**State Self-Compassion Dynamics: Partial Evidence for the Bipolar Continuum Hypothesis**

# Abstract

# Objectives: The Bipolar Continuum Hypothesis (BCH) proposed by Neff posits that compassionate self-responding (CS) and uncompassionate self-responding (UCS) lie on a continuum and are inversely related. However, some researchers suggest that CS and UCS may function independently. This study aimed to investigate this debate by examining how state self-compassion (SC) components fluctuate in response to real-life contextual factors.

# Method: Across two longitudinal field studies over three months, 494 participants provided weekly Ecological Momentary Assessment (EMA) data. We examined how immediate emotional states, decentering (a mindfulness-related skill), and the unpleasantness of recent events influenced CS and UCS in real time.

# Results: Our findings provided partial support for the BCH, showing that CS and UCS generally fluctuate inversely in response to negative affect and decentering. Negative affect emerged as the strongest predictor, with higher levels linked to increased UCS and decreased CS. Decentering was associated more with reducing UCS than increasing CS, suggesting an asymmetry in their relationship. In contrast, the unpleasantness of specific events had a relatively minor impact on both components.

**Conclusions:** These findings provide partial support for the BCH, demonstrating that CS and UCS are inversely related in most contexts, particularly in response to emotional states and mindfulness practices. However, individual variability suggests that CS and UCS may operate more independently for some individuals. Future research should focus on refining interventions that enhance CS, while accounting for individual differences in the dynamics between CS and UCS in therapeutic settings.

**Keywords:** self-compassion; ecological momentary assessment; contextual factors; emotion regulation; decentering; negative affect.

Self-compassion—the capacity to respond to personal suffering and perceived inadequacies with kindness and understanding—has emerged as a central construct in contemporary psychological research. The Self-Compassion Scale (SCS; Neff, 2003), with over 9,786 Google Scholar citations at the time of writing, stands as the predominant measurement instrument for this construct. Despite its widespread use, the exact nature of self-compassion remains a topic of ongoing debate.

At the heart of this discourse lies the Bipolar Continuum Hypothesis (BCH; Neff, 2022), which conceptualizes compassionate and uncompassionate self-responding as opposing ends of a single continuum rather than distinct constructs (Ferrari et al., 2022; Muris and Otgaar, 2022; Neff, 2022, 2023). This model positions self-kindness, common humanity, and mindfulness at the compassionate pole, with their theoretical opposites—self-judgment, isolation, and over-identification—at the uncompassionate pole (Neff, 2003). Neff (2022) maintains that parsing these components into separate constructs constitutes a conceptual fallacy and advocates for the use of the SCS total score as a unified measure. This theoretical framework finds support in psychometric analyses showing that the SCS captures both a global self-compassion factor and six distinct subfactors (Neff et al., 2017, 2021).

Despite this empirical support for the BCH, competing conceptualizations persist in the literature. Several researchers contend that compassionate and uncompassionate self-responding represent distinct constructs rather than polar opposites (Muris et al., 2018; Muris and Petrocchi, 2017). This position draws support from differential prediction studies showing that uncompassionate self-responding demonstrates stronger associations with psychopathology than compassionate self-responding (Muris, 2016). Further challenging the unidimensional framework, empirical evidence suggests that individuals can simultaneously exhibit high levels of both compassionate and uncompassionate self-responding (Ullrich-French and Cox, 2020)—a finding that is incompatible with a strict bipolar continuum model.

Ferrari et al. (2022) contributed to this debate by proposing that experimental designs—rather than traditional psychometric approaches—may better resolve the BCH debate. They argued that if CS and UCS operate semi-independently, individuals should be able to experience both simultaneously. Moreover, they conceptualized self-compassion as a dynamic, context-dependent system rather than a static trait. Building on this perspective, our study shifts focus from trait-based measures to state self-compassion, examining how individuals' self-responding fluctuates across specific situations and emotional contexts. This approach offers a novel framework for testing the Bipolar Continuum Hypothesis by investigating real-time interactions between CS and UCS.

The conceptualization of self-compassion as a dynamic process mirrors broader developments in psychological science that emphasize state-dependent variability over trait stability. Ecological momentary assessment (EMA) methodology has been particularly instrumental in capturing these temporal dynamics. Mey et al. (2023) showed that fluctuations in momentary self-compassion predict concurrent changes in affect and stress reactivity, with uncompassionate self-responding emerging as a particularly robust predictor of negative emotional states. This finding aligns with a growing body of research examining the temporal covariation between self-compassion and related psychological processes. Multiple studies have identified robust associations between momentary self-compassion and various adaptive outcomes, such as enhanced mindfulness, reduced stress reactivity, and improved well-being (Biehler & Naragon-Gainey, 2022; Ewert et al., 2022; Sahdra et al., 2023). The consistency of these temporal relationships supports a reconceptualization of self-compassion as fundamentally dynamic rather than dispositional.

Despite notable advancements in studying self-compassion's temporal dynamics and contextual variability, several methodological limitations persist in the existing literature. Previous studies have typically employed brief assessment periods (≤ 7 days), potentially overlooking the full complexity of state self-compassion dynamics. Moreover, the absence of validated state measures at the time of those studies led to reliance on ad hoc instruments, potentially compromising measurement reliability.

The present research addresses these limitations through extended ecological momentary assessment (3 months) and implementation of the validated State Self-Compassion Scale (Neff, 2022). Notably, our study is the first to examine the factor structure of state self-compassion within an EMA framework while accounting for the hierarchical nature of temporal data nested within days and individuals.

This investigation aims to empirically evaluate the Bipolar Continuum Hypothesis by examining how situational factors differentially influence the CS and UCS components. According to the Bipolar Continuum Hypothesis, situational factors should exert opposing effects on CS and UCS, supporting a unified construct model. Conversely, evidence of differential impacts would suggest independent dimensions, lending support to a dual-construct framework.

Building on Ferrari et al.’s (2022) suggestions, we conceptualize self-compassion as a dynamic process responsive to contextual influences. We test three specific hypotheses:

1. Trait-level CS and UCS may demonstrate greater independence over extended periods, while state-level components may show stronger temporal coupling.
2. Stressful or negative contexts may enhance the bipolarity between components.
3. The relationship between components may vary across individuals, necessitating person-centered approaches to self-compassion research

To test these hypotheses, we conducted two EMA studies. Study 1 examined associations between immediate emotional states, event unpleasantness, and state self-compassion components. Study 2 extended this investigation by assessing state self-compassion before and after a high-stakes university examination, providing a naturalistic test of contextual effects. Additionally, we incorporated decentering (Biehler & Naragon-Gainey, 2022)—a fundamental mindfulness process—to examine its potential differential effects on both components, offering a novel approach to testing the Bipolar Continuum Hypothesis.

Understanding the dynamic interactions between state CS and UCS has important implications for psychological interventions aimed at enhancing well-being. By investigating how situational factors influence self-compassion in real-time, our study aims to contribute to the theoretical understanding of self-compassion and inform practical strategies for fostering healthier self-relations in diverse life contexts.

# Study 1: Temporal Dynamics of State Self-Compassion in Daily Life

Study 1 examined how state self-compassion fluctuates in response to everyday emotional experiences and challenging events. We focused specifically on momentary negative affect (NegAff; Haney et al., 2023) and event unpleasantness as potential drivers of these fluctuations, examining their impact across multiple temporal scales: within days, between days, and between individuals. According to the Bipolar Continuum Hypothesis, contextual influences should produce opposing effects on CS and UCS components. Moreover, emotionally salient contexts may amplify this bipolar relationship (Dejonckheere et al., 2021; Ferrari et al., 2022). Study 1 tested these predictions through intensive longitudinal assessment of daily experiences.

## Method

**Procedure.** In our study, we utilized an EMA protocol to evaluate momentary self-compassion and mood variations, with a focus on real-time measurement of affective states. Initially, participants provided informed consent, and those meeting the inclusion criteria attended an introductory session. Here, we administered baseline measures assessing Self-Compassion as a trait characteristic, levels of depression, anxiety and stress over the past week, and emotion regulation capabilities. These were measured using the Self-Compassion Scale (Neff, 2003), the Depression Anxiety Stress Scale-21 (Lovibond & Lovibond, 1995), and the Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004), respectively – for details, see the Supplementary Information (SI). Following this, participants were trained in using the m-Path mobile application (Mestdagh et al., 2023) on their smartphones, which was used for completing the EMA surveys.

The EMA protocol extended over three months, encompassing 10 specific days within this timeframe. On these days, participants received five daily prompts, issued exclusively on Saturdays, based on a semi-random sampling protocol. The timing for these notifications was scheduled as follows: the first between 10:00 and 10:30 AM, the second between 3:00 and 3:30 PM, the third between 5:00 and 5:30 PM, the fourth between 7:00 and 7:30 PM, and the final one between 9:00 and 9:30 PM. Upon receiving a notification, participants were prompted to answer a set of 13 questions, encompassing momentary self-compassion, negative and positive affect, and their evaluation of a significant recent event since the last prompt.

**Participants.** In the study, participants were required to complete data collection on at least four of the ten designated days to ensure a detailed capture of their experiences. The sample included both undergraduate and graduate students from psychology courses, and participation was voluntary. In total, data from 326 participants were eligible for analyses. The mean age was 24.08 years (SD = 7.88 years).

Eligibility for participation in this study was contingent upon meeting several predefined inclusion criteria at the time of enrollment. Participants were required to: (1) be at least 18 years of age; (2) possess a proficient level of Italian; (3) have prior experience with smartphone usage; and (4) not have any self-reported mental health disorders or drug/alcohol addiction.

None of the participants reported present or past psychiatric disorders and none of them reported using medications.

Participants whose compliance rate fell below 50% were excluded from the study. This criterion led to the exclusion of 7 participants. Consequently, the final sample size was established at 326 individuals. Overall, participant compliance was notably high. On average, participants responded to 85% of the daily notifications. This means that out of an average of 5 notifications sent each day, participants responded to approximately 4.2 of them. Furthermore, when considering the entire duration of the study, the compliance rate across all days was 87%. In other words, participants responded on 8.7 out of the possible 10 days.

### Materials.

#### 

#### EMA protocol. The EMA protocol comprised 13 questions, which included items designed to assess various aspects of participants’ momentary experiences.

*Pleasant/Unpleasant Event.* The initial query consistently explored the emotional valence — pleasantness or unpleasantness — of the most impactful event since the last notification. For example, “Think about the most notable event that has occurred since you last received a notification. If this is your first notification of the day, consider the most significant event from the start of the day. How would you evaluate this event?” Participants were asked to rate the event on a 5-point Likert scale, where 1 indicates “extremely unpleasant” and 5 signifies “extremely pleasant.”

*Positive and Negative Affect.* We examined four emotional states using a combined approach of assessment tools. For negative emotions, we used two items from the Positive and Negative Affect Schedule (PANAS, Watson, Clark, & Tellegen, 1988): “At this moment, I feel NERVOUS” and “At this moment, I feel UPSET.” However, during a pre-test, we determined that the positive emotions items from PANAS did not align with our specific objectives of the study. Therefore, we opted for two positive emotions items from Kuranova et al. (2020): “At this moment, I feel CHEERFUL” and “At this moment, I feel SATISFIED.” Unlike PANAS, Kuranova et al. (2020) developed their affect items by calculating mean scores across all assessed emotions. From their proposed four items, we selected two that best represented the positive emotional states relevant to our study. Participants were then asked to rate the intensity of these emotions on a 5-point Likert scale, ranging from 1 (“not at all”) to 5 (“very”).

*State-Self-Compassion Scale Short Form (SSCS-SF).* Developed recently by Neff et al. (2021), the SSCS-SF is a 6-item self-report tool designed to measure the current level of Self-Compassion. The scale encompasses six items, each reflecting one of the subscales of the Trait-SCS. These include three positive subscales — Mindfulness, Common Humanity, Self-Kindness — and three negative subscales — Overidentification, Self-Judgement, Isolation. The CS dimension is calculated by summing the scores of the positive items (*e.g.*, “At this moment, I have care and tenderness towards myself”), while the UCS dimension is derived from the aggregate of the negative items (*e.g.*, “I can’t stop thinking about everything that is wrong”). To ensure a minimum of 4 items for each dimension (McDonald, 2013), in line with the specific aims of our study, we augmented the SSCS-SF with two supplementary items. These additional items - one for the CS dimension and another for the UCS dimension - were carefully chosen from the State-SCS Long Form (Neff et al., 2021). Our selection criteria prioritized items with the highest factor loadings, as determined by a previous factor analysis conducted with a similar sample (Colpizzi et al., 2024). Participants were requested to rate how accurately each item described their current experience on a 6-point Likert scale, ranging from 1 (“extremely false”) to 6 (“extremely true”). The SSCS-SF has shown adequate psychometric properties according to Neff et al. (2021).

**Data Analysis Plan**

We employed two Bayesian hierarchical models to investigate the relationships between the CS and UCS components of state self-compassion and the contextual factors of negative affect and the level of unpleasantness of the event. The regression analysis encompassed inter-individual differences, variations in the context from day to day within individuals, and fluctuations within days for these two contextual factors. In a further analysis, we employed a Bayesian hierarchical model to directly examine the linear relationship between the UCS and CS components of state self-compassion. This model was designed to accommodate momentary shifts in negative affect and subjective context evaluation, while also addressing the stratified nature of our data.

**Statistical Analysis**

All analyses were performed using Bayesian multi-level models to estimate both central tendencies and variances of outcome variables, contingent on predictor values. Bayesian methods were chosen for their ability to provide a probabilistic interpretation of model parameters, enhancing the robustness of results.

We utilized Markov Chain Monte Carlo (MCMC) simulations, specifically Hamiltonian Monte Carlo implemented in Stan (Stan Development Team, 2020), with weakly informative priors to ensure adequate model fit. The posterior distributions were derived from at least 2,000 samples across four chains, following 1,000 adaptation steps.

The optimal model structure, incorporating both random and fixed effects, was determined through a model comparison process. All numerical variables were standardized prior to analysis to enhance comparability and interpretability. To identify the best model fit, we employed the Leave-One-Out Cross-Validation (LOO) procedure, which evaluates out-of-sample prediction accuracy by sequentially excluding individual observations from the dataset and assessing the model’s performance on these excluded points. Models demonstrating lower LOO values were interpreted as having superior fit and enhanced predictive accuracy – details are available in the Supplementary Information (SI).

Results are presented as posterior distributions with means (β) and 89% credibility intervals (CI). Contrasts were calculated to determine the expected difference between levels of a predictor, reported with 89% highest posterior density intervals (HPDI). Model parameters are considered to show an effect if their 89% CI does not include zero. Unlike frequentist confidence intervals, the 89% CI in Bayesian analysis represents the range within which the parameter value lies with 89% probability, given the observed data. Bayesian models do not rely on p-value thresholds but provide a probabilistic view of parameters and their uncertainties, reducing the likelihood of Type I errors and offering greater flexibility compared to frequentist approaches (McElreath, 2020).

**Correlations between CS and UCS components of State Self-Compassion**.

The multilevel correlation, which accounts for the nested structure of participants, days, and individual measurements within each day, between the CS component of state self-compassion (computed as the sum of four compassionate items) and the UCS component (computed as the sum of four uncompassionate items) was -0.48 (89% CI [-0.49, -0.47]). This moderate negative correlation highlights the interconnected nature of CS and UCS within daily experiences.

The impact of situational factors on state self-compassion becomes evident when considering even the smallest time lag (i.e., a time lag of one) within the same day. Specifically, the correlation between CS at a given time point and UCS at the immediately preceding time point weakens substantially, dropping to -0.10 (89% CI [-0.12, -0.08]). This substantial reduction underscores the strong influence of immediate situational contexts on the CS and UCS components of state self-compassion.

**Multilevel Reliability.** We conducted a multilevel reliability analysis of the CS and UCS components of the State Self-Compassion scale by using the procedure proposed by Lai (2021). For the *CS component*, the Within-Subject Reliability () was equal to 0.626, indicating moderate consistency in responses across different measurement occasions. This level of reliability reflects the variability in individuals’ self-compassionate responses over time. A higher reliability index of 0.820 was observed for the Between-Subject Reliability (), demonstrating the measure’s effectiveness in distinguishing stable individual differences in self-compassion. Finally, the overall Composite Reliability () was 0.79, suggesting a reliable integration of both within and between-subject variabilities. For the *UCS component*, slightly higher than the CS component, the Within-Subject Reliability () was equal to 0.68, indicating moderate consistency in responses over time. Markedly robust at 0.88, the Between-Subject Reliability () indicates a strong individual differentiation in the UCS component of state self-compassion. Finally, the Composite Reliability () for the UCS component was 0.83, reinforcing the measure’s overall reliability.

In summary, the between-subject reliability indices for both components, particularly the UCS component, surpass the benchmark of 0.8, suggesting the scale’s effectiveness in capturing stable individual differences in state self-compassion. The within-subject reliabilities, while lower, are reflective of state self-compassion as a dynamic construct. These values capture the natural fluctuation in the CS and UCS levels due to changing circumstances and internal states, highlighting the scales’ sensitivity to temporal variations within individuals.

## Results

**The Impact of Negative Affect and Event Unpleasantness on State Self-Compassion**.

Two Bayesian hierarchical models were employed to investigate the influence of contextual factors on the CS and UCS components of the state self-compassion scale. These models considered between-day variations within individuals and within-day fluctuations as predictors. Specifically, the CS and UCS components of the state self-compassion were modeled as functions of six predictors: negative affect and the level of unpleasantness of the event. These predictors were centered to isolate three distinct dimensions of variance: inter-individual differences, between-day variations within the same individual, and within-day fluctuations within each individual (see SI for details).

For both CS and UCS, the effects of NegAff were observed in opposite directions. Higher NegAff was associated with a decrease in CS and an increase in USC. For CS: NegAff moment: β = -0.24 (89% CI: -0.25 to -0.23); NegAff day: β = -0.26 (89% CI: -0.27 to -0.25); NegAff person: β = -0.51 (89% CI: -0.57 to -0.45). For USC: NegAff moment: β = 0.26 (89% CI: 0.25 to 0.27); NegAff day: β = 0.31 (89% CI: 0.30 to 0.32); NegAff person: β = 0.65 (89% CI: 0.60 to 0.71).

The effects of the level of unpleasantness of the most salient situational event on both CS and UCS were minimal but slightly positive. For CS, Unpleasantness moment: β = 0.04 (89% CI: 0.03 to 0.05); Unpleasantness day: β = 0.01 (89% CI: -0.00 to 0.02); Unpleasantness person: β = 0.01 (89% CI: -0.05 to 0.07). For USC: Unpleasantness moment: β = 0.00 (89% CI: -0.01 to 0.01); Unpleasantness day: β = 0.04 (89% CI: 0.03 to 0.05); Unpleasantness person: β = 0.12 (89% CI: 0.07 to 0.17).

In summary, the analysis of NegAff provides strong support for the BCH. The data clearly show an inverse relationship between NegAff and the two components of state self-compassion – CS and UCS – aligning well with Neff’s hypothesis. This suggests that as negative affect increases, CS decreases while UCS increases, and vice versa.

The influence of the level of unpleasantness of the most salient situational event on self-compassion presents a more complex picture. The relationship between the level of unpleasantness and the SC and USC components does not align as straightforwardly with the BCH. This complexity suggests that additional factors or more intricate mechanisms may be influencing how contextual evaluations affect state self-compassion. However, it is important to note that the effect sizes for the unpleasantness of the event are notably small, as indicated by the standardized partial regression coefficients. This observation implies that while the unpleasantness of the most salient event has some impact on state self-compassion, its overall influence is relatively minor compared to the more substantial effects of negative affect.

**Discussion**

These findings offer nuanced support for the Bipolar Continuum Hypothesis in the context of daily experiences. The robust opposing effects of negative affect on CS and UCS align with the Bipolar Continuum Hypothesis prediction of inverse relationships between these components. However, the minimal and sometimes parallel effects of event unpleasantness on both components suggest that the bipolar relationship may be more pronounced for internal emotional states than for external contextual factors. This pattern indicates that the dynamic interplay between compassionate and uncompassionate self-responding may be more complex than initially theorized, varying across different types of situational influences.

**Study 2: State Self-Compassion Dynamics in High-Stress Environments**

Study 2 investigates the dynamic relationships between contextual factors and the compassionate self-responding (CS) and uncompassionate self-responding (UCS) components of state self-compassion in high-stress environments. High-stress conditions provide a rigorous test of the Bipolar Continuum Hypothesis, as stress could differentially impact CS and UCS.

Stressful situations often challenge individuals' ability to maintain CS, potentially increasing their susceptibility to UCS. However, effective stress management might lead to higher levels of both self-compassion and self-regulation, with lower levels of self-criticism. Such findings would support the bipolar nature of these components.

Alternatively, high-stress conditions might lead to simultaneous increases in both CS and UCS (Ullrich-French & Cox, 2020). This would suggest that CS and UCS can coexist, potentially operating as independent processes rather than as mutually exclusive poles of a single continuum. If supported, this would challenge the Bipolar Continuum Hypothesis and indicate that CS and UCS might function separately, particularly in high-stress contexts.

## Methods

**Procedure.** Mirroring the methodology of Study 1, this investigation initiated with participants providing informed consent and those meeting the inclusion criteria attending an initial session. During this session, we assessed baseline measures as in Study 1 – for details, see SI. Subsequent to the baseline assessment, participants underwent training in the use of the m-Path mobile application (Mestdagh et al., 2023).

The EMA protocol spanned three months, with data collection occurring over 16 selected days. Participants received five daily prompts on Saturdays, in line with a semi-random sampling approach. The timing of these notifications was set at specific intervals throughout the day: between 10:00 and 10:30 AM, 3:00 and 3:30 PM, 5:00 and 5:30 PM, 7:00 and 7:30 PM, and finally, between 9:00 and 9:30 PM.

In contrast to Study 1, Study 2 introduced a novel protocol element: context-specific notifications. In addition to the regular prompts, participants received notifications during known high-stress periods, specifically before and after exams (on 4 out of the 16 total days). This modification was intended to capture participants’ emotional and self-compassionate responses in real-time during stressful scenarios, providing contextually enriched data.

The study was structured around three distinct temporal phases to assess the impact of this stressor: (1) the Pre-Exam Phase (immediately before the exam, capturing anticipation and concern), (2) the Post-Exam Phase (immediately after the exam, reflecting immediate reactions and relief or ongoing stress), and (3) the Distant Time Point Phase (a period significantly after the exam, when the stressor became less relevant). This time-based segmentation allowed for the comparison of emotional and psychological responses across periods of heightened and reduced stress, enabling an evaluation of dynamic changes in self-compassion, stress, and related constructs in response to varying levels of stress proximity.

Each notification prompted participants to respond to a set of 17 questions designed to assess momentary self-compassion, positive and negative affect, decentering ability, and their evaluation of a notable event since the last prompt.

### Participants.

Participants in this study were required to complete data collection on at least four of the 16 designated days to ensure a detailed capture of their experiences. The participant group comprised both undergraduate and graduate students enrolled in psychology courses, and their involvement in the study was voluntary. The analysis included data from 168 participants, with an average age of 19.6 years (SD = 1.9). Consistent with Study 1, eligibility for this study required participants to meet predefined criteria, including the absence of a mental health diagnosis.

None of the participants reported current or past psychiatric disorders, and none of them reported using medications.

In this study, we set the compliance criterion at a minimum of 50%. This criterion led to the exclusion of 2 participants. Consequently, the final sample size was established at 168 individuals. The overall compliance rate was high. On average, participants engaged with 82% of the daily notifications, translating to responses to about 4.1 out of every 5 notifications sent each day. Additionally, when considering the entire duration of the study, the compliance rate across all days was 72%. This indicates that, on average, participants were responsive on 7.2 out of the 10 days of the study.

**Materials.** The EMA protocol in this study consisted of 17 questions, incorporating the same items as used in Study 1. These included: (1) Assessment of Pleasant/Unpleasant Events, (2) Evaluation of Positive and Negative Affect, and (3) the State-Self-Compassion Scale Short Form (SSCS-SF). However, a notable addition in this protocol, differing from Study 1, was the inclusion of 4 items specifically designed to assess decentering abilities. These additional items, derived from previous EMA studies (Biehler & Naragon-Gainey, 2022), were integrated to provide a deeper understanding of the participants’ ability to observe their thoughts and feelings from a detached perspective. We introduced decentering, a key component of mindfulness, which refers to the ability to take a detached and objective perspective on one's mental experiences. Decentering plays a critical role in how individuals relate to their own suffering, a central aspect of self-compassion (Biehler & Naragon-Gainey, 2022). By adopting a decentered perspective, individuals may respond to negative emotions with greater kindness and understanding, thereby enhancing CS. According to the BCH, this should correspond with a decrease in UCS. If the BCH does not hold, however, decentering may impact only CS without affecting UCS. Furthermore, decentering may influence how individuals process stress, helping them recognize stressful emotions as temporary and not reflective of their identity (Bernstein et al., 2015), which could help sustain or enhance CS while reducing UCS.

**Data Analysis Plan.** Our initial analysis examined the impact of two academic exams on state self-compassion, with their timings strategically manipulated by the research team. We segmented the exam periods into pre-exam, post-exam, and non-exam phases to capture state self-compassion fluctuations across these distinct temporal contexts. This design allowed us to observe how the timing of exams – controlled and manipulated as a contextual factor – impacted the two components of state self-compassion, providing a unique opportunity to interpret these effects as direct consequences of our manipulation.

Study 2 broadened the investigation of study 1 by introducing decentering as a novel variable. Our multi-level analysis examined inter-individual differences, between-day variations, and within-day fluctuations in state self-compassion, utilizing an array of predictors including negative affect, decentering, and the level of the unpleasantness of the event. In a direct test of the BCH, we employed a Bayesian hierarchical model, predicting the UCS component from the CS component. This model incorporated momentary negative affect, decentering, and the level of the unpleasantness of the event, along with random effects for participants and days. In a final statistical analysis, we compared the multilevel correlations between CS and UCS of state self-compassion that were computed during three distinct temporal phases (chosen to represent periods of varying stress levels and personal relevance), in order to test the hypothesis of Dejonckheere et al. (2021).

## Results

### Impact of Academic Exam on State Self-Compassion.

To analyze the impact of two academically scheduled exams on students' state self-compassion, we utilized two distinct Bayesian hierarchical models. The prompts were strategically scheduled to create distinct periods for analysis: *No Exam* (baseline; at least a week before or after the exam), *Pre-Exam* (the evening before the exam), and *Post-Exam* (the evening of the exam day). The primary objective was to monitor fluctuations in the CS and UCS components of state self-compassion during these key moments. We hypothesized that anxiety would escalate before the exams (*Pre-Exam*) and decrease after the exams (*Post-Exam*), potentially reverting to baseline or lower levels due to the typically positive outcomes of these exams.

In fact, our results revealed robust contextual influences on state self-compassion.

1. In the *Pre-Exam* period, there was a decrease in CS compared to baseline (posterior estimate for beta\_pre: -0.29; 89% CI: [-0.51, -0.08]; p(β) < 0 = 0.98). This suggests that the anticipation of the exam substantially lowered students’ compassionate self-responses. Conversely, UCS increased compared to baseline (posterior estimate for beta\_pre: 0.66; 89% CI: [0.38, 0.95]; p(β) > 0 = 1), indicating heightened self-criticism or reduced self-kindness during this stressful period.

2. In the *Post-Exam* period, there was an increase in CS compared to baseline (posterior estimate: 0.23; 89% CI: [0.02, 0.45]; p(β) > 0 = 0.96), suggesting a rebound in self-compassion following the stressor. UCS decreased compared to baseline (posterior estimate: -0.67; 89% CI: [-0.95, -0.39]; p(β) < 0 = 1), indicating a reduction in self-criticism or increased self-kindness post-exam – see Figure 2.

**Figure 2**

*Study 2: Posterior Distribution of CS and UCS Components Before and After Exam Days*

Immagine che contiene diagramma, Diagramma, testo, schermata

Descrizione generata automaticamente

*Note.* **Top Panel:** This panel illustrates the differences in self-compassion levels, both CS and UCS, on the day before an exam relative to typical non-exam days. The differences were calculated by subtracting the self-compassion levels on non-exam days from those on the day before the exam. **Bottom Panel:** This panel presents the differences in self-compassion levels on the day after an exam, again compared to non-exam days. Contrary to the day before the exam, the day after an exam typically witnesses a reversal in the trends of CS and UCS levels. The graph depicts that, as expected, the UCS component sees an elevation the day before the exam, indicating increased stress or negative self-concept, while the CS component declines, suggesting a decrease in positive self-compassion. This trend reverses the day after the exam, with the CS component rebounding above the pre-exam average and the UCS component diminishing. The zero line on the graph represents the reference level of self-compassion during periods not influenced by exam stress, serving as a steady-state benchmark for comparison.

These results underscore the dynamic nature of state self-compassion in relation to situational stressors. The observed decrease in CS and increase in UCS before the exam, relative to baseline levels, demonstrate the strong impact of stress on state self-compassion. The reversal of these trends post-exam, with an increase in CS and decrease in UCS, indicates a recovery in state self-compassion levels. The findings provide strong evidence supporting the BCH. The inverse relationship between CS and UCS in response to stress and subsequent relief aligns with the BCH's prediction that increases in CS are associated with decreases in UCS, and vice versa. This dynamic response to contextual stressors strengthens the argument that CS and UCS exist on a single continuum.

The distinct changes in CS and UCS in opposite directions before and after the exam also highlight the necessity of considering temporal context when evaluating state self-compassion. The results suggest that while CS and UCS generally move inversely to one another, the intensity and direction of these changes are heavily influenced by specific situational factors. These insights emphasize the importance of understanding the nuanced and context-dependent nature of state self-compassion, reinforcing the BCH while also pointing to the complex interplay between stress, self-compassion, and individual differences in emotional regulation.

**Testing the Bipolar Continuum Hypothesis Through Contextual Influences on State Self-Compassion**.

In our second statistical analysis, we replicated a similar approach used in Study 1 to test the BCH. We examined the influence of contextual factors on the SC and UCS components of state self-compassion separately. Utilizing two Bayesian hierarchical models, we modeled the SC and UCS components as functions of nine predictors: negative affect, decentering, and the level of unpleasantness of the event. To distinguish specific dimensions of variance, these predictors were uniquely centered to capture: 1. Inter-Individual Differences: Variations between different individuals. 2. Between-Day Variations: Changes within the same individual across different days. 3. Within-Day Fluctuations: Fluctuations within the same individual throughout a single day. This comprehensive approach allowed us to dissect the relative contributions of these different dimensions of variance, thereby providing a nuanced understanding of how contextual factors impact state self-compassion in line with the BCH.

For the compassionate dimension of CS, there was robust inter-individual variability. The baseline compassionate self-view among participants varied, with a standard deviation of 0.56 for the intercept (89% Confidence Interval [CI]: [0.51, 0.61]). Our analysis revealed a strong negative association of NegAff with state self-compassion across various levels. Person-level: β = -0.31 (89% CI [-0.40, -0.22]); Day-level: β = -0.17 (89% CI [-0.18, -0.15]); Moment-level: β = -0.13 (89% CI [-0.14, -0.11]). Conversely, decentering demonstrated a positive correlation with SC. Person-level: β = 0.20 (89% CI [0.12, 0.27]); Day-level: β = 0.12 (89% CI [0.11, 0.13]); Moment-level: β = 0.08 (89% CI [0.07, 0.09]). The subjective evaluation of the level of unpleasantness of the event showed a modest positive relationship with state self-compassion. Person-level: β = 0.03 (89% CI [-0.05, 0.11]); Day-level: β = 0.04 (89% CI [0.02, 0.05]); Moment-level: β = 0.02 (89% CI [0.01, 0.04]).

For the UCS, credible inter-individual differences were also observed. The standard deviation for the intercept related to user\_id was 0.47 (89% CI [0.43, 0.51]), indicating considerable variations in baseline levels of uncompassionate self-view. Negative affect was positively correlated with state self-compassion across various levels. Person-level: β = 0.33 (89% CI [0.25, 0.41]); Day-level: β = 0.16 (89% CI [0.15, 0.18]); Moment-level: β = 0.14 (89% CI [0.13, 0.15]). In contrast, decentering showed a significant negative correlation with state self-compassion. Person-level: β = -0.36 (89% CI [-0.43, -0.30]); Day-level: β = -0.22 (89% CI [-0.23, -0.21]); Moment-level: β = -0.15 (89% CI [-0.16, -0.13]). The perception of the level of unpleasantness of the event exhibited minimal correlations. Person-level: β = 0.05 (89% CI [-0.02, 0.12]); Day-level: β = -0.00 (89% CI [-0.01, 0.01]); Moment-level: β = -0.03 (89% CI [-0.04, -0.01]).

These findings provide substantial support for the BCH. The observed opposite influences of contextual factors on the CS and UCS components of state self-compassion across all levels of variance (inter-individual, between-day, and within-day) align with the BCH. The strong negative association between negative affect and CS, coupled with the positive association between negative affect and UCS, suggests that increases in self-compassion are associated with decreases in self-criticism, and vice versa. Furthermore, the positive relationship between decentering and CS, along with its negative relationship with UCS, indicates that mindfulness practices may enhance compassionate responses while reducing uncompassionate ones, thus reinforcing the bipolar nature of these components in qualitative terms. The modest influence of the level of unpleasantness of events on state self-compassion also highlights the complex interplay of situational factors in shaping self-compassion.

Collectively, these results underline the dynamic and context-dependent nature of state self-compassion. They validate the BCH by demonstrating that CS and UCS are inversely related across various contexts and individual differences, confirming that self-compassion operates as a bipolar construct rather than as independent or synergistic elements.

**Levels of Personal Concern.** In a further statistical analysis, we tested the BCH by examining the correlations between the CS and UCS components of state self-compassion across different levels of personal concern and stress. To validate this hypothesis, we examined correlations in high-stress situations (high personal concern) and low-stress contexts (low personal concern). If strong negative correlations are observed consistently across both high and low stress contexts, this would strongly support the BCH by demonstrating that the inverse relationship between CS and UCS remains stable regardless of stress levels. Instead, if high stress contexts show weak or independent correlations between CS and UCS, this would challenge the BCH by suggesting that the relationship between self-compassion components becomes less bipolar and more independent when personal concern is increased.

In high-stress situations, such as the day before an exam, the CS-UCS correlation was -0.70 (89% CI: [-0.76, -0.62]). This strong negative correlation indicates that higher levels of CS are associated with lower levels of UCS, consistent with the BCH. Immediately after the exam, this pattern remained consistent, reinforcing the inverse relationship between CS and UCS, with a correlation of -0.70 (89% CI: [-0.78, -0.59]). In a lower stress context, far removed from the exam, the CS-UCS correlation shifted to -0.79 (89% CI: [-0.95, -0.60]). This period was selected for its high compliance and uniformity in EMA notification timing, providing a stable baseline for comparison. Notably, the 89% CI in this lower stress context substantially overlapped with those observed in the higher stress conditions.

These results validate the BCH. The stable, strong negative correlations across different levels of personal concern suggest that the interplay between self-compassion components remains consistent, regardless of fluctuating stress levels.

**Decentering and CS and UCS Correlation.** In a final statistical analysis, we aimed to test the BCH by examining the influence of decentering on the relationship between the CS and UCS components of state self-compassion. Decentering refers to the ability to observe thoughts and feelings as temporary and separate from the self. We hypothesized that individuals with higher levels of momentary decentering would exhibit a stronger negative correlation between CS and UCS, reinforcing the bipolar nature of self-compassion. Conversely, if decentering did not strengthen the negative correlation between CS and UCS, or if the correlation became weaker, this would challenge the BCH by suggesting that decentering might lead to a more independent or synergistic relationship between CS and UCS.

To investigate this hypothesis, we employed a Bayesian multivariate model to examine how individual levels of decentering affect the relationship between CS and UCS components of state self-compassion. The results indicate that higher levels of decentering are associated with a stronger negative correlation between CS and UCS (β = 0.06, 89% CI [0.05, 0.07]). This means that individuals who frequently engage in decentering, a core aspect of mindfulness, show a more pronounced inverse relationship between compassionate and uncompassionate self-responding. Additionally, the residual correlation between CS and UCS was negative (Estimate = -0.39, 89% CI [-0.48, -0.29]), further reinforcing the interconnectedness of these components. The observed interaction effect, where higher levels of decentering are associated with a stronger negative correlation between CS and UCS, supports the BCH. This suggests that mindfulness practices promoting decentering may reinforce the bipolar nature of self-compassion. As individuals become better at recognizing thoughts and emotions as transient and separate from their identity, the inverse relationship between CS and UCS becomes more pronounced.

**Discussion**

The results of Study 2 show that in high-stress contexts, such as the periods surrounding academic exams, CS and UCS fluctuate in opposite directions. Specifically, we observed a decrease in CS and an increase in UCS during the pre-exam period, followed by a rebound in CS and a reduction in UCS post-exam. This pattern reinforces the notion that CS and UCS operate as opposing ends of a continuum, particularly in response to stress.

This study highlights the role of stress in modulating the self-compassion components (Allen and Leary, 2010). Before the exam, when stress levels were high, participants displayed higher UCS and lower CS, consistent with the expectation that stressful situations impair individuals' ability to engage in self-kindness. Conversely, the post-exam period, marked by stress relief, showed a recovery in CS and a decline in UCS, suggesting that the capacity for self-compassion resurfaces once the stressor is removed. This dynamic shift aligns with the Bipolar Continuum Hypothesis and illustrates how situational factors, such as stress, influence the balance between these two components.

Moreover, the study examined the moderating role of decentering, a mindfulness-related ability that allows individuals to observe their thoughts and emotions from a detached perspective ([Biehler](https://scholar.google.it/citations?user=emo9WJgAAAAJ&hl=it&oi=sra) and [Naragon-Gainey](https://scholar.google.it/citations?user=Seltz3wAAAAJ&hl=it&oi=sra), 2022). Higher levels of decentering were associated with a stronger negative correlation between CS and UCS, indicating that individuals who can decenter effectively exhibit a more pronounced inverse relationship between these components. This finding suggests that mindfulness practices, such as decentering, reinforce the bipolar nature of self-compassion by helping individuals manage stress more effectively, thereby enhancing CS and reducing UCS.

In summary, Study 2 provides robust evidence that CS and UCS are inversely related, particularly in high-stress environments, supporting the Bipolar Continuum Hypothesis. The results underscore the importance of considering both contextual and individual factors, such as stress and decentering, in understanding the dynamics of state self-compassion.

**Dimensionality Analysis**

Previous psychometric studies have consistently supported the Bipolar Continuum Hypothesis by demonstrating the superiority of general factor models in capturing the dimensionality of trait self-compassion. Extending this research, we evaluated the dimensionality of *state self-compassion* with our EMA data by using multilevel confirmatory factor analysis (MCFA) to account for the nested structure of repeated measurements within individuals and across days.

We compared three models: a One-Factor Model, a Two-Factor Model distinguishing between correlated CS and UCS, and a Bifactor Model. The Bifactor Model demonstrated the best overall fit, suggesting that state self-compassion is best represented by both a general factor and specific dimensions (CS and UCS) – for details, see SI.

It is important to emphasize that selection must balance statistical fit with interpretability. While the Bifactor Model demonstrated superior statistical fit, its additional complexity did not substantially enhance the interpretability of the findings. Most of the explained variance was captured by the general factor, suggesting that a simpler unidimensional model may offer similar explanatory power with less complexity. These results thus support the concept of "essential unidimensionality" (Reise et al., 2013) in *state self-compassion*.

In summary, our MCFA analysis aligns with Neff's hypothesis of an inverse relationship between CS and UCS. However, it is essential to recognize that MCFA evaluates *latent, person-level relationships*, reflecting *general trends* over time and across contexts. This nomothetic approach may not fully capture the momentary dynamics of CS and UCS within individuals. Other momentary-level analyses might reveal more independent or context-specific associations between CS and UCS during short time periods.

**Modeling the Dynamic Relationship Between Compassionate and Uncompassionate Self-Responding: An Idionomic Approach**

To address this limitation and gain deeper insights into person-specific dynamics, we conducted an *idiomic analysis* to examine the relationship between UCS and CS at the individual level by combining samples from both studies (Ciarrochi et al., 2024; Ferrari et al., 2022; Sahdra et al., 2024). This approach allows us to explore potential heterogeneity in self-compassion processes that may be masked by nomothetic analyses, providing a more nuanced understanding of how these constructs interact within-individuals over time.

**Idionomic Analysis of the Relationship Between UCS and CS**

For the present purposes, an idionomic analysis was conducted in two stages. The first stage involved a strictly idiographic approach, focusing on the individual-level patterns. In the second stage, we applied a nomothetic approach to examine and describe group-level regularities as well as the variability in these effects across individuals (e.g., Ciarrochi et al. 2024; Sahdra et al. 2024).

**Step 1.** For each participant separatedly, we implemented a hierarchical Bayesian model using Stan to estimate the rela- tionship between uncompassionate (UCS) and compassionate self-responding (CS). The model incorporated additional covariates, including negative affect and context evaluation, as well as lagged effects of CS from the previous measurement within the same day. The model for each participant was specified as follows:

UCS𝑛 ∼ 𝑡𝜈(𝛼 + 𝛾CS ⋅ CS𝑛 + 𝛾neg\_aff ⋅ neg\_aff𝑛 + 𝛾context ⋅ context𝑛 + 𝜙 ⋅ lag\_CS𝑛

+ 𝛾interaction ⋅ CS𝑛 ⋅ neg\_aff𝑛, 𝜎),

Where:

• UCS𝑛 represents the CS score for observation 𝑛,  
• 𝛼 denotes the intercept,  
• 𝛾CS is the coeﬀicient for the primary predictor, CS (CS𝑛),  
• 𝛾neg\_aff and 𝛾context are coeﬀicients for negative affect (neg\_aff𝑛) and context evaluation

(context𝑛), respectively,  
• 𝜙 represents the autoregressive coeﬀicient for the lagged CS within the same day

(lag\_CS𝑛 ),  
• 𝜎 is the scale parameter (standard deviation) of the distribution,  
• 𝜈 denotes the degrees of freedom of the Student’s t-distribution,  
• 𝛾interaction is the coeﬀicient for the interaction term between CS and negative affect.

This model allows for the examination of the association between UCS and CS while controlling for the effects of negative affect, context evaluation, lagged CS effects within the same day, and the CS × negative-affect interaction. We employed a Student’s t-distribution (𝑡𝜈) to account for potential outliers or heavy-tailed distributions in the data (see Supplementary Information for further details).

For each participant, we examined the posterior distribution of the gamma\_CS coeﬀicient to estimate the proportion of posterior draws that were negative. This enabled us to evaluate whether there was evidence of a negative association between UCS and CS at the individual level, in line with Neff’s bipolar continuum hypothesis. Additionally, we computed the mean posterior estimates for the gamma\_neg\_aff, gamma\_context, and gamma\_interaction param- eters, which represent the effects of negative affect, context evaluation, and the interaction between CS and negative affect, respectively, on UCS for each participant.

**Step 2.** After the idiographic analysis, we used a hierarchical model (e.g., Ciarrochi et al. 2024) in the brms package (R) to summarize the proportion of negative estimates for the gamma\_CS parameter across participants. This model employed a binomial distribution, with the total number of posterior samples as the denominator and the proportion of negative estimates as the response. A random intercept for participants was included to account for individual variability.

Hierarchical models were also applied to the mean posterior estimates of the gamma\_neg\_aff, gamma\_context, and gamma\_interaction parameters, representing the influences of negative affect, context evaluation, and the interaction between CS and negative affect on UCS. Each model included a fixed effect (intercept) and random intercepts for participants, capturing individual differences. A Student-t likelihood was used to account for potential outliers and accommodate the heavy-tailed nature of the effect distributions, providing robust aggregate estimates of each parameter and the heterogeneity of their relationships with UCS (see SI for further details).

**Results**

The analysis of the gamma\_CS parameter across participants indicated that 81.0% (89% CI [0.796, 0.823]) of the posterior estimates for the association between uncompassionate self- responding (UCS) and compassionate self-responding (CS) were negative. This supports Neff’s bipolar continuum hypothesis, which posits an inverse relationship between UCS and CS. However, the variability in individual effects (sd(Intercept) = 1.25, corresponding to 0.196 on the probability scale) suggests moderate heterogeneity in the strength of this relationship across participants.

For the influence of negative affect on UCS, represented by the gamma\_neg\_aff parameter, the analysis revealed a positive overall effect (intercept = 0.38, 89% CI [0.34, 0.42]), indicating that higher levels of negative affect are generally associated with increased UCS. The variability between individuals (sd(Intercept) = 0.19, corresponding to 0.547 on the probability scale) suggests substantial heterogeneity in how strongly negative affect influences UCS.

The analysis of context evaluation showed a small but credible negative effect on UCS (mean = -0.04, 95% CI [-0.07, -0.01]), suggesting that higher context evaluation scores are associated with a slight reduction in UCS. The variability in individual responses (sd(Intercept) = 0.17, corresponding to 0.543 on the probability scale) also indicates substantial heterogeneity in the relationship between context evaluation and UCS across participants.

Finally, the interaction between CS and negative affect was negligible, with the 89% credible interval spanning zero (-0.03, 0.00), suggesting no meaningful interaction effect between these variables on UCS.

**Discussion**

The idionomic analysis largely supported Neff's bipolar continuum hypothesis, showing an inverse relationship between UCS and CS for 81% of participants. However, there was considerable variability in the strength of this association across individuals, revealing that the Bipolar Continuum Hypothesis does not hold equally for everyone.

Negative affect robustly increased UCS, demonstrating that heightened negative emotions are linked to greater self-criticism. This relationship also varied across participants, highlighting individual differences in emotional sensitivity. Context evaluation had a modest but consistent negative effect on UCS, suggesting that a more positive perception of one's situation slightly reduces self-criticism.

However, the interaction between CS and negative affect was found to be negligible, which implies that the relationship between CS and UCS is not strongly moderated by momentary emotional states. In other words, the impact of CS on reducing UCS does not robustly depend on fluctuations in negative affect. This suggests that in certain contexts, CS and UCS might not be as tightly coupled as the Bipolar Continuum Hypothesis predicts. Instead of always moving in opposite directions, they may operate more independently in response to varying emotional or situational factors. This challenges the idea that CS and UCS are strictly opposite poles of the same construct in all situations.

In summary, while the overall results support the Bipolar Continuum Hypothesis at the group level, these findings highlight its limitations in accounting for the complexity and variability of *momentary* *self-compassion dynamics* across individuals.

# General Discussion

# In our two EMA studies, we explored the dynamic relationship between contextual factors and state self-compassion, emphasizing how these interactions vary within individuals over time. This research builds on Ferrari et al.'s (2022) call for a shift in self-compassion research, moving beyond the static, trait-level focus to capture the real-time fluctuations of state self-compassion in response to everyday contexts. By employing EMA, we were able to assess how state self-compassion is influenced by contextual factors such as negative affect, the salience of events, and stress.

# Our findings provide partial support for the Bipolar Continuum Hypothesis, which posits an inverse relationship between CS and UCS. Across daily assessments, particularly during high-stress situations like university exams, we observed a clear pattern: as CS increased, UCS decreased, and vice versa. This suggests that under stress, the inverse relationship between these two components becomes more pronounced, lending support to the Bipolar Continuum Hypothesis in these contexts.

In addition to stress, negative affect and decentering emerged as robust influences on state self-compassion. Negative affect had symmetrical but opposite effects on CS and UCS, reinforcing the bipolarity of the construct as proposed by Neff. However, decentering, a measure of mindfulness and emotional regulation, had a stronger impact on reducing UCS than on increasing CS. This imbalance raises questions about whether the Bipolar Continuum Hypothesis fully captures the complexity of self-compassion dynamics. While decentering reduces self-criticism, it may not equally promote self-compassion, challenging the notion of a strictly bipolar model.

The stronger association between decentering and UCS aligns with previous research linking uncompassionate self-responding to rumination and stress (López et al., 2015). These results suggest that mindfulness practices may have a more potent role in mitigating self-criticism than in enhancing self-compassion, hinting at a more nuanced interaction between these components than the Bipolar Continuum Hypothesis suggests.

Interestingly, the level of unpleasantness of specific events had only a modest impact on state self-compassion, suggesting that broader emotional and cognitive factors, such as negative affect and mindfulness, play more significant roles. This finding is consistent with prior research (Neff et al., 2021; Mey et al., 2023), but also highlights a reciprocal relationship: while self-compassion can buffer against negative emotions, heightened emotional states can also reduce momentary self-compassion. This underscores the context-sensitive nature of state self-compassion and its vulnerability to external factors.

Our results also demonstrated how state self-compassion adapts to fluctuating stress levels, particularly around exam periods. Before exams, CS decreased while UCS increased, aligning with the BCH. After exams, this pattern reversed, highlighting the flexibility and responsiveness of state self-compassion in high-stress environments. These findings emphasize the utility of EMA in capturing the dynamic, real-time processes of self-compassion, providing deeper insights than static, trait-based self-reports.

In summary, while our findings support key aspects of the Bipolar Continuum Hypothesis, they also point to complexities that may not be fully explained by a purely bipolar model. Contextual factors like negative affect and mindfulness, particularly decentering, influence CS and UCS in asymmetrical ways, suggesting the need of more flexible models to capture the full range of self-compassion dynamics.

Our psychometric analysis of the EMA data showed that a Two-Factor Model and a Bifactor Model provided superior statistical fit compared to a One-Factor Model when examining the dimensionality of state self-compassion. However, practical importance considerations raised concerns about overfitting, suggesting that a simpler, unidimensional model may offer similar explanatory power while maintaining parsimony. These psychometric analyses thus provide partial support for the Bipolar Continuum Hypothesis' central tenet of an inverse relationship between CS and UCS.

It is important to point out that, while all previous nomothetic (group-level) analyses partially support the Bipolar Continuum Hypothesis, they may also obscure important individual differences. To address this limitation, we performed an idiomic (individual-level) analysis of the combined data of the two studies. This analysis revealed substantial variability in the CS-UCS relationship. Although most participants displayed an inverse relationship, a subset of individuals showed no clear association or a positive correlation between CS and UCS. This suggests that for some individuals CS and UCS may fluctuate together rather than inversely, challenging the universality of the Bipolar Continuum Hypothesis and highlighting the need for more individualized descriptions of the relation between the two components of state self-compassion.

In terms of clinical applications, our findings support the Bipolar Continuum Hypothesis by indicating that increasing CS can effectively reduce psychopathological symptoms (Neff, 2022). This suggests that enhancing CS may serve as a protective factor in therapeutic contexts. Some researchers, however, argue that CS and UCS should be addressed as separate constructs in therapy (Ullrich-French & Cox, 2020). While our longitudinal study suggests that increasing CS typically results in a natural reduction of UCS, our idionomic analysis revealed that, for some individuals, CS and UCS may function more independently. This finding underscores the need for tailored interventions, where for certain individuals, focusing separately on CS and UCS may be necessary to achieve optimal therapeutic outcomes.

**Limitations and future directions**

The present study exhibits several strengths, notably its use of repeated naturalistic sampling methods to capture dynamic variables within a community-based population, offering nuanced insights into variable fluctuations in natural settings. However, several limitations must be considered when interpreting the results. To begin with, the sample was predominantly drawn from a university community of psychology students, which may not represent the broader public, and its non-clinical nature limits applicability to clinical populations. Indeed, our sample exhibited a stronger presence of the CS component compared to the UCS component (Bayesian Cohen’s d = 1.48). In contrast, clinical populations often exhibit a stronger UCS component. For

## instance, Neff and McGehee (2010) showed that individuals with psychological disorders tend to have higher levels of self-criticism and lower levels of self-kindness, a pattern inverse to what we observed in our study. Therefore, expanding the study of SC to different populations, such as clinical ones, could be useful to clarify the nature of state SC.

Additionally, the study did not consider other potential momentary variables that could influence self-compassion scores and the relationship between CS and UCS. This highlights the need for broader research that includes factors such as mindfulness (Biehler & Naragon-Gainey, 2022) and rumination (Raes, 2010).

Finally, the study's EMA protocol, which involved once-weekly measurements over three months, contrasts with more intensive typical EMA studies. A more frequent data collection strategy, such as five notifications per day, every day for two weeks, could provide a deeper understanding of variable fluctuations in daily life.

**Data availability.** Data are available at <https://osf.io/8vg3h/?view_only=815fd6e81b8e421e84428ec23b659c95>

**Declarations**

**Ethics statement.** The studies’ protocol received approval from the University of BLINDED Ethical Committee (Prot. n. 0249805) and was conducted in accordance with the principles of the Declaration of Helsinki.

**Informed Consent.** All participants provided their informed consent to participate in the studies.

**Conflict of interest.** The authors declare that they have no conflict of interest.

# References

Aldao, A. (2013). The future of emotion regulation research: Capturing context. *Perspectives on Psychological Science*, *8*(2), 155–172.

Aldao, A., Sheppes, G., & Gross, J. J. (2015). Emotion regulation flexibility. *Cognitive Therapy and Research*, *39*, 263–278.

Allen, A. B., & Leary, M. R. (2010). Self‐Compassion, stress, and coping. *Social and Personality Psychology Compass*, *4*(2), 107-118.

American Psychiatric Association, (2013). *Diagnostic and statistical manual of mental disorders: DSM-5(Vol. 5, No. 5). Washington, DC: American Psychiatric Association.*

Bernstein, A., Hadash, Y., Lichtash, Y., Tanay, G., Shepherd, K., & Fresco, D. M. (2015). Decentering and related constructs: A critical review and metacognitive processes model. *Perspectives on Psychological Science*, *10*(5), 599–617.

Biehler, K. M., & Naragon-Gainey, K. (2022). Clarifying the relationship between self-compassion and mindfulness: An ecological momentary assessment study. *Mindfulness*, *13*(4), 843–854.

Carpenter, R. W., Wycoff, A. M., & Trull, T. J. (2016). Ambulatory assessment: New adventures in characterizing dynamic processes. *Assessment*, *23*(4), 414–424.

Caudek, C., Sica, C., Marchetti, I., Colpizzi, I., & Stendardi, D. (2020). Cognitive inflexibility specificity for individuals with high levels of obsessive-compulsive symptoms. *Journal of Behavioral and Cognitive Therapy*, *30*(2), 103-113.

Caudek, C., Sica, C., Cerea, S., Colpizzi, I., & Stendardi, D. (2021). Susceptibility to eating disorders is associated with cognitive inflexibility in female university students. *Journal of Behavioral and Cognitive Therapy*, *31*(4), 317-328.

Colpizzi, I., Berti, C., Sica, C., Alfei, V., & Caudek, C. (2024). Individual Differences in Risk and Protective Factors: The Role of Self-Compassion Components among Emergency Responders. *Behavioral Sciences*, *14*(3), 178.

Dejonckheere, E., Mestdagh, M., Verdonck, S., Lafit, G., Ceulemans, E., Bastian, B., & Kalokerinos, E. K. (2021). The relation between positive and negative affect becomes more negative in response to personally relevant events. *Emotion*, *21*(2), 326–336.

Ferrari, M., Ciarrochi, J., Yap, K., Sahdra, B., & Hayes, S. C. (2022). Embracing the complexity of our inner worlds: Understanding the dynamics of self-compassion and self-criticism. *Mindfulness*, *13*(7), 1652–1661.

Ferrari, M., Hunt, C., Harrysunker, A., Abbott, M. J., Beath, A. P., & Einstein, D. A. (2019). Self-compassion interventions and psychosocial outcomes: A meta-analysis of RCTs. *Mindfulness*, *10*, 1455–1473.

Fischer, R., Scheunemann, J., & Moritz, S. (2021). Coping strategies and subjective well-being: Context matters. *Journal of Happiness Studies*, 1–22.

Gratz, K., & Roemer, L. (2004). Difficulties in emotion regulation scale (DERS). *Journal of Psychopathology and Behavioral Assessment*, *26*, 41–54.

Haney, A. M., Fleming, M. N., Wycoff, A. M., Griffin, S. A., & Trull, T. J. (2023). Measuring affect in daily life: A multilevel psychometric evaluation of the PANAS-x across four ecological momentary assessment samples. *Psychological Assessment*.

Inwood, E., & Ferrari, M. (2018). Mechanisms of change in the relationship between self-compassion, emotion regulation, and mental health: A systematic review. *Applied Psychology: Health and Well-Being*, *10*(2), 215–235.

Kuranova, A., Booij, S. H., Menne-Lothmann, C., Decoster, J., Winkel, R. van, Delespaul, P., De Hert, M., Derom, C., Thiery, E., Rutten, B. P. F, Jacobs, N., van Os, J., Wigman, J. T. W., & Wichers, M. (2020). Measuring resilience prospectively as the speed of affect recovery in daily life: A complex systems perspective on mental health. *BMC Medicine*, *18*(1), 1–11.

Lai, M. H. (2021). Composite reliability of multilevel data: It’s about observed scores and construct meanings. *Psychological Methods*, *26*(1), 90–102.

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, *33*(3), 335–343.

McDonald, R. P. (2013). *Test theory: A unified treatment*. Psychology Press.

McElreath, R. (2018). *Statistical rethinking: A Bayesian course with examples in R and Stan*. Chapman and Hall/CRC.

Mestdagh, M., Verdonck, S., Piot, M., Niemeijer, K., Kilani, G., Tuerlinckx, F., Kuppens, P., & Dejonckheere, E. (2023). M-path: An easy-to-use and highly tailorable platform for ecological momentary assessment and intervention in behavioral research and clinical practice. *Frontiers in Digital Health*, *5*, 1182175.

Mey, L. K., Wenzel, M., Morello, K., Rowland, Z., Kubiak, T., & Tüscher, O. (2023). Be kind to yourself: The implications of momentary self-compassion for affective dynamics and well-being in daily life. *Mindfulness*, *14*(3), 622–636.

Muris, P. (2016). A protective factor against mental health problems in youths? A critical note on the assessment of self-compassion. *Journal of Child and Family Studies*, *25*, 1461-1465.

Muris, P., van den Broek, M., Otgaar, H., Oudenhoven, I., & Lennartz, J. (2018). Good and bad sides of self-compassion: A face validity check of the Self-Compassion Scale and an investigation of its relations to coping and emotional symptoms in non-clinical adolescents. *Journal of Child and Family Studies*, *27*, 2411-2421.

Muris, P., & Otgaar, H. (2022). Deconstructing self-compassion: How the continued use of the total score of the self-compassion scale hinders studying a protective construct within the context of psychopathology and stress. *Mindfulness*, *13*(6), 1403-1409.

Muris, P., & Petrocchi, N. (2017). Protection or vulnerability? A meta‐analysis of the relations between the positive and negative components of self‐compassion and psychopathology. *Clinical Psychology & Psychotherapy*, *24*(2), 373-383.

Naragon-Gainey, K., DeMarree, K. G., Kyron, M. J., McMahon, T. P., Park, J., & Biehler, K. M. (2023). Decentering from emotions in daily life: Dynamic associations with affect, symptoms, and well-being. *Clinical Psychological Science*, 21677026221147262.

Neff, K. D. (2003). The development and validation of a scale to measure self-compassion. *Self and Identity*, *2*(3), 223–250.

Neff, K. D. (2022). The differential effects fallacy in the study of self-compassion: Misunderstanding the nature of bipolar continuums. *Mindfulness*, *13*(3), 572-576.

Neff, K. D. (2023). Self-compassion: Theory, method, research, and intervention. *Annual Review of Psychology*, *74*, 193–218.

Neff, K. D., Tóth-Király, I., Knox, M. C., Kuchar, A., & Davidson, O. (2021). The development and validation of the state self-compassion scale (long-and short form). *Mindfulness*, *12*, 121–140.

Neff, K. D., Whittaker, T. A., & Karl, A. (2017). Examining the factor structure of the Self-Compassion Scale in four distinct populations: Is the use of a total scale score justified?. *Journal of Personality Assessment*, *99*(6), 596-607.

Raes, F. (2010). Rumination and worry as mediators of the relationship between self-compassion and depression and anxiety. *Personality and Individual Differences*, *48*(6), 757–761.

Trull, T. J., & Ebner-Priemer, U. W. (2020). Ambulatory assessment in psychopathology research: A review of recommended reporting guidelines and current practices. *Journal of Abnormal Psychology*, *129*(1), 56.

Ullrich-French, S., & Cox, A. E. (2020). The use of latent profiles to explore the multi-dimensionality of self-compassion. *Mindfulness*, *11*, 1483–1499.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, *54*(6), 1063.