Measuring Feelings of Self-Compassion and Stress in daily life – An Experience Sampling Study

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Abstract

Background. The construct of Self-compassion in positive psychology describes the understanding towards oneself when faced with shortcomings, inadequacies, or failures. Self-compassion interventions are frequently used to decrease stress and increase well-being. However, there is a lack of research on how these two concepts are associated on a daily level. This is important for the measurement of stress, because the stress experience in the moment, tends to differ from the recalled stress experience. **Objective.** The present study investigated the daily association between self-compassion and stress. Firstly, the association between Trait Self-Compassion and State Stress is analysed. Secondly, the association between State Self-Compassion and State Stress is analysed. Finally, it is analysed whether State Self-Compassion or Trait Self-Compassion are stronger associated with State Stress. If State Self-Compassion is higher, it would indicate an in the moment buffering effect of self-compassion on stress. If Trait Self-Compassion is higher, it might be an indication of planning ahead. **Method.** Over eight days a mobile experience sampling study with 35 college students (M age =20.65) was carried out. The Self-Compassion Scale-Short Form (SCS-SF) and Perceived Stress Scale (PSS) were used to assess Trait Self-Compassion and Trait Stress. In the timespan of seven days, the students indicated on three different time points every day, how stressed and self-compassionate they felt. **Results.** Trait Self-Compassion and State Self-Compassion are significantly negatively associated. State Self-Compassion and State Stress are significantly negatively associated as well. Multilevel analysis suggests that the parameter estimate for Trait Self-Compassion and State Stress (ß= -0.375, n=34, p<.001) is higher than the parameter estimate for State Self-Compassion and State Stress was (ß= -0.239, n=34, p< .001). **Conclusion.** Both Trait Self-Compassion and State Self-Compassion have possible potential to decrease stress. For further Self-Compassion based interventions for stress, it is potentially more effective to increase Trait-Self Compassion in order to decrease stress. More studies on State Stress are necessary to determine which approach is more effective in an actual intervention.

Introduction

In recent psychological literature, there was an increased focus on the construct of self-compassion and its possible buffering effect on stress (Zhang, Luo, Che & Duan, 2016). The psychologist Kristin Neff was the first person to research and define the construct of "self-compassion". Neff describes self-compassion as being kind towards the self, which entails being gentle, supportive, and understanding (Neff, 2011). However, it is not exactly clear in which way self-compassion influences stress. In the context of stress-studies, self-compassion is often viewed as a possible buffer of a stress response to an adverse experience (Zessin, Dickhäuser, & Garbade, 2015). Several studies have shown that self-compassion is associated with less stress and anxiety (Zessin et al., 2015). A study that looked at first year students stress levels, and self-compassion as a coping mechanism, found that increased self-compassion was linked to increased feelings related to competence, confidence, ownership over one's behaviour, and connectivity to others (Neely, Schallert, Mohammed, Roberts & Chen, 2009). However, the amount of studies on the connection between self-compassion and stress is limited. It is still not clear how self-compassion is associated with stress in daily life. On the one hand, people with a higher trait level of self-compassion might organize their life in a way that leads to decreased stress on a day-to-day basis. On the other hand, self-compassion might have a more direct influence on stress through buffering at the moment a stressor occurs. If the association between Trait Self-Compassion and State Stress is stronger, this would support the suggestion that self-compassion leads to organizing life in a different way. If the association between State Self-Compassion and State Stress is stronger, stress as a buffer in the moment is indicated.

Self-Compassion

Self-compassion in psychological research is often defined as the ability to be compassionate towards oneself when faced with unfavourable experiences, failure and inadequacy (Neff, 2011). There are often three different characteristics of self-compassion highlighted: The first aspect of self-compassion is self-kindness. Self-kindness is described as being warm towards oneself when confronted with suffering instead of reacting with excessive self-criticism or reacting by trying to confine negative emotions caused by the situation (Neff, 2011). The second element of self-compassion is common humanity. This aspect refers to an acknowledgment of human failures and inadequacies (Elices et al., 2017). The individual accepts failure as a part of being human and understands that other people go through similar experiences and that these experiences are common and tolerable. The third aspect of self-compassion is mindfulness. Being compassionate towards oneself entails taking a balanced attitude to one's negative emotions, so that feelings are neither repressed nor inflated (Neff, 2011). Negative emotions and thoughts are observed instead of stifled. The person does not seek for a distraction from negative emotions and manages not to be overcome by them. Furthermore, the person does not over identify with the negative emotions and alleged inadequacies (Elices et al., 2017).

An expanding body of research suggests that self-compassion allows people to suffer less, while also helping them to thrive (Neff & Davidson, 2016). Over the past decade, self-compassion has gained popularity as a related construct to mindfulness, and research on self-compassion is growing at an exponential rate (Neff & Davidson, 2016). However, the psychological study of self-compassion has been mostly limited to laboratory settings and survey assessments.

Stress

Stress is the body's reaction to any change that leads to a reaction. The body responds to these changes in physical, mental, and emotional ways (Benavente & Costa, 2011). It reacts to perceived danger with an automatic response, known as the fight or flight instinct. This mechanism is activated through hormonal signals and can be lifesaving when confronted with short-term, life-threatening problems (Levi, 2016). However, this response can become an impediment if it is repeatedly triggered through the day, because the body needs some time to calm down after every trigger (Shalev, 2002). Prolonged or repeated arousal can become harmful and has serious psychological consequences in the long term, such as anxiety and depression (Shalev, 2002).

Stress does not just involve a person's mental health; it also has physical consequences on the body. Inflammatory hormones are circulated when a person is stressed. If this occurs frequently it increases cancer risk, among other issues (Bickfort, 2005). Furthermore, chronic stress is linked with a wide array of different diseases, such as heart disease, asthma, obesity, diabetes, headaches, depression and anxiety, gastrointestinal problems and Alzheimer (Kassymova, Kosherbayeva, Sangilbayev & Schachl, 2018). Moment to moment assessment of the stress response brings an advantage in measuring stress since participants fill out questionnaires throughout the day, while being in their natural environment. This provides an advantage for measuring stress responses, because minor daily stressors and small disturbances in stress levels are being included, which might not be the case in a different setting (Vaessen et al.,2015). This is important in the context of this study because it makes it possible to look at the daily association between stress and self-compassion. Furthermore, through retrospective recall the situational context of stress is often missed.

Self-Compassion and Stress

Previous research implies that self-compassion may possibly have a buffering effect on stress (Zessin et al., 2015). One important study, that was conducted in form of a meta-analysis, examined to what extent procrastination was linked with lower levels of self-compassion and higher levels of stress. In the four samples, which were analysed, self-compassion mediated the relationship among stress and procrastination. These outcomes indicate that lower levels of self-compassion may account for some of the negative stress, which increases avoidance behaviour, experienced by procrastinators. Interventions that boost self-compassion could therefore be advantageous (Sirois, 2012).

A second study was conducted to determine whether adolescents who were high in self-compassion, self-reported different levels of emotional wellbeing, compared to adolescents who were low in self-compassion. Furthermore, it was established whether those high in self-compassion reacted differently under a lab social stressor than those low in self-compassion. Findings reinforced the potential buffering effect that self-compassion may have in shielding adolescents from social stressors (Bluth et al., 2016). The outcomes of the study were, that the individuals who were high in self-compassion scored higher in emotional wellbeing than the individuals who were lower in self compassion. Furthermore, the individuals with the high self-compassion scores had a weaker physiologic stress response when confronted with a stressor in a laboratory setting than the individuals lower in self-compassion (Bluth et al., 2016). A third study looked at the role of self-compassion in trainee stress and anxiety. The results in this study were consistent with previous findings. Self-compassion was found to be correlated negatively with stress and anxiety (Warren et al., 2018).

Summarizing some of the most important aspects of the studies, there is a negative correlation between self-compassion and stress. Nevertheless, there are no studies in which the relationship of stress and self-compassion is analysed on a day-to-day basis.

In the moment assessment of stress is important, since questionnaires which are built on recollection of stress fail to measure key aspects of stress, that are outside of the transitory time-window of the stress response (Vaessen et al., 2015). Such key aspects of stress are subjective appraisal and experience. It is important to measure these aspects, because some individuals may show a sensitized affective response to a daily stressor, that might not be measured without assessment in the moment. Therefore, it could be a valuable addition for self-compassion research, to use the Experience Sampling Method.

However, many studies about stress are focused on retrospective recall of a stressful period (Myin-Germeys et al., 2003). Through such retrospective recall the situational context of stress is often missed (Myin-Germeys et al., 2003). Additionally, it is important to look at the relationship between self-compassion and stress in daily life, because through measuring daily fluctuations of stress and self-compassion, it is easier to observe whether the two constructs influence each other on a moment to moment basis. Looking back at the above-mentioned studies, which analysed the relationship between stress and self-compassion, it becomes clear that most studies measure self-compassion not on a day to day basis. Nonetheless, especially in the context of creating interventions, it is important to know how State Self-Compassion is associated with stress. During an intervention it is one possibility to raise self-compassion on a state level. An example for this type of intervention is the study by (Breines & Chen, 2013), in which participants state self-compassion was increased by activating support giving schemas. Another way to use self-compassion in an intervention, is to focus on increasing Trait Self-Compassion. For instance, in the form a "Daily Self-Compassion Journal", which was developed by Neff (2011) and was used in an intervention to increase Trait Self-Compassion by Hansmann (2018). However, even though, state levels of self-compassion were not assessed in this study, it is likely that they were also increased.

In this context, it is important to know whether trait level self-compassion or state level of self-compassion are more effective in reducing stress. With this information, it would be possible to create more effective interventions.

Current Study

The objective of this research is therefore, firstly, to study the link between Trait Self-Compassion and stress and to establish if these two constructs are negatively associated, as it is indicated by earlier research (MacBeth and Gumley, 2012). Secondly, this study looks at the association between State Self-Compassion and stress. Since both Trait Self-Compassion and State Self-Compassion measure different aspects of the same construct, it might be expected that the association between State Self-Compassion and stress is negative. Finally, this research aims to establish whether the association between Trait Self-Compassion or State Self-Compassion with State Stress is stronger.

Method

Participants

In total, 35 participants volunteered for the study. All participants were university students and their age ranged between 18 and 31 years. Participants of six nationalities were represented in the study, including: Vietnamese, Indonesian, Bulgarian, Indian, Dutch and German. Most of the sample consisted of women (87.9%), 8.8% percent identified as men, and 2.9% identified as gender non-confirming. Requirements for participation in the study were: To be 18 years of age, to understand the English language and to own a smartphone device, to be able to use the Tiim App utilized in this study.

The respondents were selected through convenience sampling, through a university intern system called the SONA system of the university of Twente. Additional participants were selected through personal acquaintances of the researchers.

Procedure

The study took place over the course of eight days in total, of which the first seven days were used for the ESM measurements of the variables State Self-Compassion and State Stress. For obtaining the data, signal-contingent sampling was used. The study was ethically approved by the Behavioural, Management and Social Sciences Ethics Committee of the University of Twente. The participants were instructed to install the Tiim survey app. Through the Tiim App the participants got a short introduction into the study. At this point in time, the participants were asked to give their consent, and were also informed that they could withdraw their consent at any given time during the study. If the participants had any further questions about the study or its results, they were invited to contact the researchers at any time.

Before the start of the actual study, a pilot study was conducted with two participants over the course of three days, after which the main data collection started. On the first day of the study, the participants did not have to answer questions, but received instructions to set an alarm at three different points in time throughout the day. From the second day of the study onward, the participants had to answer six short questions three times per day on their smartphone. Three measurements per day were considered to be appropriate because it was intended to collect data of the participants feelings at time points that were representative of the different parts of the day. More than three measurements were considered to be too demanding for the participants because that would be too disruptive to their day-to-day life. Therefore, the measurements were scheduled in the morning between 8 and 10 a.m., around lunchtime between 12 and 2 p.m. and in the evening between 6 and 8 p.m.

This continued, with the same questions and set up for the following 6 days. On the 9th day of the study the participants answered the "Self-Compassion Scale Short Form" and the "Perceived Stress Scale". At the end of the surveys, the participants were encouraged to contact the researches, if they were interested in the results of the study.

Materials and Measures

Two different questionnaires were used in this study. One is the Self-Compassion Scale Short Form (SCS-SF), the second is the Perceived Stress Scale (PSS). Additionally, the Tiim App was used.

The Incredible Intervention Machine (TIIM)

All questionnaires and daily questions were accessed via an app called the Incredible Intervention Machine (TIIM). TIIM is a survey tool developed by the BMS Lab of the University of Twente (The BMS Lab, n.d.). It can be used on IOS and Android smartphones. It was specifically developed to provide researchers with a tool to implement an intervention or make participants respond to a questionnaire. Its app form has the advantage of being able to ask participants questions at different points in time, since it runs on portable smart phone devices. The daily questions were organised in form of modules. The first module would appear between 8 and 10 a.m. and would include the two daily questionnaires. The second module would include the two daily questionnaires and would appear between 12 and 2 p.m. The third module included the two daily questionnaires and appeared between 6 and 8 p.m. Furthermore, push notifications can be sent to the participant as soon as a new module is available, and as a means to remind the participants to respond. TIIM allows to time each notification specifically and to determine how long a module is supposed to be accessible to the participant. When the application is opened, the module is shown, but after the response has been recorded, the home screen of the application shows only the note that the participant is asked patiently to wait for the next module to become available.

Trait Questionnaires

Perceived Stress Scale. The Perceived Stress Scale is a widely and well-established self-report scale measuring perceived stress (Eun-Hyun Lee, 2012). It measures the degree to which situations in one's life are perceived as stressful. The items were designed to measure how unpredictable, uncontrollable, and overloaded respondents feel in their day-to-day lives. The scale also has several direct questions about current levels of experienced stress. It was designed for people with at least a junior high school education and its items and the response alternatives are easy to understand. The questions are also of a general nature and not related to any specific context or subgroup. The students were asked how often they felt stressed on a five-point scale from zero (never) to five (very often). An example item of the scale is: "In the last month, how often have you been upset because of something that happened unexpectedly?" (Cohen et al., 1983).

The psychometrics of the Perceived Stress Scale, its internal consistency, reliability and factorial validity are well reported and sufficient (Cronbach's Alpha between 0.60 and 0.82) (Eun-Hyun Lee, 2012). Additionally, the psychometric properties of the PSS have been evaluated empirically using populations of college students (Cronbach's Alpha 0.81 and 0.88) (Eun-Hyun Lee, 2012).

Self-Compassion Scale Short Form. The Self-Compassion Scale Short Form is a shorter version of the Self-Compassion Scale. On this scale the students were asked how often they behaved in the way described by a five-point Likert-Scale stretching from one (almost never) to five (almost always). One Example Item of the scale was: "I try to see my failings as part of the human condition". Higher scores on the scale indicate higher levels of self-compassion. The short form of the scale consists of only 12 items instead of 26. The SCS-SF demonstrates adequate internal consistency (Cronbach's alpha > .86). The short form has a good correlation with the long scale (r > .97) (Raes, Pommier, Neff & Van Gucht, 2011).

The SCS-SF was tested in psychometric studies including racially/ethnically diverse participants which demonstrated the SCS-SF's validity and utility among these samples (Zhang et al, 2019).

Daily Questionnaires

The daily questionnaires, at every time point, were presented in a different order to prevent habituation in the responses.

State Stress. Since State Stress was accessed on a daily basis, with three different measurement points per day, to reduce the effort and increase the response rate, the single Item: "On a scale from 0 to 7 and even being the worst stress possible, what number best describes your level of stress right now?" was chosen for assessment. This Item was developed, to asses stress in the moment and is called the Stress Numerical Rating Scale – 11 (SNRS-11). Three different studies support the initial validation of the Stress Numerical Rating Scale-11 (Stress NRS-11) (Karvounides et al., 2016). The validity of the single item will be evaluated in the current study, by doing a correlational analysis with the Trait Stress scores measured with the Perceived Stress Scale (PSS) in the result section.

State Self-Compassion. In addition to the item measuring stress, the item "On a scale from 0 to 7, how kind do you feel towards yourself right now?" was formulated similar to the stress item. It was used to measure self-compassion. The validity of the single item will be evaluated in the current study, by doing a correlational analysis with the Trait Self-Compassion scores measured with the Self-Compassion Scale-Short Form (SCS-SF).

Data Analysis

It is also important to determine the reliability of the Self Compassion Scale – Short Form score and the perceived stress inventory in the study sample. Therefore, for both scales, Cronbach's Alpha was determined. The data was analysed with SPSS, the IBM Statistics program and with Microsoft Excel. Initially, the data set collected with the TIIM app was exported into SPSS.

Subsequently, sum scores were calculated for the Self-Compassion Scale Short Form and for the Perceived Stress Scale, and for each participant means were calculated. As a next step, the descriptive statistics, regarding the distribution of age, gender, and nationality, were analysed. Additionally, the distribution and mean scores of Trait Self-Compassion and Trait Stress were calculated. Then the mean scores across all time points for each person were calculated. This results in the Person Mean score (PM). This was subtracted from each individual and time specific score. This results in the Person Mean Centred score (PMC). As a next step, the correlations between Trait Stress, State Stress, Trait Self-Compassion and State Self-Compassion were calculated. This was done according to Pearson Correlation. Also, a multilevel analysis was done to determine whether Trait Self-Compassion or State Self-Compassion is stronger associated with State Stress. The multilevel model was used with the strategy of person mean centring. Both PMC and PM of Self-Compassion were set as covariates, whereas stress was set as a dependent variable. PM represent the trait like association, whereas the PMC scores represent the state like association.

Results

Descriptive Statistics

Both stress and self-compassion were normally distributed, as indicated in Table 1. Table 1 gives an overview of minimum and maximum scores of Trait Self-Compassion and Trait Stress, as well as the mean scores of both constructs. The SCS-SF shows acceptable reliability with a Cronbach's Alpha of 0.67. The PSS shows acceptable reliability as well, with a Cronbach's Alpha of 0.72.

Table 1

Minimum and Maximum Scores, Means (M) and Standard Deviations (SD) of Trait Self-Compassion and Trait Self-Stress

Variables	Minimum (scale minimum)	Maximum (scale maximum)	M	SD
Self-Compassion Scale–Short Form, M (SCS–SF)	19 (12)	41(60)	30,4	5.64
Perceived Stress Scale, M (PSS)	15 (0)	38(40)	24.6	5.26

N=35

Table 2

Correlation Coefficient between the different variables

Variables	Self-Compassion (PM) (Trait-like)	Self-Compassion (PMC) (State-like)	State Stress (PM)
Trait Self-Compassion (SCS-SF)	0.337		
Trait Stress (PSS)			0.370
Self-Compassion (PM) (Trait-like)	1		-0.381
Self-Compassion (PMC) (State-like)	-0.265	1	
State Stress (PM)	-0.381	-0.265	1

N=35

Data Analysis

The analysis of the effect sizes was based on Cohen (1988): A correlation coefficient (r) greater than .5 suggests a large or strong correlation, r greater than .3 a moderate correlation, and r greater than .1 a small correlation. The results of the Correlation analysis are shown in Table 2. The correlation analysis showed a significant weak correlation between Trait Self-Compassion (SCS-SF) and Self-Compassion (PM). This indicates that higher levels of Trait Self-Compassion are associated with higher levels of Person Mean State Self-Compassion (PM). Furthermore, the correlation analysis showed a significant weak correlation between Trait Stress (PSS) and State Stress (PM) (Trait-like association). This indicates that higher levels of Trait Stress (PSS) are associated with higher levels of State Stress (PM). Also, a significant weak negative correlation between State Self-Compassion (PM) (Trait-like) and State Stress (PM) was found. This means, that as the scores on State Self-Compassion (PM) increase, the scores on State Stress (PM) decrease. Additionally, the correlational analysis between Self-Compassion (PMC) and State Stress (PM) showed a significant weak correlation between the two variables. That means, that as Self-Compassion (PMC) scores increase, the scores on State Stress (PM) decrease.

Furthermore the results of the Multilevel Analysis show, that the Association found for Self-Compassion (PM) with State Stress was (ß= -0.375, n=34, p<.001) and the association found between Self-Compassion (PMC) and State Stress was (ß= -0.239, n=34, p< .001). This means that the Self-Compassion (PM), (Trait-like) parameter estimates a higher association with State Stress, than the Self-Compassion (PMC) (State like) parameter.

Discussion

The present study aimed at investigating the association between self-compassion and stress. Moreover, especially the association between Trait Self-Compassion and State Stress in comparison with the association between State Self-Compassion and State Stress were examined.

The first research question was, to find out if Trait Self-Compassion and State Stress were negatively associated, because this would indicate the potential of self-compassion to decrease stress. Secondly, this study looked at the association between State Self-Compassion and stress. Since both Trait Self-Compassion and State Self-Compassion measure different aspects of the same construct, it was expected, that the association between State Self Compassion and stress will be negative. Finally, this study analysed whether the association between State Self-Compassion or Trait Self-Compassion with State Stress is stronger. The results show the assumption in the first research question to be correct: Trait Stress and State Self-Compassion are significantly negatively associated. The second assumption, that State Self-Compassion would be negatively associated with State Stress, turned out to be correct as well. Furthermore, it was indicated that the negative association between Trait Self-Compassion and State-Stress might be higher than between State Self-Compassion and State Stress. However, the values are not directly comparable.

Additionally, to validate the single Item Daily Questionnaire for State Stress, the correlation between Trait Stress (PSS) and State Stress (PM) was calculated. As reported in the results, the correlation is significant. However, with a low value. This indicates that the single item might not be a good valid assessment form for State Stress. However, some validity is indicated, because the significant correlation. The same can be said about the single Item Daily Questionnaire for self-compassion.

It was important to study the association between self-compassion and stress, because it is important to find ways to decrease stress, since stress poses a great risk to a person's well-being and physical health (Hassard et al., 2014). Therefore, it is important to find possible buffers for stress. The negative association between self-compassion and stress found in this study, indicates that self-compassion might help to protect a person against the negative health aspects of stress. However, in this study only association and not causation is established. There has been no research done so far on the association between self-compassion on the state level and stress.

It is important to fill this knowledge gap, because it gives us more information on how self-compassion might work in the moment to reduce stress. As described in the introduction, if a person scores high for self-compassion on a trait level, this indicates that the person might have more self-compassion with their future self. Therefore, the person will plan better ahead to avoid stress in the future. However, if self-compassion on a state-level is stronger associated with stress, it might be an indicator that self-compassion's main effect on stress happens in the moment, for example in form of a spontaneous self-compassionate response. This response might buffer the stress response, or helps to cognitively refrain an aversive event, to make it less stressful in the moment. This theory is supported by a study from Breins et al (2014), which discovered that people with higher self-compassion, react less strongly to a stressor in a laboratory setting, when compared to individuals with lower self-compassion (Breins et al., 2014). Since the association between both the Trait Self-Compassion and the State-Self Compassion and stress is both significantly negative, both interpretations are viable. However, the association between Trait Self-Compassion and State-Stress is estimated to be probably stronger. This indicates that through raising a person's Trait Self-Compassion levels, stress in daily life can possibly be reduced. In comparison, raising state levels of self-compassion might be effective as well, but not as effective as raising trait levels.

The findings in this study, are in line with the findings in the study made by Sirois (2012), which found that Trait Self-Compassion and State Stress are negatively associated. When comparing the findings of this study with the study of Bluth, et al. (2015), which discovered, that adolescents who were high in self-compassion, self-reported a decreased level of stress in comparison to adolescents who were low in self-compassion, the current study supports the findings. Trait Self-Compassion is indicated to help to protect adolescents from social stressors. It is also noted that the current study had participants in a similar age group (Bluth et al., 2015).

There are several studies that administered an intervention based on self-compassion. In a study by Eriksson et al. (2018), a web-based self-compassion and mindfulness intervention was implemented, to examine its effect on stress and burnout symptoms. The training included 15-minute sessions in self-compassion training every day, six days of the week, in the time frame of six weeks. The intervention lead to an increase in total scores on the Self-Compassion-Scale while the score on the Perceived Stress Scale decreased significantly. These results are in line with the results of this study, that showed that Trait Self-Compassion is negatively associated with State Stress. To distinguish studies which raise State Self-Compassion levels from studies which increase Trait Self-Compassion is not easy, because of limited research in this field. However, some studies give an indication, on which criteria to distinguish the two. Firstly, to raise Trait-Self Compassion, with a long-lasting or permanent effect, the length of an intervention is important. For Example, when looking at a study by Neff & Germer (2013), 8 weeks were sufficient in raising State-Self Compassion levels and in maintaining the higher levels in a 6-month and one-year follow-up study. There were no studies, which raised Trait Self-Compassion sustainably in a shorter amount of time so far. Therefore, according to current studies, to raise Trait Self-Compassion in the long term, the intervention should be at least 8 weeks long (Neff & Germer, 2013).

Secondly, the kind of self-compassion exercise which is done might also influence whether the state or the trait level are more affected. For example, to increase State Self-compassion, cognitive schemas are often used, and proven to be effective (Breines & Chen, 2013). An interesting approach for further research in this field could be a similar intervention, while also measuring the State-level of Self-compassion. The results of the current study would support a possible influence of State Self-Compassion levels on stress.

Implications and limitations

Surprisingly, the association found between Trait Self-Compassion and State Stress was only moderate, though in previous studies, a strong correlation between self-compassion and stress was reported. Firstly, it was interesting that trait measures of both self-compassion and stress only correlated weakly with the state measures of Self-Compassion and stress. One possible explanation for this difference is, that people are actually not good at estimating how stressed or self-compassionate they are in their day-to-day life. They might be strongly influenced by the stress or self-compassion level they experience while filling in the questionnaire. Memory tends to be imperfect, therefore it is difficult for people to recall information about their stress levels, while depending on their memory alone. Using the EMS questions was also a way of avoiding this recollection bias (Hassan, 2006). Further research should be done to focus on the difference between state and trait levels in stress as well as self-compassion.

Secondly, since State Self-Compassion seems to have a weaker association with State Stress than Trait Self-Compassion with State Stress, increasing Trait Self-Compassion in form of an intervention might be more beneficial. For further research a possibility to determine whether this is the case would be a study with an intervention, which aims to raise State Self-Compassion in one group and Trait Self-Compassion in another group to compare the results. However, it is not possible to design a study in which in one group only the Trait Self-Compassion levels are increased, whereas in another group only State Self-compassion is increased. Nevertheless, there is the possibility of designing a similar study. The study would start with two groups A and B who have similar levels of self-compassion. One group (A) first receives an 8 weeklong Self-compassion intervention, designed to increase trait levels of self-compassion (Neff & Germer, 2013). The second group (B) receives no treatment in this time period. In a follow-up study, which runs for one week, the second group would work daily with self-compassion schemas designed to increase Trait-Self Compassion.

In the week in which group B works with the self-compassion schemas, group A receives no further intervention. In both groups, State Stress levels are measured during three different time point throughout the day. In the end, the results of both groups are compared.

A study based on an intervention to increase self-compassion to buffer stress would also be interesting to determine if the relationship between self-compassion and stress is causal, which this study fails to do.

To sum it all up, both Trait Self-Compassion and State Self-Compassion are significantly negatively associated with stress. Additionally, it is indicated that the association might be stronger on a trait level, raising Trait Self-Compassion in form of an intervention might therefore be potentially more beneficial.

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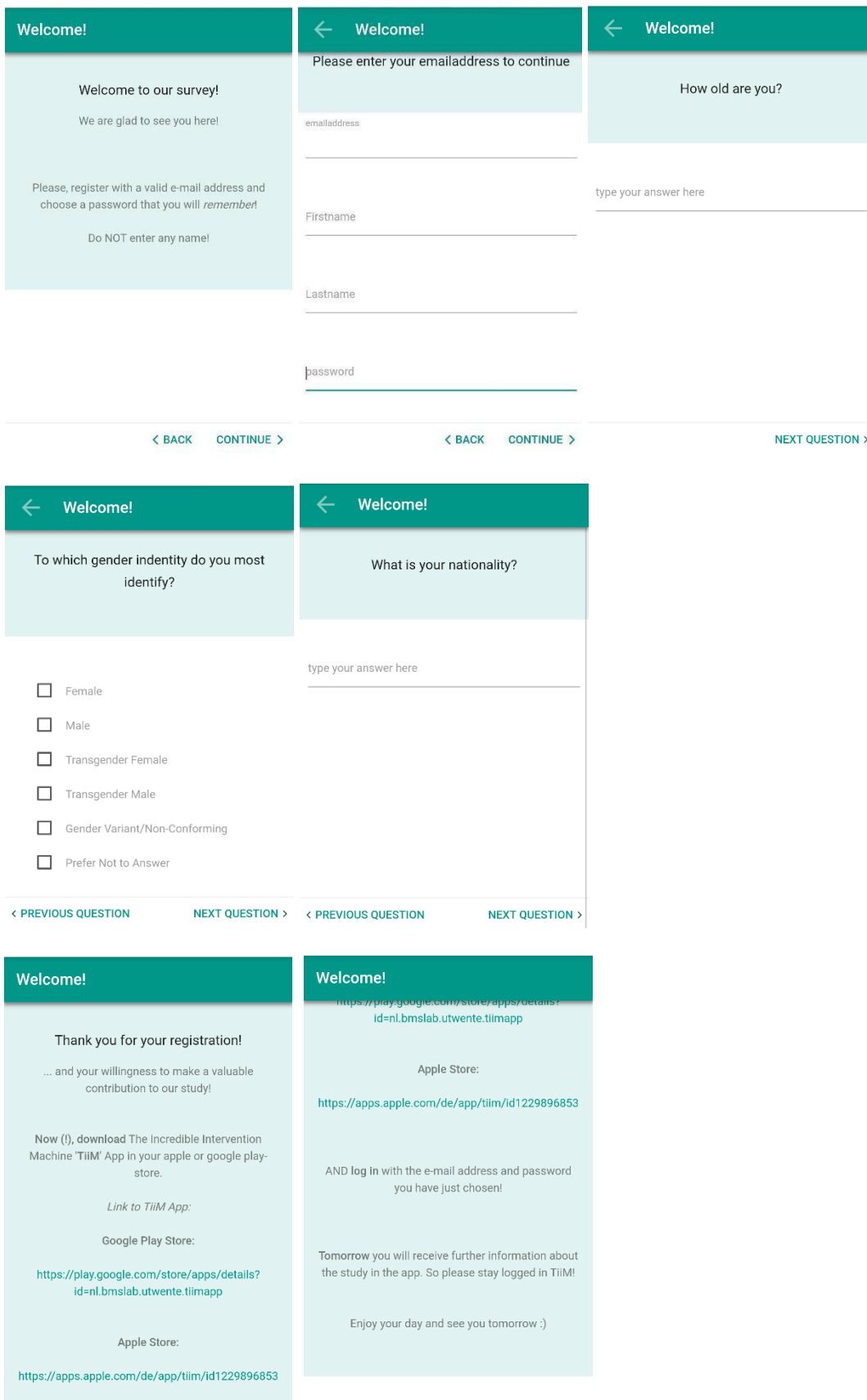
Appendices

Appendix 1: Push Notifications

Table 1

Push Notifications

Time	Push Notification
After assigning participants to study:	Welcome! Further information will follow tomorrow! :)
Day 1: 08:00:	Thank you for your patience; New information are available!
19:00 (if not done yet):	Have you read all information? We'll start tomorrow morning :)
Day 2 - 8: 08:00:	Good morning :) Tell me how you are feeling!
12:00:	Lunch time :) Tell me how you are feeling!
19:00:	Tell me how you are feeling! And enjoy your evening :)
09:30, 13:30, 20:30 (if not done yet):	Don't forget to tell me how you are feeling :)
To encourage	You are doing great! 4 more days to go! Good morning :) Only 2 more days. You're doing great! A few missed answers are no problem! Keep doing!
Day 8: 21:00:	You've made a great job this week! :) Tomorrow you'll receive the ending questionnaires.
Day 9: 08:00:	Today is your last day! Please fill in the 4 questionnaires.
14:00 (if not done yet):	Great job so far! Don't forget to fill in the last questionnaires! :)
19:00 (if not done yet):	Great job so far! Don't forget to fill in the last questionnaires! :)

Appendix 2: The Incredible Intervention Machine (TiiM)

Figure 1
Subscription

Appendix 3:

The Perceived Stress Scale

INSTRUCTIONS:

The questions in this scale ask you about your feelings and thoughts during THE LAST MONTH.   In each case, please indicate your response by placing an "X" over the circle representing HOW OFTEN you felt or thought a certain way.

	Never	Almost Never	Sometimes	Fairly Often	Very Often
1. In the last month, how often have you been upset because of something that happened unexpectedly?	◯	◯	◯	◯	◯
2. In the last month, how often have you felt that you were unable to control the important things in your life?	◯	◯	◯	◯	◯
3. In the last month, how often have you felt nervous and "stressed"?	◯	◯	◯	◯	◯
4. In the last month, how often have you felt confident about your ability to handle your personal problems?	◯	◯	◯	◯	◯
5. In the last month, how often have you felt that things were going your way?	◯	◯	◯	◯	◯
6. In the last month, how often have you found that you could not cope with all the things that you had to do?	◯	◯	◯	◯	◯
7. In the last month, how often have you been able to control irritations in your life?	◯	◯	◯	◯	◯
8. In the last month, how often have you felt that you were on top of things?	◯	◯	◯	◯	◯
9. In the last month, how often have you been angered because of things that were outside your control?	◯	◯	◯	◯	◯
10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	◯	◯	◯	◯	◯

Appendix 4:

self-compassion scale: short form

how I typically act towards myself in difficult times …

please read each statement carefully before answering; using the scale given below
indicate, to the right of each item, how often you behave in the stated manner:

almost never				*almost always*
1	*2*	*3*	*4*	*5*

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*	