.03956	6	17.6
State_Anger.28	27	1.6296	.89435	7	20.6