The association between self-compassion and cognitive fusion over a week.

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<30/06/20>

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Abstract

Background. In the past years, self-compassion has been recognized as a construct that promotes mental health and protects from avoidance strategies (e.g. rumination and suppression). In contrast, this type of strategies is accompanied by cognitive fusion (i.e. to be entangled with your thoughts), which is predictive of mental health problems. Previous studies demonstrated that self-compassion can be protective of cognitive fusion. However, no study previously examined their dynamic interaction in daily life. This is important because it can give an insight on what level different interventions can focus. **Objective.** Firstly, this study investigates the fluctuations during a week in state measures of self-compassion and cognitive fusion. Secondly, it assesses the convergent validity of the state measures of self-compassion and cognitive fusion. Thirdly, the current study investigates whether the within- or between-person variation of self-compassion have a stronger association with the state level of cognitive fusion. **Method.** A longitudinal online experience sampling study with 30 participants (M_{age}= 22.6) was conducted. The Self-Compassion Scale-Short Form was used to measure self-compassion and Cognitive Fusion Questionnaire was used to measure cognitive fusion. For the state measure a questionnaire composed of two items per construct which were asked three times per day over eight days. **Results.** The state measures of self-compassion and cognitive fusion are significantly negatively associated. Next, the study demonstrated a moderate convergent validity for both constructs with their respective trait measures. Finally, the results showed no difference in the negative within- and between-person association of self-compassion and cognitive fusion. **Conclusion.** This study confirmed the negative association between trait self-compassion and trait cognitive fusion and demonstrated no difference between the state-like and trait-like measures of self-compassion. This could be used to

design interventions aiming to rise trait level of self-compassion while looking both on a group and individual level.

Introduction

In the past years, self-compassion gained attention as a construct which is linked to lower levels of anxiety, depression and stress symptoms (Neff et al., 2007; Zeller et al., 2015). Self-compassion is defined as an ability to hold and be open towards one's suffering, not to disconnect or avoid it. It has been shown that this facilitates resilience of people through moderation of their reaction to negative experiences (Leary et al., 2007; Smith, 2015).

In some cases, people have private adverse experiences (e.g. thoughts, emotions, bodily sensations, etc.) for which they want to change the frequency or form of these events (i.e. experiential avoidance; Hayes et al., 1996). In these cases, people who are not self-compassionate have excessive fusion with thoughts which results in experiential avoidance strategies such as rumination and suppression that are central to several mental health problems (Gold & Wegner, 1995; Hayes et al., 1996; Szasz, 2009). That said, self-compassion was shown to have a protective effect on them which in turn could prevent from developing depression and anxiety (MacBeth & Gumley, 2012; Kristin Neff, 2003a). Acceptance and commitment therapy (i.e. ACT) is an example of therapy which was shown to be suited for tackling this processes while integrating self-compassion in it due to the consistency of key elements and the conceptualization of self-compassion itself (Hayes et al., 1996; Neff & Tirch, 2013; Kristin Neff, 2003a). Specifically, one of the processes the ACT targets is *cognitive fusion* (i.e. the process by which people perceive the literal meaning of their thoughts instead of seeing them as transitional internal experiences; Greco, Lambert, & Baer, 2008; Hayes et al., 2002) which, as mentioned before, is a prerequisite of experiential avoidance (Ciarrochi, Bilich, & Godsell, 2010; Hayes et al., 1996; Hayes et al., 2002). A number of these studies indicate that self-compassion can be used to lessen cognitive fusion but

still research on these concepts is limited (Gillanders et al., 2015). It was seen that the average difference between people (i.e. between-person level) was indicative of a negative association on a trait level (Carvalho et al., 2019). However, since both constructs are emotional experiences, they reflect individual affective *states* which are variable across time (i.e. within-person level). Their association in daily life is unclear due to these individual fluctuations from one time to another. In other words, we know their relation at a between-person level but the same inference cannot be made on a within-person level (Curran & Bauer, 2011). It could be that, if the trait level of self-compassion is strongly negative associated with state level of cognitive fusion, then people high on self-compassion are protected from cognitive fusion. This can then mean that on the state level, self-compassion is positively associated with the state level of cognitive fusion. This would be explained by the fact that people who are entangled with their internal events can mediate it by being more self-compassionate at the moments they need it the most (e.g. when they start to ruminate). The reason for this might be that people who have high trait self-compassion could generate it on a state level when they notice that they are entangled with their internal experiences. Still this type of association is speculative. Therefore, this study aims to examine this idea and to see whether the association of state self-compassion and cognitive fusion is negative, comparable to their trait association, or indeed they have a positive relation.

Self-compassion

Negative experiences such as losses, mistakes and failures might have physical, psychological and emotional consequences. Self-compassion can be used during such events to alleviate suffering. Neff (2003) introduced self-compassion as the way the individual does not look in a judgmental way towards their suffering but with an understanding and an acknowledgement of such experiences as a part of the larger human experience. Neff (2003a) postulates that self-

compassion constitutes three positive components (a) *self-kindness* (i.e. being kind and understanding towards oneself, rather than being judgmental and self-critical), (b) *common humanity* (i.e. perceiving one's experiences as a part of the larger human experience rather than thinking of them as separated and isolated), and (c) *mindfulness* (i.e. being present and aware of one's painful thoughts, experiences and feelings without over-identifying with them).

Numerous studies have showed the positive benefits of self-compassion. People who are self-compassionate have better psychological flexibility, emotional and psychological well-being than people who are not (Marshall & Brockman, 2016; Neff et al., 2007). This positive self-attitude helps people in times of unpleasant self-relevant events and protects against the consequences of self-judgment, isolation, and over-identification (i.e. depression, anxiety and stress; Neff, 2003a; Neff et al., 2007; Leary et al., 2007; Zhang et al., 2016; Carvalho et al., 2019). As a result, different interventions were developed to increase the levels of self-compassion which were tested in a laboratory setting and showed positive results (Barnard & Curry, 2011). For example, the study of Dreisoerner and colleagues (2020) used compassionate writing to increase trait levels of self-compassion. This suggests that people who are high on self-compassion tend to look towards themselves in a kind and balanced way, accepting their internal struggles consistently over time. At the same time, Breines and Chen's (2013) study showed that activating support-giving schemas successfully raises state levels of self-compassion. In their first experiment they showed that people who recalled a time when they helped a friend, reported higher state levels of self-compassion in regard to a personal adverse experience than the people in control condition. This indicated that by following strategies such as recall, someone can generate self-compassion in the moment which in turn can protect against the cognitive consequences of negative events (i.e. state; Neff et al., 2007). Both interventions demonstrated that self-compassion can be increased on a trait and a state level but in both cases, it remains unclear which level would be more beneficial to target. That brings

the question, if the target of interventions should be to increase the state or the trait level of self-compassion.

Cognitive fusion

As mentioned before, cognitive fusion is the degree to which a person is entangled with their thoughts, emotions and private experiences and it is characterised by considering these internal experiences as an absolute truth instead of seeing them as a transitional events and subjective experiences (Hayes, Strosahl, & Wilson, 2012). This can lead to efforts for control over these experiences and avoiding them, which can result in different mental health problems (e.g. anxiety and depressive symptoms; Greco et al., 2008; Dinis, Carvalho, Pinto Gouveia, & Estanqueiro, 2015). For instance, the thought "this will never end" is a momentary difficulty that eventually will pass but it is perceived as a certain future (i.e. cognitive fusion). This motivates people to neglect their life goals and primarily focus on relieving their pain. This can lead to avoidance strategies (e.g. rumination, suppression, worry, etc.) which short-term effect negatively reinforces their continues use and in turn can be the basis of some mental health problems (Hayes et al., 1996). The research on for this construct in daily life is limited. Although, in one daily life study Berghoff, Ritzert and Forsyth (2018) found that experiential avoidance may reinforce future cognitive fusion, providing first evidence for a potential causality in this relationship. This is in line with the previous research indicating that when people want to avoid something, they get fused with their negative experience and then they resort to avoidance strategies which leads to psychological disorders. That said, it might be valuable to look at the association of self-compassion, which acts as a buffer against these strategies, together with cognitive fusion, which plays a role in their emergence.

Self-compassion and Cognitive fusion

Self-compassion takes the role of a protector, while cognitive fusion is in the basis of some mental health problems. On one hand, people who are fused with internal events might resort to avoiding strategies such as rumination and ultimately lead to issues such as depression (Hayes et al., 1996). On the other hand, self-compassion was shown to buffer against the use of such strategies and ultimately protects against issues such as depression (Neff, 2003a; Odou & Brinker, 2014). This depicts how self-compassion protects from the consequences of cognitive fusion (Gillanders et al., 2015). At the same time, Carvalho et al. (2019) suggests that depressive symptoms caused by pain intensity are influenced by the degree people are entangled with their physical and mental experiences, instead of perceiving them as transient events. This association which is mediated by fusion, is moderated by self-compassion where people who respond with warmth and understanding towards averse experiences, shortcomings and personal flaws are buffered against entanglement with internal events which could cause depressive symptoms (Gillanders et al., 2015). This indicates that self-compassion not only protects from the negative effects of cognitive fusion but it might protect against it all together.

Despite that many psychological theories focus on within-person processes, they are empirically evaluated with cross-sectional study designs (i.e. a single time point) which provides information on between-person level. It is known that the analysis of such data is not suited for making inferences on within-person level. When such misattributed inferences take place, an ecological fallacy occurs (Curran & Bauer, 2011). All previously mentioned studies have shown a negative association between self-compassion and cognitive fusion but all of them utilize a cross-sectional design which misses the dynamic interaction of these concepts in daily life (Gillanders et al., 2015). Although, there is a negative association on a trait level, the same cannot be inferred

the same for the state level because people who are self-compassionate might generate it in the moment when they need it the most. In that case, the association between the state level self-compassion and cognitive fusion would be positive in contrast with their negative association on trait level. Such an outcome could motivate the design of interventions which focus on making people more self-compassionate on a state level. Particularly, they could be taught different self-compassionate phrases which they can adapt across different context (e.g. stress, worry, depression, etc.) and readily use them as they need them. With the use of ecological momentary assessment, these aspects can be explored and it could expand the literature on self-compassion and cognitive fusion.

This Study

The aim of this study is to establish if there is a positive association between the state of self-compassion and cognitive fusion. The current study examines if the association of self-compassion and cognitive fusion would be positive on a state level in contrast to the negative association reported in previous studies on a trait level (Gillanders et al., 2015). Next, it examines whether the within- or between-person variation of self-compassion would have a stronger association with the state level of cognitive fusion. Finally, this study aims to validate the state measures of self-compassion and cognitive fusion specifically adapted for experience sampling method.

Methods

Participants

The study was consisted of 30 students mainly from the University of Twente (UT) with age ranging from 18 to 35 years old (M_{age}= 22.6, SD_{age}= 38.2, female 50% and male 50%). They were from different nationalities Dutch (43.3%), German (30%), other (26%). Most of the participants were recruited by means of convenience sampling (i.e. researcher's own personal contacts) and through the Test Subject Pool (SONA) system for the Behavioural, Management and Social Sciences (BMS) faculty of UT. The respondents from BMS faculty were rewarded with one SONA credit for completing the study and for participants recruited otherwise, no compensations were offered. The inclusion criteria were to be above the age of 18, to have proficient English skills and have an electronic device which could download and use the application utilized for this study.

Materials

To create and distribute the online survey the *Ethica* platform was used. The questionnaire was part of a larger study on trait-state associations. For this particular study, two traits questionnaires and four experience sampling questions were used. This study is concerned only with the Self-Compassion Scale-Short Form (SCS-SF; see Appendix B) and Cognitive Fusion Questionnaire (CFQ; see Appendix C).

Ethica

Ethica is a flexible and open-access platform which is used to design different types of studies using different sensory data. This platform allows researchers to easily recruit diverse participants, monitor them in real-time, adjust the study as needed, increase its external validity, provides the needed security for the collected data and it is available for Android and iOS devices ("Features," n.d.). Additionally, it provides a desktop version which allows researchers to design studies and to have an overview on the collected data. This study used Ethica version 153 to measure the dynamic interaction of cognitive fusion and self-compassion on day-to-day basis. Particularly, it was possible to schedule at what time to make the questionnaires available to be filled in and when to notify the participants that they are available.

Trait questionnaires

SCS-SF. Trait self-compassion was measured with the 12 items short form questionnaire of self-compassion (Raes et al., 2011). Participants needed to rate the statements about how they act towards themselves during difficult times on a 5-point Likert scale (1=*almost never*; 5=*almost always*). This scale measures six facets of self-compassion: *self-kindness* (e.g. "I try to be understanding and patient towards those aspects of my personality I don't like."), *self-judgement* (e.g. ". I'm disapproving and judgmental about my own flaws and inadequacies."), *common humanity* (e.g. "I try to see my failings as part of the human condition."), *isolation* (e.g. "When I'm feeling down, I tend to feel like most other people are probably happier than I am."), *mindfulness* (e.g." When something painful happens I try to take a balanced view of the situation.") and *over-identification* (e.g. "When I fail at something important to me I become consumed by feelings of inadequacy). The negative facets self-judgement, isolation and over-identification are reverse

scored. The composite scores indicate the level of self-compassion where higher scores indicate higher levels of self-compassion. The scale is factorially validated, correlation between the composite scores of the short and long form of the questionnaires is $r = .97$ and internal consistency of α=.86 (Raes et al., 2011). The validity and reliability of this scale for the current study will be shown in the result.

CFQ. The degree to which people were fused with their thoughts and beliefs was measured with the Cognitive Fusion Questionnaire comprised of seven items. Participants needed to indicate how true the statements were on a 7-point Likert scale (1=*never true;* 7=*always true*). Higher score indicates higher fusion with thoughts. An example item of this scale is *"My thoughts cause me distress or emotional pain"*.The scale demonstrates good construct and incremental validity, good test-retest reliability *r=.80* and internal consistency in a range of mental health, occupational, students and community samples with Cronbach's α ranging from .88 to .93 (Gillanders et al., 2014).

The reliability of both scales for the current study will be presented in the results.

State Questionnaire

The daily questionnaire for the current study can be found in Appendix D. Additionally, the questions from the larger study can be found there as well. Furthermore, the reliability and validity of all items for the current study will be discussed in the "Results" section.

State Self-Compassion. To measure the state level of self-compassion, two items were adapted from the corresponding trait questionnaire. The participants needed to indicate the extent to which they agree with the given statements on a 5-point Likert scale (1=*strongly disagree;* 5=*strongly agree).* They were adapted from the *self-kindness* (e.g. "Right now, I am giving myself the caring and tenderness I need towards my negative feelings.") and *common humanity* (e.g. "Any

feelings of inadequacy I experience right now, are shared by most people.") sub-scale. There are several reasons to choose these two facets over the rest even though the composite scores indicate the level of self-compassion (Neff, 2003b). First, a couple of studies suggest that the SCS might measure two different constructs (i.e. self-compassion and self-coldness), consequently the sub-scales measuring self-compassion were adopted (i.e. self-kindness, common humanity and mindfulness; Brenner et al., 2017; López et al., 2015). Next, the component mindfulness was excluded since it is already known that it promotes mental health and the other components of self-compassion (Hofmann et al., 2010; Dreisoerner et al., 2020). Additionally, there are combination of interventions using one for mindfulness and another for self-compassion. Rather, it is interesting to see how common humanity and self-kindness are related to self-compassion. Another reason is that the conceptualization of self-kindness and common humanity overlap with self-compassion.

State Cognitive Fusion. The state level of cognitive fusion was measured with two items adapted from the corresponding trait questionnaire with factor loadings of .652 and .733 (Gillanders et al., 2014). Participants, indicated the extent to which they agree with the given statements on a 5-point Likert scale. An example item is "Currently, I don't feel entangled in my thoughts." which was negatively coded to tackle acquiescence bias.

Design & Procedure

A longitudinal correlational survey design by means of experience sampling method (ESM) was employed. The study was approved by the BMS Ethics committee of UT (Nr. 200382). The research took place over the period of eight days. Before the beginning, a two-day pilot study was deployed with three participants. In the beginning of the study, the respondents were instructed to download the *Ethica* application, to join this study by filling in the code and allow their

notifications. It was outlined the importance for enabling the notification functions and if they found it as difficult, they were provided with a link towards *dontkillmyapp.com* with guidelines for different brands. On the first day they needed to read the general information about the study, give their consent to participate, which they could withdraw at any giving time (see Appendix A), and to fill in the trait questionnaires of self-compassion and cognitive fusion. Here, it should be noted that due to technical difficulties, in the beginning of the study, the participants were prompt to do the trait questionnaires and to give their consent on the second day instead on the first day. A week after the start of the study, this issue was fixed and they received the consent form and trait questionnaires on the first day. Additionally, they were instructed to contact the researchers if they had any questions or problems with the study. The trait questionnaires had seven questions for cognitive fusion and twelve for self-compassion. They were set to be available between 9:00 AM and 11:30 AM on the first day before the state questionnaire with the goal to prevent any possible influences on the trait measures. Afterwards, that was changed to be immediately available once they were registered. They were notified the moment the survey was available, if it was not completed, they received a notification after two and four hours. If they had not responded for the next 24 hours from the time that was available, the questionnaire expired and it was not available to be filled in again. Some participants reported that they received notification to fill in the questionnaire even after it was completed. As a result, the expiration of the survey was changed to seven hours after one week from the start of the study. For the next seven days, they needed to complete the same eight questions which were prompt three times per day with the goal of establishing the dynamic interaction of the above-mentioned concepts through the day. This survey was scheduled to be randomly available to respondents in the morning (between 9:00 AM and 10:30 AM), the afternoon (between 14:00 PM and 15:30 PM) and the evening (between 20:00 PM and 21:30 PM). They were notified the moment the survey was available, if it was not completed,

they received a notification after 15, 30 and 45 minutes. If the participants had not responded for the next 90 minutes from the time that was available, the questionnaire expired and it was not available to be filled in again. Answering every question was mandatory and participants could not proceed to the next without providing a response.

Date Analysis

IBM SPSS Statistics (version 26) was used to analyse the data. First, the data was exported from Ethica and the data was prepared for statistical analysis through Rstudio. Descriptive statistics were run to calculate demographic data (i.e. age, gender and nationality), the mean, the standard deviation and the skewness of the self-compassion and the cognitive fusion scores from the trait questionnaires. Afterwards, a histogram was employed to further confirm the normal distribution of the data.

Similarly to other studies, , it was decided to exclude from the analysis participants with lower than 50% response rate (Conner & Lehman, 2012, p.101), The two constructs which were investigated on the state level, had two questions each. In order to derive a single state measurement for each construct, the means of the two questions per construct were calculated.

In order to analyse on a state and a trait level these constructs and allow for between-person analysis, the average person mean (PM) over all timepoints was calculated. Furthermore, to be able to conduct within-person analysis, the state scores for self-compassion and cognitive fusion were subtracted from their respective PM score to calculate the person mean-centered score (PMC) for each participant.

To evaluate the internal consistency of the SCS-SF and the CFQ in the current sample, Cronbach's alpha was calculated with $\alpha > 0.9$ being considered excellent, $\alpha > 0.8$ being good, $\alpha > 0.7$ being acceptable, $\alpha > 0.6$ being questionable, and $\alpha < 0.6$ being unacceptable. Additionally, to examine the validity of the current study state items for, a Pearson correlation analysis was used between a) state self-compassion (PM) and the SCS-SF, b) state cognitive fusion (PM) and CFQ with interpretation of correlation coefficient as follows: $r > 0.5$ suggesting a strong correlation, $r > 0.3$ a moderate correlation, and $r > 0.1$ a weak correlation. Additionally, in order to assess the reliability of the current state measures, all time points were split in two halves. The first half comprise of the first half of the time points and the second half of the remaining time points, as it was done by Csikszentmihalyi and Larson (2014). Then a split-half correlation was conducted.

To see the relationship between a) trait self-compassion and trait cognitive fusion, b) trait self-compassion and state self-compassion (PM) and c) trait cognitive fusion and state cognitive fusion (PM), Pearson correlation was utilized. Furthermore, a linear model was used to explore the association between state self-compassion (PM) and state cognitive fusion (PM). Next, an autoregressive Linear Mixed Model (i.e. LMM) was chosen to conduct the analysis of the current study because the collected data is from a sample of students with multiple responses which might be similar to each other and as a result it could violate the independence assumption. The LMM can estimate the variations at different levels of nested data by aggregating it in a between- and within-person level which aids in reaching independence and gives the possibility to see effects which might not be seen otherwise while looking at the set as a whole even if there are missing values (Palmier-Claus et al., 2011). A LMM was used to understand what is the association between self-compassion and cognitive fusion and whether is more state-like (within-person) or

trait-like (between-person). The variables in this model were standardized in order to aid in interpreting the within and between person parameter estimates.

Results

Descriptive Statistics

Overall, 43 participants signed up for this study, from which 13 were excluded due to low response rate (i.e. below 50%) and their data was deleted. This study had on average 76.94% response rate. In Table 1, an overview of the mean, standard deviations, minimum and maximum score, accompanied by the scale's minimum and maximum score, of the trait questionnaires of can be found. Both questionnaires had a normal distribution, although self-compassion had a slight negative skewness. The SCS-SF showed an acceptable internal consistency with Cronbach's Alpha of *.79* and the CFQ showed a good internal consistency with Cronbach's Alpha of *.89.*

A bivariate correlation analysis between the trait questionnaires was performed in order to confirm the association of self-compassion and cognitive fusion from previous studies in the current sample. The analysis showed a significant strong negative correlation between the constructs (r=-.610, $p<0.001$) indicating that people who score high on trait self-compassion tend to score low on trait cognitive fusion. Furthermore, a correlation analysis between the trait self-compassion (SCS-SF) and state self-compassion (PM) demonstrated significant moderate correlation ($r=.428$, $p<0.001$) indicating that people who score high on a trait level score high on the average state level as well. Moreover, another correlation analysis for cognitive fusion between trait level (CFQ) and state level (PM) showed significant moderate correlation ($r=.318$, $p<0.001$) indicating that people who score high on a trait level for cognitive fusion score high on a mean

state level as well. Moreover, the reliability of the state measure for self-compassion first and second half showed significant positive correlation (r=*.86*, p=*0.001*). For the first and second half of cognitive fusion, the result showed significant positive correlation (r=*.67*, p=*0.01)*

Table 1

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

Variables	Minimum (scale minimum)	Maximum (scale maximum)		
			M	SD
SCS-SF	24 (12)	52 (60)	38.86	7.30
CFQ	10 (7)	43 (49)	28.30	8.39
Self-compassion (PM)	2.46 (1)	4.45 (5)	3.44	.47
Cognitive fusion (PM)	1.36 (1)	3.29 (5)	2.32	.47

Note. The table shows the scores of trait self-compassion (SCS-SF) and trait cognitive fusion (CFQ). The averaged across all time points person mean (PM) scores of the state questionnaire for self-compassion and cognitive fusion are shown as well.

Linear Models

First, a linear model between state levels of self-compassion (PM) and cognitive fusion (PM) was used in order to investigate their association. The results showed that state self-compassion was significantly negatively associated with state average cognitive fusion over time (βpm = *-.47, SE= .05, p<0.001).* In the sense that when people scored on average high on state

self-compassion, they scored low on cognitive fusion. Second, a linear mixed model used the standardized score of state cognitive fusion as a dependent variable and state self-compassion between- and within-person as independent fixed variable (i.e. PM and PMC respectively). The results demonstrated that state cognitive fusion had a weak negative association with the between-person (i.e. PM, Trait-Like) and the within-person (i.e. PMC State-Like) estimates *(β_{PM} = -.22, SE= .05, p<0.001; β_{PMC} = -.29, SE= .04, p<0.001).* Furthermore, the overlap of between- and within-person 95% confidence interval [-0.32,-0.11] and [-0.36,-0.22] respectively indicate that the weak association is not significantly different between the two estimates.

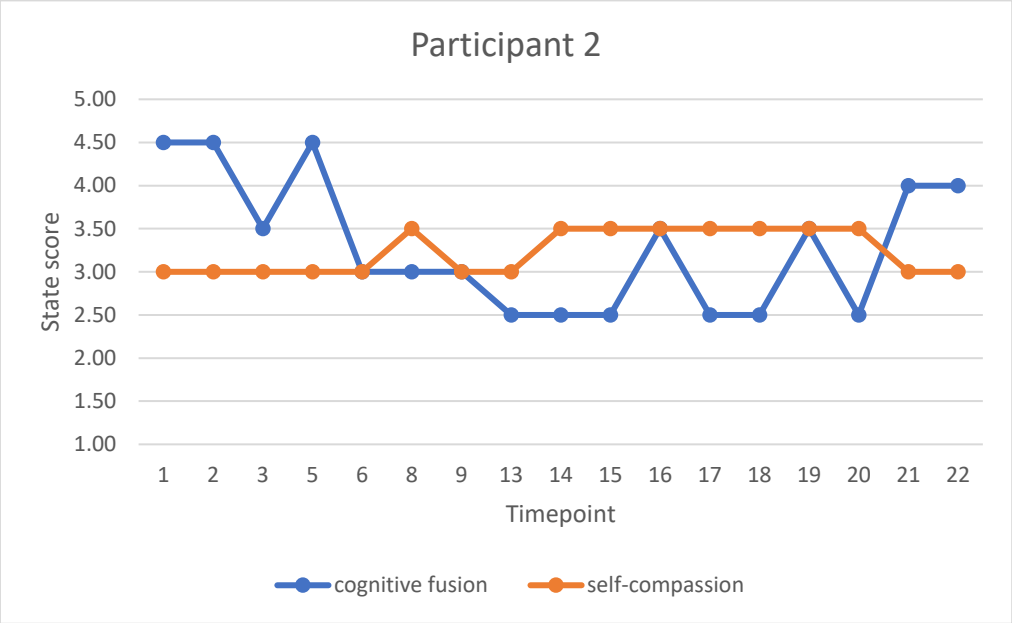
Individual graphs

For the purpose of exploring the daily fluctuation of state self-compassion and cognitive fusion, several participants were chosen and individual graphs were generated. These graphs show the variation of self-compassion of participants with low, average and high cognitive fusion. As well, the chosen participants were selected based on the least missing time points with the goal of demonstrating more comprehensive graphs for their fluctuations over time.

The first example, has the highest state level of cognitive fusion (3.29) and average state level of self-compassion (3.24) among all participants (figure 1). The pattern of cognitive fusion starts high but towards the end of the study, it becomes lower in comparison to self-compassion. Moreover, the line of self-compassion is more stable over time showing spikes in moments when the scores of cognitive fusion gets lower which demonstrates a negative relationship over time.

Figure 1

Daily scores for state self-compassion and high state of cognitive fusion per measurement point.



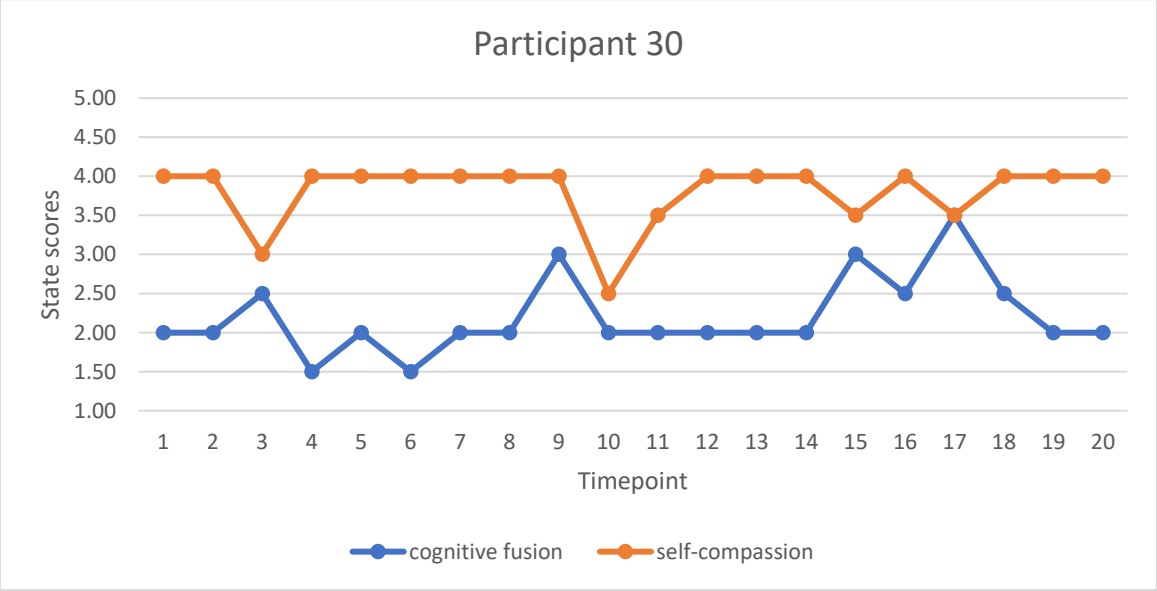
Note. The graph does not include timepoints which the participant missed to fill out. Particularly, timepoint 4, 7, 10, 11 and 12.

Another example, Figure 2 shows average fluctuations during the course of the study with state score for cognitive fusion of 2.20 and self-compassion of 3.80. Similarly, to the other participants the graph demonstrates a negative association. This participant has on average higher

state scores of self-compassion than states score of cognitive fusion and in moments when there is a spike in cognitive fusion, there is a decline of self-compassion. Once self-compassion goes up, cognitive fusion goes down or becomes stable (e.g. time point 11).

Figure 2

Daily scores for state self-compassion and medium state of cognitive fusion per measurement point

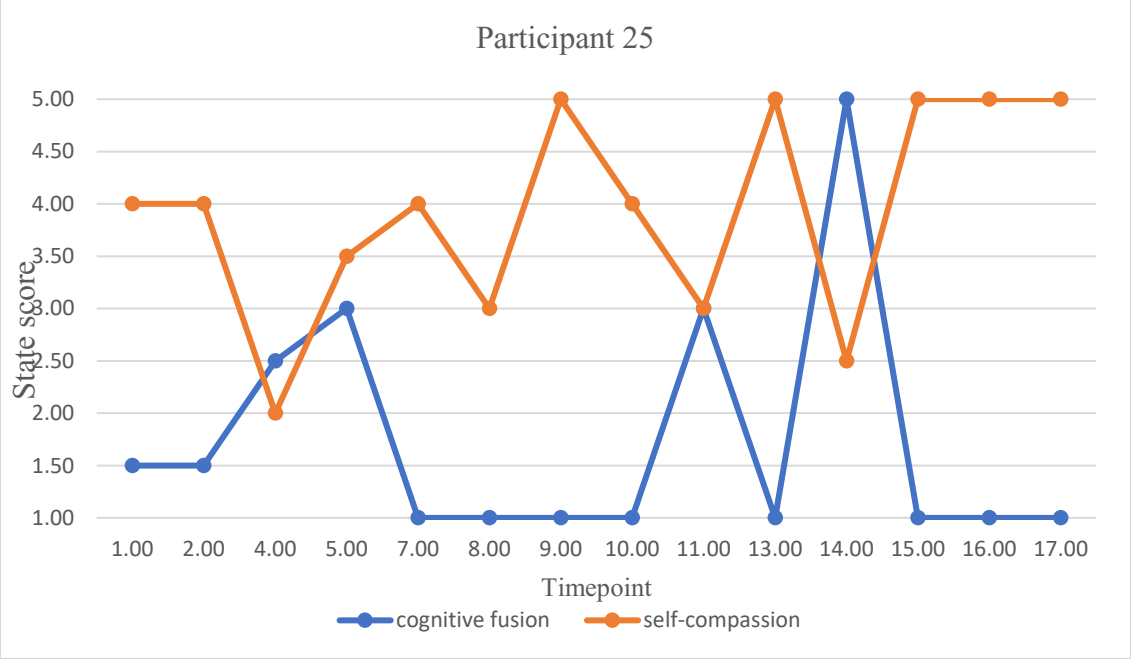


The final example shows low levels of cognitive fusion (1.75) and self-compassion (3.93; Figure 3). Although, on the graph it can be notice that the participant has low state level of cognitive fusion, at couple of measurement points it fluctuated greatly. Similar to the other example, it can

be seen that in moments when self-compassion decline, there is an increase in cognitive fusion. This affirms the negative association between self-compassion and cognitive fusion.

Figure 3

Daily scores for state self-compassion and low state of cognitive fusion per measurement point



Note. The graph does not include timepoints which the participant missed to fill out. Particularly, timepoint 3, 6 and 12.

Discussion

The aim of the current study was to establish if state self-compassion would have a positive association with state cognitive fusion. Next, it was examined if self-compassion and cognitive fusion would have a stronger trait-like or state-like association. Additionally, the convergent validity of the state measures was investigated. To start, a correlation between the trait measures of self-compassion and cognitive fusion was performed in order to confirm their negative correlation as reported in earlier (Gillanders et al., 2015). The analysis confirmed a strong negative correlation between the constructs. To answer the first research question, this study examined whether there is a positive association between the state levels of self-compassion and cognitive fusion. The results refuted the expected positive association and demonstrated a weak negative association contrary to the posit hypothesis. Next, it was explored if the state estimates of self-compassion (between- or within-person) would have stronger negative association with cognitive fusion. The results showed, that the values were not significantly different from each other. This would mean that there is no difference in self-compassion within-individual and between-individuals when people are experiencing cognitive fusion. Furthermore, for the purpose of investigating the convergent validity of the state measures, a correlation between the state and the trait measure was performed. The study demonstrated a moderate correlation between the state and the trait measures of both self-compassion and cognitive fusion. Overall, the results showed negative state association. Additionally, in the individual graphs, the moments when self-compassion declined, cognitive fusion rose. A tentative interpretation of these results is that if people have higher level of self-compassion, in moments when it declines, they become more susceptible to fuse with their internal experiences.

Interpretation of the results

The negative associations between self-compassion and cognitive fusion were in line with previous studies. From both theoretical (Neff & Tirch, 2013) and empirical (Gillanders et al., 2015) perspective it was expected to have a negative association between the constructs. From theoretical perspective, as Neff (2003) defines self-compassion as consisted of self-kindness, common humanity and mindfulness. Combining these three components a person adopts a self-compassionate state of mind which is not judgmental of personal adverse experiences and accepts them as part of the human nature without over-identifying with them. From that perspective, it can be expected that people who are not over-identifying with their adverse internal experiences and accepts them would not get fused with their negative thoughts. An interpretation of this finding is that people who have higher level of self-compassion would experience to a lesser extent cognitive fusion. That way they do not get entangled in their internal events in comparison to people who have lower level of self-compassion which in turn breaks the link from cognitive fusion to suppressing and ruminating and as a result their could protected from potential development of mental health problems. Self-compassionate people acknowledge their strengths and weakness which helps them accept the reality of not being perfect human being who should not experience suffering and in turn are worthy of being compassionate towards themselves. From empirical perspective, Gillanders et al. (2015) shows that self-compassion moderates the relationship between illness threat and cognitive fusion. Indicating that self-compassionate people who encounter an adversity are buffered of the negative effects of cognitive fusion. This would mean that people have a self-compassionate mind set which prevents them on over-identifying with their struggle and accept their struggle. The hypothesis which state that people who are self-compassionate on a trait level, would demonstrate a positive association with cognitive fusion on

a state level was refuted. As the previous studies indicated, people who have higher levels of trait self-compassion might not be susceptible to fusing with internal events as people who have lower levels. The reason for this might be that self-compassionate people have positive attitude towards themselves and as a result they do not have to engage in generation of self-compassion in the moment to alleviate fusion with their internal experiences. Rather, they have a stable level of self-compassion due to their psychological resilience which could prevent from the negative effects of cognitive fusion (Smith, 2015). This could explain as well the fluctuations in the individual graphs as well. In moments, when there was a lapse of self-compassion, in almost all cases there was an increase of cognitive fusion. At the moment in which self-compassion rose, cognitive fusion declined. This could mean that people who are more self-compassionate are less susceptible to fusion with their experiences and in the moment, when they fail to have a positive self-attitude, they become more susceptible to fusion.

This type of association was expected from empirical and theoretical perspective, another important question lies in whether the negative association of self-compassion on a state-like or a trait-like level is stronger with the state level of cognitive fusion. So far, there are no studies examining that. This will help with informing on what level the interventions should focus on in order to prevent fusing with internal events and possibly prevent the development of some mental health problems. Although, it should be noted that this is a tentative interpretation since the association for both within- and between-person is weak and there is no significant difference. On the one hand, Gillanders et al. (2015) indicated that it could be beneficial to raise the trait level of self-compassion as a buffer of the negative consequences of cognitive fusion. On the other hand, Breines and Chen (2013) indicated that it might be beneficial to raise the state level of self-compassion to cope with negative experiences by means of support-giving schemas. Nevertheless,

in the study of Smeets and collegues (2014) they used an intervention to heighten participant's self-compassion where they used three exercises, one of which was to design three personalised self-compassion phrases for each component of the construct and to adapt them across different difficult situations which they encounter in daily life. Even though it is a tentative interpretation, the results of this state level intervention were similar to trait level one where their levels of rumination and other maladaptive cognitive process were reduced. The results of the current study are concurrent with the results of the later study.

Finally, the overall finding supports the moderate validity of the state measures for cognitive fusion and self-compassion. Furthermore, the test-retest reliability where the time points were split in two halves showed that the two averaged score of the first and second part of the week strong correlation. This shows that these items successfully measure cognitive fusion and self-compassion over time (Csikszentmihalyi & Larson, 2014).

Limitations and Future Directions

Earlier this year, Neff and colleagues (2020) submitted for publication a state measure for self-compassion which could measure this construct better.

The association between self-compassion and cognitive fusion on a state level was moderate, while in other studies was strong. There might be two reasons for that. First, the state measure of self-compassion involved only two components with one question per component. It is questionable if this state measure can fully capture the overall level of self-compassion since Neff (2003b) conceptualized self-compassion based on three components, emphasizing the importance of common humanity and mindfulness in it. For cognitive fusion, a better state measure could be more representative of the construct. Second, the study was conducted over eight days, this is a short period in which people might not have many adverse experiences which could affect the

results. Particularly, type II error where participants does not experience adverse experience, thus they have lower level of cognitive fusion. Rather, it would be beneficial to know their level of cognitive fusion after such experiences. It is possible that the current study has missed an important element for the interpretation of the association of self-compassion and cognitive fusion due to the lack of this information. That could be seen in the individual cases in which a causality could not be established due to the lack of situational context. The state questions were designed to represent in the best possible way the definition of these constructs. It might be that two questions are not enough to fully measure the constructs. Particularly, this holds true for self-compassion since it is measured by in combination with several additional components which were not included in the current study due to the amount of questions participants would have answered per prompt. This happened after the start of the data collection; therefore, it was not feasible to contact them and request to use the instrument. Therefore, the first future recommendation is to utilize suitable state measures of this construct, for example, Neff and colleagues (2020) recently submitted a publication for a state measure of self-compassion. The second recommendation is to conduct the study for a longer period of time in order to ensure that people will encounter events which might lead to cognitive fusion, if they are susceptible to it. The third recommendation is to include questions involved with the situational context of participants in order to fully take advantage of the ESM.

Moreover, another limitation of this study is the lack of situational context, cultural and individual values. It can be beneficial to ask participants if there was some type of adverse experience which occurred in the past couple of hours. Subsequently, this can be connected with their cultural and individual values as it can give an insight how people can benefit from the buffering effects of self-compassion across different situations, while taking into consideration their individuality. Hence, the fourth future recommendation is to add state questions involved with

situational context and trait questionnaire to assess their values. The third limitation of this study concerns the generalizability of the results. The participants of the study were only students which exclude people who do not have a higher education. Thus, a future study could add in their investigation representative number of people from diverse culture and education levels to increase the generalizability of the results.

Lastly, due to technical issues, some people received more prompts to fill in the questionnaire which could have given four measure points for some days, consequently the results might be questionable. Others reported that they received less prompts to fill in the questionnaires, additionally reducing the response rate which could lead to underestimating the results. Moreover, participants were deleted from the study which resulted into the deletion of their data as well. This prevents us of gaining the added value from the missing data. Therefore, the current study could be replicated in order to check if the results are reliable.

In spite of the above-mentioned limitation, it is important to mention that one of the prominent strengths of this study is the utilization of ESM. With this method we were able to capture the fluctuation of self-compassion and cognitive fusion on state level within- and between-person.

Conclusively, the current study replicated the negative association between self-compassion and cognitive fusion. The results showed moderate convergent validity for the state measures of these constructs. Additionally, the study indicated that there is no difference between the negative within- and between-person association of self-compassion and cognitive fusion. This study was the first to examine the within- and between association of self-compassion and cognitive fusion. Until now, inferences for within-person were made based on between-person data. This result indicate that it could be beneficial when designing interventions which target self-

compassion, to focus on the trait level while they tailor it to not only to the specific group but to each individual as well.

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Appendix A: Consent form

Your participation in this study is completely voluntary and all your responses are treated anonymously. None of the responses will be connected to identifying information and wouldn't be shared with third parties. Data will only be used for statistical analyses. However, you can withdraw from the study at any time! By simply stopping answering the daily questions without the need to give any reasons.

If you would like to have further information about the research, now or in the future, feel free to contact Dimitar Seykov or Arya Arjomand at:

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

Appendix B: Self-Compassion Scale - Short Form (Raes et al., 2011)

** Items with reverse 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 C: Cognitive Fusion Questionnaire (Gillanders et al., 2014)

1. My thoughts cause me distress or emotional pain.
2. I get so caught up in my thoughts that I am unable to do the things that I most want to do
3. I over-analyse situations to the point where it's unhelpful to me
4. I struggle with my thoughts.
5. I get upset with myself for having certain thoughts.
6. I tend to get very entangled in my thoughts
7. It's such a struggle to let go of upsetting thoughts even when I know that letting go would be helpful

Appendix D: Daily Questionnaire

1. Currently, I don't feel entangled in my thoughts.
2. At the moment, I feel determined to stick to my current task until it's complete.
3. Any feelings of inadequacy I experience right now, are shared by most people.
4. Right now, I don't feel confident in my ability to effectively accomplish my current task.
5. Right now, I am giving myself the caring and tenderness I need towards my negative feelings.
6. Right now, I believe I can succeed in my current task, if I set my mind to it.
7. I am currently struggling with my thoughts.
8. At the moment, I don't feel committed to my current task as much as I should.