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Clarifying the Relationship Between Self-Compassion and Mindfulness: An Ecological Momentary Assessment Study

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Abstract

Objectives: Self-compassion entails relating to one's negative experiences with awareness, acceptance, and kindness, and it is associated with greater well-being. The Self-Compassion Scale (SCS) includes mindfulness, which is theorized as a necessary precursor to a self-compassionate response. The present study examined associations of the SCS and its subscales with mindfulness and decentering at baseline and in daily life to clarify the measure's construct validity. We also tested whether self-compassion moderates the association between mindfulness and eudaimonic well-being in daily life during occasions of increased negative affect.

Method: The sample of 172 community adults completed the SCS at baseline and a 7-day ecological momentary assessment. The SCS's construct validity was tested with multilevel correlations and regressions. We tested the interaction of momentary mindfulness, momentary negative affect, and dispositional self-compassion in predicting momentary well-being.

Results: Results generally supported the construct validity of the SCS, but SCS mindfulness subscales were most closely associated with decentering scales in daily life. Higher dispositional self-compassion, higher momentary mindful awareness, and lower momentary negative affect predicted higher momentary eudaimonic well-being. However, self-compassion did not interact with momentary mindful awareness and negative affect.

Conclusions: The SCS generally related to measures of mindfulness and decentering as expected, but further work should be done to clarify subscale construct validity. Self-compassion

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Author Contributions

KB: assisted with the execution of the study and data collection, analyzed the data, and drafted the manuscript. KN-G: designed and executed the study, assisted with the data analyses, and provided critical revisions. All authors approved the final version of the manuscript for submission.

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Informed Consent: Informed consent was obtained from all participants in the study.

Compliance with Ethical Standards

This research was approved by the institutional review board committee at the University at Buffalo, the State University of New York and therefore was performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. All subjects provided informed consent prior to participating in the study. The authors declare no conflict of interest and have no relevant financial or non-financial interests to disclose.

was predictive of higher momentary eudaimonic well-being in people's daily lives, supportive of ecological validity, but trait levels of self-compassion did not affect the relationship between momentary mindfulness and eudaimonic well-being.

Keywords

self-compassion; mindfulness; well-being, decentering; ecological momentary assessment

Self-compassion is a particular way of relating to oneself when faced with suffering, characterized by an accepting and kind awareness of one's negative feelings (Neff, 2003a, 2003b). As such, it has been associated with numerous adaptive outcomes, including greater well-being and healthy psychological functioning (Neff et al., 2007, 2018), and compassion-based interventions have been associated with increases in self-compassion alongside increases in well-being, among other positive outcomes (Kirby et al., 2017). The widely-used Self-Compassion Scale (SCS; Neff, 2003a, 2003b) conceptualizes the construct as including six components that assess several positive and negative poles of self-compassion (i.e., compassionate and uncompassionate self-responding), with the mindfulness component theorized to be a precursor to other components. Arguably, being mindfully aware of current negative emotions without being overwhelmed by or avoidant of them is indispensable to having the perspective to be self-compassionate. Neff (2003a) noted that "self-compassion requires mindful awareness of one's emotions (Bennett-Goleman, 2001; Kabat-Zinn, 1994; Kornfield, 1993; Salzberg, 1997), so that painful or distressing feelings are not avoided but are instead approached with kindness, understanding, and a sense of shared humanity" (p. 92). This seems to imply a stepwise process, whereby mindfulness is required for the application of other aspects of self-compassion. Relatedly, compassion-based interventions (e.g., Compassion Cultivation Training, (Goldin & Jazaieri, 2017); Mindful Self-Compassion, (Neff & Germer, 2013)) often teach mindfulness as a foundational skill prior to teaching other components.

The scoring and use of the SCS, however, does not represent the mindfulness component as a forerunner to the other components, and a lack of clarity on the structure of self-compassion remains. Some authors have argued for a two-factor structure with positive scales on one factor and negative on the other (e.g., Brenner et al., 2017), whereas others found support for a hierarchical six-factor or a bifactor structure across multiple samples (Neff, 2016; Neff et al., 2018). Recent work evaluating the use of the SCS over the last 15 years has advised against using the SCS total score and argued that the inclusion of the negatively-worded subscales (i.e., uncompassionate self-responding) inflates the link between self-compassion and psychopathology (Muris & Otgaar, 2020). However, the author of the SCS and others maintained that the total score is valid (Neff, 2016; Neff et al, 2018), and most research has used the total score as representative of trait levels of self-compassion. Related to the question of construct clarity of the SCS, relatively little work has been done to examine the convergent, discriminant, and predictive validity of individual subscales. Understanding the separate contributions of the individual aspects of self-compassion could inform their individual utility and, given the possible role of mindfulness as a precursor to other components, examining the mindfulness subscales separately is an important extension to understanding self-compassion. Furthermore, while

the association of mindfulness and self-compassion is fairly well-studied, the distinctiveness of the SCS components and their contributions to other mindfulness-related constructs (e.g., decentering) has not yet been studied, to our knowledge.

There is also a need to better understand how and why self-compassion might contribute to a range of positive outcomes, including well-being. A large meta-analysis found that well-being was moderately associated with self-compassion as modeled with a total score (r = .47, 79 studies, n = 16,416), with evidence for a causal association (Zessin et al., 2015). Specifically, experimental manipulations of state self-compassion (i.e., a self-compassionate writing exercise compared to an active control group, with measurement 1 week later) and longitudinal interventions targeting trait self-compassion (compassion-based interventions, with measurement 1 month later) both led to increases in well-being (Zessin et al., 2015). Of note, well-being consists of separable facets of eudaimonic and hedonic well-being (e.g., Ryan & Deci, 2001), and so it is possible that self-compassion may differentially impact these components. Hedonic well-being is a combination of high positive and low negative affect, whereas eudaimonic well-being involves pursuing and realizing personal values and potential in life (regardless of the affective response that arises) (Ryan & Deci, 2001). Although intervention research found that self-compassion increases hedonic well-being (Mantelou & Karakasidou, 2017), self-compassion is theoretically most relevant for eudaimonic well-being as it provides motivation for positive growth and change in the face of negative affective states (Neff, 2003a). Specifically, “having compassion for oneself often entails giving up harmful behaviors to which one is attached, and encouraging oneself to take whatever actions are needed- even if painful or difficult- in order to further one’s well-being.” (Neff 2003a, pp. 88)

Supporting this theory, Zessin et al. (2015) found that self-compassion had a stronger relationship with eudaimonic well-being (or psychological well-being, r = .62, 12 studies, n = 1,586) than with hedonic well-being (or positive affective well-being, r = .39, 32 studies, n = 5779). This work suggests that self-compassion is particularly relevant to eudaimonic well-being, though the specific mechanisms and contextual variables that contribute to their association are not clear. Additionally, this work has not parsed out the unique contributions of individual components of self-compassion, so it is unclear how each piece may engender well-being.

Theory suggests that mindfulness has a uniquely important function in facilitating compassionate responding to suffering and increasing well-being by increasing savoring of positive experiences and positive reappraisal of adversity (Garland et al., 2015). Mindfulness itself is a multidimensional construct, characterized by an accepting present-moment awareness of both internal and external stimuli, and mindfulness has a growing literature base mostly independent of its role in self-compassion (e.g., Chiesa, 2013; Van Dam et al., 2018). Trait mindfulness and self-compassion have been moderately to strongly associated (e.g., total scale rs = .62 in a clinical sample and .77 in a healthy sample: Hoge et al, 2013; total and subscale rs = .32-.69 in an student/community sample: Hollis-Walker & Colosimo, 2011; total and subscale rs = .28-.43 in a clinical trial: Van Dam et al., 2011), and there is cross-sectional evidence for an indirect effect of self-compassion on the relationship between mindfulness and eudaimonic well-being (Hollis-Walker & Colosimo, 2011). In

addition, several cross-sectional studies have found that trait self-compassion accounted for unique incremental variance in positive outcomes. Specifically, after accounting for mindfulness, self-compassion accounted for additional variance in symptom severity and quality of life (Van Dam et al., 2011), psychological health (Woodruff et al., 2014) and negative affect (López et al., 2016). Furthermore, self-compassion and mindfulness together accounted for significantly more variance in trait eudaimonic well-being than did mindfulness alone (Hollis-Walker & Colosimo, 2011). Although these studies demonstrated the incremental utility of trait levels of mindfulness and self-compassion in understanding well-being, to our knowledge no studies to date have tested their interaction or examined them together on a moment-to-moment level. Given the potential role of mindfulness as a precursor to a self-compassionate response, theory suggests that self-compassion can be most fully enacted only in the presence of a current mindful state (Neff, 2003a). As such, it is critical to study the interaction of these variables and to assess momentary levels of mindfulness.

Although it is often measured as a trait, mindfulness is not perfectly stable, but rather is dynamic across time and situations (Hölzel et al., 2011; Shoham et al., 2017, 2018). That is, regardless of one's overall tendency to be mindful, mindful states are variable and contextually-dependent (Brown & Ryan, 2003). These states can be captured in daily life via methods like ecological momentary assessment (EMA) that have additional benefits such as reduced retrospective recall biases and increased ecological validity (Shiffman et al., 2008), relative to retrospective trait measures or lab manipulations/interventions. State mindfulness has been reliably assessed using self-report measures or items (e.g., Tanay & Bernstein, 2013; Shoham et al., 2017), and it was associated with lower levels of momentary perceived stress and indicators of sympathetic nervous system activation (Aguilar-Raab et al., 2021), as well as momentary positive emotional valence (Shoham et al., 2017), among other outcomes.

As operationalized in the SCS, mindfulness specifically refers to mindful awareness of one's negative internal experiences focused on the self. A close examination of the item content of the mindfulness subscales, as well as the original scale development papers (Neff, 2003a, 2003b), suggests that the SCS mindfulness subscales may most specifically tap decentering, which is a narrower facet of mindfulness (Baer et al., 2006). Decentering can be defined as a process of taking a detached perspective on one's own mental experiences (i.e., Teasdale et al., 2002). Research has found differential relationships for momentary mindfulness vs. momentary decentering, such that momentary mindfulness was associated with emotional valence in everyday life whereas decentering was not (Shoham et al., 2017). A recent examination of the construct validity and measurement of decentering found evidence for two related components: observer perspective (OP), and [reduced] struggle with thoughts/feelings (ST/F) (Naragon-Gainey & DeMarree, 2017). Consistent with this observation that the SCS mindfulness scales may not assess mindful awareness specifically, the authors of a recently developed measure of self-compassion (the Sussex-Oxford Compassion Scales; Gu et al., 2017, 2019) noted that the SCS lacks items that assess the attention component of mindfulness. To date, there is an absence of empirical work examining associations of the SCS and its subscales with decentering, so the breadth and specificity of associations are unknown. Clearly labeling these constructs can help us to understand the temporal

dynamics of mindfulness-related constructs in the moment, their interactions, and how they may similarly or differentially impact outcomes.

The current study has two primary aims. First, this study tests the associations of the SCS and its subscales with decentering at baseline and in daily life. We also include associations of the SCS with mindfulness to determine the relative strength and specificity of decentering's associations with the SCS and its subscales, and to examine how self-compassion predicts state mindfulness in daily life. We hypothesized that the SCS mindfulness subscales (i.e., Mindfulness and Overidentification) would have the strongest unique association (relative to the other SCS subscales) with mindfulness in daily life and at baseline. Given our exploratory hypothesis that the mindfulness scales of the SCS may reflect decentering specifically, we hypothesized that the SCS mindfulness scales may have stronger associations with decentering than mindful awareness. Second, the current study examines the interaction of self-compassion and momentary mindful awareness in predicting momentary eudaimonic well-being. This interaction was hypothesized to be strongest on occasions with more intense negative affect, since self-compassion is inherently a response to a negative affective state.

Method

Participants

This study draws from a subsample of a larger project that recruited community participants aged 18 to 65 (N = 379), over-sampled for individuals receiving or seeking mental health treatment. Individuals were excluded from participation if they did not speak English, or had a diagnosis of dementia, a cognitive impairment, or schizophrenia that was not currently controlled with treatment, as this was anticipated to interfere with cognitive tasks (unrelated to the current study). The SCS was added to the study protocol after data collection had begun, so the current study includes 188 participants who enrolled after the SCS was added. Consistent with our preregistration, participants who did not complete at least 30% of the EMA surveys were excluded from analyses (n = 16), leaving a final sample of 172 participants who, on average, completed 83.9% of the EMA reports.

The final sample (N = 172) consisted of 71% women, who were primarily white (73%) with a mean age of 35.10 (SD = 13.67). Fifty-six percent reported they had previous experience with meditation, but of these, 70% reported less than a year of practice. Further demographic characteristics are reported in Table S1. There were no significant differences for those included vs. excluded from analyses on age ($t(186) = -1.51$ $p = .134$), gender, race, ethnicity, or meditation experience (χ^2 test ps > .13).

Current diagnoses were assigned at baseline using a semi-structured interview (i.e., Anxiety and Related Disorders Interview Schedule for *DSM-5*; Brown & Barlow, 2014) administered by a trained clinical psychology graduate student. Slightly more than a third of the sample (40%) met criteria for at least one disorder. The most common diagnosis was Generalized Anxiety Disorder (41%), followed by Social Anxiety Disorder (27%). Prevalence of other individual mood and anxiety disorders was low (i.e., app. 3–6% of the sample per disorder).

About one third (31%) of the sample was currently seeking/receiving treatment, and a similar proportion reported currently taking psychiatric medication (28%).

The aims, measures, and analytic plan for the current study were preregistered and may be found at: https://osf.io/yn4gt. Of note, the preregistration states that analyses would include a measure of momentary meta-awareness but, due to poor construct validity of the item, these were not completed (see an expanded discussion of this in the Supplemental Materials Appendix A).

Procedure

Participants completed an initial email or phone screening to determine eligibility for a 3 to 4-hour baseline appointment, for which they were compensated $50. Following informed consent, individuals completed a measurement of heart rate variability, computerized tasks, and a battery of self-report surveys, followed by a semi-structured clinical interview. Participants were then invited to enroll in the 7-day EMA study and oriented to the questions and procedures.

The 7-day EMA study involved completing brief surveys 6 times a day from a smartphone. Links to Qualtrics surveys were sent through the SurveySignal system (Hofmann & Patel, 2015), beginning within 4 days of the baseline appointment. Surveys were sent a minimum of 60 minutes apart within two-hours blocks from 9am to 9pm, and participants were asked to complete them within 30 minutes of receiving the link and to answer with respect to that timeframe. The 30-minute completion window was intended to maintain randomly sampled occasions throughout the day while also minimizing participant burden. Participants took, on average, 8 minutes to submit the survey from receiving the prompt (SD = 7 minutes), 50% submitted within 5 minutes or less, and 75% of the surveys were submitted in 11 minutes or less. In addition to the variables analyzed in the current study (see "Measures" section), the EMA surveys also assessed several related constructs (i.e., emotion regulation: see Table S2 for a list of all EMA items). Participants were compensated $1.50 for each survey completed within the specified time frame, with an additional $15 bonus if no more than 9 of 42 surveys were missed, for compensation of up to $78. Participants were also entered into a lottery to win one of four iPads, where the odds of winning increased with the number of surveys they completed.

Measures

Self-Compassion.—The SCS (Neff, 2003b), is a 26-item scale with six subscales: Self-Kindness, Common Humanity, Mindfulness, Self-Judgment, Isolation, and Over-Identification. Responses are given on a 5-point scale (1 = “almost never” to 5 = “almost always”). Negative items are reverse coded so that higher scores indicate their absence. Therefore, all subscales are coded in the same direction, such that higher scores indicate more self-compassion. In addition to subscales scores, a total score is calculated as the mean of the subscales. Cronbach alpha’s for the total scale (α = .96) and subscales were strong in a large sample (N = 1355) (Neff et al., 2018), and test-retest reliability was good over a three-week period for the total score (r = .93) and subscales (r = .80-.88) (Neff, 2003b). In

our sample, Cronbach's α = .93 and McDonald's ω = .93 for the total scale and α = .81-.84 and McDonald's ω = .79-85 for the subscales.

Mindfulness.—The Five-Facet Mindfulness Questionnaire (FFMQ: Baer et al., 2006), is a 39-item inventory that assesses multiple facets of mindfulness. In addition to a total scale score, there are five subscales: Observing, Describing, Acting with Awareness, Nonjudging, and Nonreactivity. Responses are on a 5-point scale (1 = "never or very rarely true" to 5 = "very often or always true"). In the current sample, Cronbach's α = .91 and McDonald's ω = .90 for the total scale and α = .80-.92 and McDonald's ω = .80-.92 for the subscales.

Decentering.—Decentering at baseline was assessed with three measures that examine different components of decentering. Two scales assessed the observer perspective (OP) component. The Experiences Questionnaire (EQ; Fresco et al., 2007) is an 11-item measure of decentering answered on a 5-point scale (1 = "never" to 5 = "all the time"). Cronbach's α = .86 and McDonald's ω = .86 for the total scale in this sample. The Toronto Mindfulness Scale-Decentering (TMS-D: Lau et al., 2006), is a 7-item subscale designed to measure an accepting and nonjudgmental observer perspective on one's thoughts. Items were rated on a 5-point scale (1 = "not at all" to 5 = "very much") with Cronbach's α = .75 and McDonald's ω = .75 for the subscale in this sample. For both scales, higher scores indicate higher decentering.

The struggle with thoughts and feelings component (ST/F) was assessed with the Cognitive Fusion Questionnaire (CFQ: Gillanders et al., 2014), a 7-item measure of the extent to which people struggle with or respond emotionally to their thoughts, with higher scores reflecting lower decentering. Responses are measured on a 7-point scale (1 = "never true" to 7 = "always true"). Cronbach's α = .92 and McDonald's ω = .92 for the total scale in this sample.

Ecological momentary assessment.—Current negative affect (4 items), well-being (2 items), mindful awareness (1 item), and decentering (4 items) were measured six times per day. The negative affect items were used in prior EMA studies (McMahon & Naragon-Gainey, 2019), whereas the other items were written for this study based upon existing trait measures and theory, given a lack of very brief validated measures of these constructs. Previous research has found that these constructs can be reliably measured in the moment with a few items or a single item, including well-being (de Vries et al., 2021), as well as mindfulness and decentering (Shoham et al., 2017). Responses were provided on a 5-point Likert scale ("Very slightly or not at all" to "Extremely"). The EMA items analyzed in the current study are shown in Table S2. We examined the structure of the decentering, well-being, and negative affect items and specified them as latent variables in subsequent analyses when there was support to do so. For this reason, we focus on fit of the measurement model rather than scale internal consistency. The measures demonstrated acceptable convergent validity with baseline measures of the same construct: decentering *r*'s = |.23-.53|, mindful awareness with FFMQ *r* = .23 (see Table S3 for details).

Data Analyses.

Multilevel structural equation modeling (MSEM) in MPlus 8.3 (Muthén & Muthén, 1998, 2017) was used to model the nested structure of the two-level EMA data (reports nested in participants). MSEM uses a latent variable framework to decompose variance of repeatedly-measured variables into orthogonal within-person and between-person components and thus fully separate within-person and between-person variance in all analyses (thus, within-person analyses control for between-person variance, and vice versa). Within-person effects are interpretable as person-centered. For Aim 1, we examined the correlations of the SCS and its subscales with baseline mindfulness and decentering scales, as well as with the between-person variance of the momentary measures. When two correlations with a common variable were compared for equality, Steiger's *z* test for dependent correlations was performed using an online calculator (Lee et al., n.d.). Next, we tested the unique incremental contributions of the SCS subscales by regressing each construct on all of the SCS subscales simultaneously. For Aim 2, a three-way cross-level interaction was examined, and all component two-way interactions and main effects were included. Time was included as a covariate in the Aim 2 analyses to account for any linear effects of time on responses. We used the latent moderated structural equations (LMS) approach (Klein & Moosbrugger, 2000), which allows for the estimation of interaction terms as latent variables, thereby adjusting for measurement error and increasing precision.

Robust maximum likelihood estimators (MLR) was used for Aim 1, whereas Bayesian estimation was required to estimate the more complex three-way interaction in Aim 2, which would not converge on proper solutions with MLR. Both estimators appropriately account for missing data and non-normal distributions. The fit of multilevel confirmatory factor analyses for latent variables used the following interpretive guidelines: CFI > .95, RMSEA < .10, SRMR < .08 (Browne & Cudeck, 1992; Hu & Bentler, 1999).

Results

Preliminary Analyses

Multilevel confirmatory factor analysis was used to test whether three distinct factors formed as expected for EMA variables (i.e., negative affect, wellbeing, and decentering; mindful awareness was a single item so could not be tested structurally), at both the within- and between-person levels (see Figure S1 for the measurement model and parameter estimates). A model with factors for negative affect (NA) and well-being (WB) was a good fit to the data: χ^2 (18) = 192.27 p < .001, CFI = 0.97, RMSEA = 0.04, SRMR = 0.03 (within), 0.04 (between), and factor loadings were large and in the expected direction (within-person = .56 to .86; between-person = .72 to .99). The two factors were moderately correlated (within r = −0.43, between r = −0.38, ps < .001). Given that this model was sound, NA and WB were specified as latent variables in all subsequent analyses. The intraclass correlations (ICCs; NA = 0.47, WB = 0.61) indicated substantial variance on both levels and the factors correlated weakly but in the expected direction with the SCS total (NA r = −.35; WB r = .36; see Table S3 for all intercorrelations).

Several issues with the decentering factor emerged, indicating that these items should not be combined into one or two factors (see Supplementary Materials Appendix B for details). Therefore, we chose to analyze two decentering items separately—one forward-coded item (Decentering 1; referred to as Decentering Observer Perspective [OP]) and one reverse-coded item (Decentering 2; "Decentering Struggle with Thoughts/Feelings [ST/F]) —that accounted for the greatest variance in the baseline decentering measures and covered both components. This approach is more parsimonious than analyzing all four items and identifies the items that likely provide the most valid assessments of decentering. These items demonstrated variance on both levels (ICCs: OP = 0.37, ST/F = 0.43), as did the single mindful awareness EMA item (ICC = 0.36). The decentering items correlated weakly but in the expected direction with the SCS total (ST/F $r = -.34$; OP $r = .24$) but the mindful awareness item did not ($r = .11$; see Table S3). Figures S2-S4 show spaghetti plots for within-person trajectories of each EMA variable.

Correlations among baseline measures of mindfulness and decentering were generally moderate to large (e.g., .40 to .70) and in the expected direction, given past research (see Table 1). Correlations among the SCS subscales were generally moderate to large (rs = .20 to .72; see Table 1). Between subscales of the same valence (i.e., Self-Kindness, Common Humanity and Mindfulness, then separately Self-Judgment, Isolation and Overidentification) correlations were particularly large (rs = .57 to .72). Examination of variance inflation factor (1.9-3.0) and tolerance values (0.34-0.53) did not indicate issues with multicollinearity.

Associations of the SCS with mindful awareness and decentering

The SCS total score was moderately to strongly correlated in the expected direction with baseline measures of mindfulness and decentering (Table 1), consistent with previous work examining the relationship between dispositional mindfulness and self-compassion. The SCS total was most strongly associated with both the EQ ($r = 0.70$) and the FFMQ total ($r = 0.64$), with significantly weaker (but still strong) associations with the CFQ ($r = -0.62$) and TMS-D (r = 0.40) relative to the FFMQ (zs = 3.45-11.27, $p < .001$). The SCS subscales were also moderately to strongly correlated with measures of mindfulness and decentering at baseline (rs = |.41 to 0.68|), but associations did not appear to be specific to the SCS mindfulness subscales as would be expected. Each of the SCS subscales had a strong correlation ($r > 0.50$) with one or more measures of mindfulness or decentering at baseline. In particular, the SCS Self-Kindness subscale was as or more strongly related to almost all measures of mindfulness and decentering, relative to the associations of SCS Mindfulness and Overidentification (rs = 0.17 to 0.62).

We next examined whether the SCS mindfulness scales were correlated more strongly with decentering measures (i.e., EQ, TMS, CFQ), than with the mindfulness measure (i.e., FFMQ total). SCS Mindfulness was more strongly related to the EQ than to the FFMQ ($z(166) = 3.51$, $p < .0001$), but it was not more strongly related to the other measures of decentering relative to the FFMQ. Similarly, SCS Overidentification was more strongly related to the CFQ than to the FFMQ ($z(166) = -9.65$ $p < .0001$), but it was also not more strongly related to the other measures of decentering relative to the FFMQ. Thus, there was mixed

evidence for the relative strength of the associations of SCS mindfulness scales to baseline mindfulness vs. decentering.

It is possible that the SCS subscales were broadly related to baseline mindfulness and decentering measures because the subscales all reflect a shared general component. To isolate the unique variance of each subscale, the measures of mindfulness and decentering were regressed on all of the SCS subscales simultaneously, with a separate model for each outcome (Table 2). For all outcome measures except the TMS-D (which had no significant predictors), one or both SCS mindfulness subscales were significant predictors, but so were several other SCS subscales. Thus, multiple components of self-compassion were uniquely associated with mindfulness and decentering, with SCS Overidentification being the most consistent predictor across measures.

The next set of analyses considered how the SCS was related to the EMA measures of mindful awareness and decentering; note that the ST/F decentering item is reverse-keyed, such that higher values indicate less decentering. The SCS total score was not significantly correlated with mindful awareness ($r = 0.11$, $p = .14$) but it was correlated with both decentering items (rs = 0.24 and −0.34, ps <.001), and the correlation with decentering ST/F was significantly stronger than that of mindful awareness ($z = -4.09$, $p < .001$). At the subscale level, SCS Mindfulness was associated with mindful awareness ($r = 0.21$ $p <.01$), as well as both decentering items (OP: $r = 0.26$ $p < .001$, ST/F: $r = -0.20$ $p < .01$; again, the correlation with decentering ST/F was significantly stronger than the correlation with mindful awareness ($z = -3.63$, $p < .001$). Last, SCS Overidentification was not correlated with mindful awareness ($r = 0.05$, p = .58), but it was associated with both decentering items (OP: $r = 0.23$ $p < .001$, ST/F: $r = -0.38$ $p < .001$). With regard to other SCS subscales, Self-Kindness was correlated with all EMA items (rs = −0.21-0.24 ps < .05); Self-Judgment was correlated with decentering ST/F ($r = -0.32$ $p <.001$); Isolation was correlated with decentering OP ($r = 0.19$ $p <.01$); Common Humanity was not significantly correlated with any EMA items. In sum, the SCS total and subscales measuring mindfulness were significantly and consistently correlated with momentary measures of decentering (particularly the ST/F component), but had weak or nonsignificant associations with momentary mindful awareness, and significant associations were not limited to the mindfulness subscales.

In order to test the unique associations between the SCS subscales and daily measures, regression analyses were run with individual EMA items regressed on all the subscales simultaneously, with a separate model for each outcome (Table 2). Momentary mindful awareness was significantly predicted by SCS Mindfulness only ($\beta = 0.25$, $p = .05$). Decentering OP was significantly predicted by Overidentification ($\beta = 0.25$, p=.035) and high levels of SCS Self-Judgment (indicative of a suppressor effect: $\beta = -0.29$, $p = .026$), and decentering ST/F was significantly predicted by Overidentification only ($\beta = -0.28$, $p = .023$). Thus, the SCS mindfulness scales showed good specificity relative to the other SCS subscales, as SCS Mindfulness was uniquely associated with mindful awareness, whereas SCS Overidentification was uniquely associated with both momentary decentering items.

Interaction of NA, Mindfulness, and Self-Compassion in Predicting Well-Being

We tested a three-way cross-level interaction among baseline self-compassion and momentary assessments of mindfulness and NA in predicting momentary well-being (*n observations* = 6,009; see Figure S5 for a path diagram with parameter estimates). Because these analyses used Bayesian estimation and LMS, standard fit indices are not available. As hypothesized, lower momentary NA (β = −.38, $p < .0001$), higher momentary mindful awareness (β = .32, $p < .0001$), and higher trait levels of self-compassion (β = .36, $p < .0001$) were associated with higher momentary well-being. However, neither of the two-way interactions involving self-compassion (NA X self-compassion β = −0.12, $p = .13$; mindfulness X self-compassion β = 0.07, $p = .22$) nor the three-way interaction (β = −0.12, $p = .23$) were significantly associated with well-being. Thus, the associations of NA and mindful awareness with well-being did not depend on one's baseline level of self-compassion. Only the two-way interaction between NA and mindful awareness was significant (β = −.05, $p = .002$; see Figure S6 for a path diagram and parameter estimates). This interaction was probed and, contrary to theory, as levels of momentary mindful awareness increased, the negative relationship between NA and well-being became stronger. A Johnson-Neyman regions of significance plot shows that the inverse association of NA and well-being is significant except at very low levels of mindful awareness, and the relationship becomes stronger as mindful awareness increases (Figure S7).

Because there may be some content overlap between the mindfulness subscales of the SCS and the assessment of mindful awareness in daily life (r with SCS Mindfulness= .21, and r with SCS Overidentification = .05), we reran the three-way interaction model excluding the SCS Mindfulness and Overidentification scales from the total self-compassion score, and the pattern of results was unchanged. We also ran the three-way interaction with all negatively-worded SCS subscales removed due to potential overlap with NA, and the pattern of results was again unchanged. Finally, we examined lagged models, with well-being at the next report as the outcome. Again, the pattern of results was the same except that the two-way interaction between NA and mindfulness was no longer significant (β = −.02, $p = .10$).

Discussion

This study aimed to clarify the nomological net of the SCS, examine its construct validity in relation to mindful awareness and decentering, and extend the literature to examine its relationship to dynamic variables in daily life. We hypothesized that trait self-compassion would interact with momentary mindful awareness to predict momentary eudaimonic well-being, and this relationship would be strongest on occasions with high NA.

Construct Validity of the SCS

Conceptually, components of self-compassion are closely linked, and self-compassion, mindfulness, and decentering likewise are intimately connected. Therefore, it is perhaps not surprising that the relationships between these constructs were characterized by both substantial elements common and some unique elements. The SCS total score generally was moderately to strongly associated with greater mindfulness and decentering at baseline

and in daily life. These results replicate prior research of the SCS with cross-sectional, retrospective measures of mindfulness (e.g., Hollis-Walker & Colosimo, 2011; Van Dam et al., 2011), and extend it both by testing the ecological validity of the SCS and by examining the relationship to decentering. The subscale analyses provide insight into which components of self-compassion drive the overall associations with mindfulness-related constructs, as well as to assess the extent to which the mindfulness SCS subscales had strong and specific associations with mindfulness vs decentering.

At the zero-order level, all of the SCS subscales were broadly related to measures of mindfulness and decentering (Self-Kindness in particular had broad associations) suggesting a lack of unique relationships among the constructs as would be expected. This is consistent with prior work showing strong intercorrelations among the SCS subscales, with a large portion of the variance explained by a general factor (Cleare et al., 2018; Neff, 2016; Neff et al., 2017). However, regression analyses that removed the shared variance across the subscales revealed some specificity when predicting mindfulness and decentering in daily life. Thus, there was mixed evidence regarding whether the SCS mindfulness subscales related more strongly to decentering than to mindfulness, as was hypothesized. Support was strongest for associations with momentary measures, wherein the SCS mindfulness subscales and SCS total score were generally more strongly associated with momentary decentering (OP and ST/F) than with momentary mindful awareness. This association with decentering is consistent with our interpretation of the theoretical origins of a self-compassionate attitude as proposed by Neff (2003a, 2003b), and suggests the label “Mindfulness” for the subscale may be overly-broad. This could indicate concerns with the convergent and discriminant validity of the SCS mindfulness subscales, and calls for more specific research on the validity of the subscales to have a fuller picture of their utility. This finding, if replicated, could also inform intervention techniques aimed at raising self-compassion and mindfulness, and influence what measures are used to track change at trait and state levels. That is, if decentering is more crucial than other aspects of mindfulness, then interventions related to low self-compassion could emphasize decentering in particular in treatment. With the growing interest in mindfulness and self-compassion, we should aim to clearly measure the distinct components of these constructs and their relationships.

Decentering has been suggested as a critical potential mechanism of mindfulness (i.e., Shapiro et al., 2006), mediating the effect of mindfulness on depression, anxiety, alcohol problems (Pearson et al., 2015), as well as on emotionality (Shoham et al., 2017), although some mixed evidence exists (see Bhambhani & Cabral, 2016). Similarly, decentering may be a plausible mediator in the association between mindfulness and self-compassion, as taking a more objective stance on one’s own suffering via decentering may be the critical component that explains how mindful awareness of the present moment would support a response that is kind to the self and recognizes the suffering of others (Neff, 2003a, 2003b). Future work could include experimental designs that more rigorously test for mediation. More generally, it will be important to identify the active aspects of these skills and clarify their specific contributions to mindfulness-based interventions.

Further, in order to confidently identify and assess the components of self-compassion, it is critical that a variety of measures of self-compassion are developed and tested. The recently

developed Self Other Compassion Scale- Self-compassion Subscale (Gu et al., 2019) was strongly correlated with the short form of the SCS (*r*s = .63 in a student sample and .65 in a sample of health care staff, *p*s < .001; Gu et al., 2019), but individual components of self-compassion could not be examined in this study since the SCS short form only provides a total score. To our knowledge there have been no other studies that have compared these two measures of self-compassion, and there appear to be no other validated measures of self-compassion. Future research should seek to clarify the nature and optimal number of self-compassion components by examining the joint structure of numerous self-compassion measures, as well as the associations of these components in a larger nomological network. Future work can identify if these or other measures provide adequate discriminant validity to be able to pinpoint the processes at play.

Associations with Well-Being in Daily Life

With regard to the second aim, our results extend the literature by demonstrating that higher trait levels of self-compassion at baseline were associated with higher levels of well-being as reported in naturalistic settings in daily life. At a trait level, these constructs may be difficult to separate and our findings support future work examining these at a momentary level. Higher momentary well-being was also associated with higher momentary mindful awareness and lower momentary NA, and these effects remained in lagged models when predicting the next report. This is an important addition to the literature supporting the hypothesized effects of self-compassion, and it provides initial evidence that the SCS is predictive of relevant outcomes in daily life. This first step supports a deeper consideration of associations of individual components of self-compassion and how they may be working at the state level.

Contrary to expectations, the three-way interaction between trait self-compassion, momentary NA, and momentary mindful awareness did not predict levels of momentary well-being. One possibility is that our data were underpowered to detect this likely quite small effect (see “Limitations” for further discussion). However, the two-way interactions with self-compassion—which would not require as large a sample and were more likely to be adequately powered— were also not significant in the full analysis or in a posthoc analysis that omitted the three-way interaction term, suggesting that low power may not have been the sole or primary determinant in this non-significant result. Though the null finding for the interaction term certainly requires replication before drawing strong conclusions, the presence of self-compassion’s main effect and absence of interactions suggest that self-compassion is broadly associated with greater well-being in daily life, regardless of one’s current levels of NA or mindful awareness. This could imply that higher levels of mindful awareness are not required in order to benefit from self-compassion, nor is a strong negative affective state, though examining this interaction with a more thorough assessment of momentary mindfulness (with multiple components) would be necessary. To the extent that state self-compassion may fluctuate over time, is also possible that an assessment of momentary self-compassion may reveal the expected interaction. That is, trait assessment of self-compassion may not sufficiently capture one’s state level, which is what should be most determinative of momentary well-being.

Although the two-way interaction between NA and mindfulness was not of primary interest it was included as a component of the focal three-way interaction. We found that this interaction was associated with momentary well-being but in the opposite direction than expected. As momentary mindful awareness increased, the inverse relationship between momentary NA and well-being became stronger. While it is not clear if this finding is replicable, it is possible that mindful awareness of one's low mood is not enough on its own to increase well-being, and that a particular attitude (e.g., nonjudgmental, open, curious) must accompany the awareness in order for an individual to benefit (e.g., Shapiro et al., 2006). This is consistent with dismantling research that found trait acceptance as a critical component in addition to the monitoring of one's thoughts and emotions (e.g., Lindsay & Creswell, 2019). It is also possible that in episodes of strong NA, the emotions themselves were particularly salient (i.e., they were the focus of what was happening) and the mindful awareness item captured the focus on the predominant mood. A newfound awareness of NA without a prompt to address the awareness in any particular way could have left the participants ruminating on their negative mood, which may have led to momentary decreases in well-being (e.g., Shoham et al., 2018). This finding can also inform experimental and intervention work as increasing mindful awareness alone may be detrimental.

Limitations and Future Directions

The current study has several strengths, including repeated naturalistic sampling of dynamic variables in a community sample that included individuals with and without psychopathology, and a statistical approach that allowed us to examine latent variables on a within-person level. However, there are several limitations that should be considered when interpreting these results. First, the sample consisted of mostly White women in their mid-thirties with little meditation experience, and the results may not be generalizable to other more diverse samples, samples with more experience with mindfulness and meditation, or clinical samples. In addition, baseline and daily measures relied on self-report, which could be influenced by personality (i.e., neuroticism), social desirability, or other individual differences such as appraisal style, differences in emotional clarity, or emotion regulation style. Participants could also respond to the survey within a 30-minute window, and their state may have fluctuated from the time they were probed to the time they submitted their report. Future research could incorporate other measures (e.g., behavioral, physiological, observer-report) of these constructs. Another limitation was that single items were used for some EMA measures (e.g., mindful awareness, decentering), which are likely to have greater error variance than scales, and the construct validity of the EMA items used here is not well known. Furthermore, single items cannot fully capture the breadth of multidimensional constructs like mindfulness.

This study used secondary data analysis, and thus some of the research questions were limited by the design and availability of the measures already in place, which did not include EMA assessment of self-compassion. At the time of preregistration and data collection, no state or momentary measure of self-compassion existed, although research has shown that interventions can change trait-levels of self-compassion (Finlay-Jones, 2017; Neff et al., 2007). A state measure of self-compassion was published shortly before submission of this manuscript (Neff et al., 2020) but this length and format may not be easily used

for repeated momentary assessments in daily life. Future work should also examine other inter-/intra-personal traits that influence self-compassion (such as emotional clarity or the tendency to ruminate). Given the theory that self-compassion can occur in response to one's life circumstances (Neff, 2003a; Neff, 2003b), it is important to assess self-compassion in context, and it is likely to vary depending upon the situation and cognitive skills and resources available. Nonetheless, prior research indicates that self-compassion has been relatively temporally stable (r = .93 at a three-week interval; Neff, 2003b), supporting the trait-based approach of the current study. Similarly, due to the use of secondary data analysis, sample size was determined for the aims of the larger study, and we were not able to conduct a Monte Carlo power simulation to test power for key parameters for the current study (Mathieu et al., 2012), as the lack of prior multilevel research on these variables means there are not a priori parameter estimates that the simulation requires. Rules-of-thumb in the multilevel literature (i.e., Maas & Hox, 2005) suggest a sample size of at least 100 people with at least 10 reports each, and our analyses included 172 individuals with on average 35 reports each, suggesting good power. However, interactions—and particularly three-way interactions— require greater sample sizes (see Heo & Leon, 2010 for a discussion with cross-sectional single level data), and we cannot rule out the possibility that the interaction term was not significant because this analysis was underpowered.

In summary, the current study extended the literature to find that trait self-compassion was predictive of higher momentary well-being in the daily life, and the relationship of the SCS to baseline and daily mindfulness and decentering was further clarified. In general, the SCS was moderately to strongly related to most measures of mindfulness and decentering, though there was mixed evidence regarding the relative strength of the associations of SCS Mindfulness and Overidentification to mindfulness vs. decentering and its components. This study served as an initial investigation of the ecological validity of the SCS, and future studies can further examine the nature of the dynamic associations of self-compassion, mindfulness-related constructs, and well-being, as well as potential underlying mechanisms of their associations.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Data Availability:

The data analyzed in the current study are available at: https://osf.io/wnpeb/.

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Table 1.

Correlations of the baseline measures of mindfulness, decentering, and self-compassion

	EQ	TMS-D	CFQ	FFMQ	-Obs	-Des	-Awa	-Noj	-Nor	SCST	-SK	-SJ	-CH	-I	-M	-OI
EQ	--															
TMS-D	.50	--														
CFQ	**−.59**	−.24	--													
FFMQ	**.62**	.36	**−.59**	--												
−Obs	.40	.39	*−.06*	**.56**	--											
-Des	.42	.27	−.33	**.77**	.34	--										
-Awa	.34	−.36	−.46	**.63**	*.11*	.40	--									
-Noj	.31	*.11*	**−.58**	**.62**	*.04*	.29	.29	--								
-Nor	**.63**	.47	**−.51**	**.67**	.29	.43	.26	.37	--							
SCS T	**.70**	.40	**−.62**	**.64**	.31	.47	.36	.41	**.56**	--						
-SK	**.62**	.41	−.42	**.57**	.38	.49	*.17*	.32	**.51**	**.81**	--					
-SJ	.44	.22	**−.57**	.44	*.10*	.30	.26	.42	.38	**.79**	**.51**	--				
-CH	**.53**	.35	−.20	.38	.33	.31	.22	*.06*	.36	**.64**	**.57**	.20	--			
-I	.45	.25	**−.58**	**.54**	*.12*	.36	.42	.45	.45	**.81**	**.51**	**.71**	.35	--		
-M	**.68**	.40	−.40	**.50**	.40	.35	.21	.19	**.54**	**.75**	**.66**	**.35**	**.63**	.40	--	
-OI	**.55**	.22	**−.63**	**.50**	*.13*	.32	.38	.40	.46	**.77**	.40	**.72**	.27	**.69**	.43	--

Note. Correlations above .13 are significant at $p < .05$, above .17 are significant at $p < .01$, and above .24 at $p < .001$. Nonsignificant correlations are italicized. Correlations ≥ |.50| are in bold. EQ = Experiences Questionnaire, TMS-D = Toronto Mindfulness Scale- Decentering, CFQ = Cognitive Fusion Questionnaire, FFMQ = Five-facet mindfulness questionnaire, Obs = FFMQ Observing, Des= FFMQ Describing, Awa = FFMQ Acting with awareness, Noj = FFMQ Nonjudging, Nor = FFMQ Nonreactivity, SCS T = Self-compassion scale self-compassion total SK= SCS self-kindness, SJ = SCS self-judgment, CH = SCS common humanity, I = SCS isolation, M = SCS mindfulness, O = SCS overidentification. Note that all SCS subscales are coded to reflect greater levels of self-compassion, with the negatively-valenced subscales reverse-coded.

Table 2.

Regressions of the Self-Compassion Scale subscales on measures of mindfulness and decentering

	EQ		TMS-D		CFQ		FFMQ		Decentering-OP		Decentering-ST/F		Mindful Awareness	
	β	***S.E.***	***β***	***S.E.***	***β***	***S.E.***	***β***	***S.E.***	***β***	***S.E.***	***β***	***S.E.***	***β***	***S.E.***
SK	0.21**	0.09	0.21	0.11	−0.09	0.09	0.34**	0.01	0.26	0.12	−0.05	0.11	0.15	0.13
SJ	−0.03	0.10	−0.06	0.13	−0.06	0.10	−0.12	0.12	−0.29*	0.13	−0.06	0.12	−0.12	0.14
CH	0.14*	0.07	0.11	0.09	0.13	0.07	−0.02	0.08	−0.21	0.11	0.05	0.10	−0.16	0.10
I	−0.03	0.08	0.07	0.11	−0.23*	0.09	0.23**	0.10	0.11	0.14	−0.06	0.12	0.01	0.13
M	0.34***	0.08	0.16	0.11	−0.15	0.08	0.13	0.09	0.20	0.13	−0.04	0.12	0.25*	0.12
OI	0.31***	0.09	0.02	0.12	−0.36***	0.09	0.23*	0.11	0.25*	0.12	−0.28*	0.12	0	0.14

Note. Standardized estimates are provided.

* p < .05

** *p* < .01

*** *p* < .001. SK= Self-compassion scale self-kindness, SJ = SCS self-judgment, CH = SCS common humanity, I = SCS isolation, M = SCS mindfulness, O = SCS overidentification, EQ = Experiences Questionnaire, TMS-D = Toronto Mindfulness Scale- Decentering, CFQ = Cognitive Fusion Questionnaire, FFMQ = Five-facet mindfulness questionnaire, Decentering-OP = Decentering Observer Perspective, Decentering- ST/F = Decentering Struggle with Thoughts/Feelings. Note that all SCS subscales are coded to reflect greater levels of self-compassion, with the negatively-valenced subscales reverse-coded.