# **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 (Study 1, n = 326; Study 2, n = 168) 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.

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

Self-compassion—the capacity to respond to personal suffering and perceived inadequacies with kindness and understanding—has emerged as a fundamental construct in contemporary psychological research. Since the introduction of the Self-Compassion Scale (Neff, 2003), which has garnered over 9,786 citations, researchers have extensively investigated this psychological phenomenon. However, the theoretical underpinnings of self-compassion remain subject to ongoing debate within the field.

At the heart of this debate lies the Bipolar Continuum Hypothesis (Neff, 2022), which posits that compassionate self-responding (CS) and uncompassionate self-responding (UCS) represent opposing ends of a single continuum rather than distinct constructs. 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. Supporting this framework, psychometric analyses have demonstrated that the Self-Compassion Scale captures both a global self-compassion factor and six distinct subfactors (Neff et al., 2017, 2021). Neff (2022) argues that separating the CS and UCS components into separate constructs constitutes a conceptual fallacy and advocates for the use of the Self-Compassion Scale total score as a unified measure.

However, competing theoretical frameworks challenge this unidimensional conceptualization. Several researchers maintain that CS and UCS represent distinct psychological constructs rather than polar opposites (Muris et al., 2018; Muris & Otgaar, 2020; Muris & Petrocchi, 2017). This position draws support from differential prediction studies showing stronger associations between UCS and psychopathology compared to CS (Muris, 2016). Further challenging the unidimensional framework, empirical evidence suggests that individuals can simultaneously exhibit high levels of both CS and UCS (Ullrich-French & Cox, 2020)—a finding incompatible with a strict bipolar continuum model.

Recent developments in this debate suggest that experimental approaches, rather than traditional psychometric methods, may better address these theoretical contradictions (Ferrari et al., 2022). This perspective aligns with broader trends in psychological science that emphasize state-dependent variability over trait stability. Ecological Momentary Assessment (EMA) methodology has proven particularly valuable in capturing these temporal dynamics. Recent studies have shown that fluctuations in momentary self-compassion predict concurrent changes in affect and stress reactivity, with UCS emerging as a particularly robust predictor of negative emotional states (Mey et al., 2023).

Multiple investigations have identified robust associations between momentary self-compassion and various adaptive outcomes, including 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 reconceptualizing self-compassion as a dynamic process rather than a stable trait characteristic.

Despite these advances in understanding self-compassion's temporal dynamics and contextual variability, notable methodological limitations persist. Previous studies have typically employed brief assessment periods (≤ 7 days), potentially overlooking the full complexity of state self-compassion dynamics. Additionally, the absence of validated state measures in earlier research necessitated reliance on ad hoc instruments, potentially compromising measurement reliability.

Our study addresses these limitations through a three-month-long EMA and the implementation of the validated State Self-Compassion Scale (Neff, 2022). Our study represents the first examination of the Bipolar Continuum Hypothesis within an EMA framework that explicitly accounts for the hierarchical structure of temporal data nested within days and individuals.

This research aims to empirically evaluate the Bipolar Continuum Hypothesis by examining the differential influence of situational factors on CS and UCS components. If self-compassion operates as a unified construct, as proposed by the Bipolar Continuum Hypothesis, situational factors should exert opposing effects on CS and UCS. Alternatively, evidence of independent or asymmetric responses to contextual influences would support a dual-construct framework.

Drawing on Ferrari et al.'s (2022) conceptualization of self-compassion as a dynamic process, we propose three specific hypotheses:

1. While trait-level CS and UCS may exhibit relative independence over extended periods, their state-level manifestations should demonstrate stronger temporal coupling, reflecting moment-to-moment regulatory processes.
2. Contextual stress or negative affect may enhance the bipolarity between CS and UCS components, suggesting situation-specific activation of self-regulatory mechanisms.
3. The relationship between CS and UCS components may exhibit notable individual differences, necessitating person-centered approaches to capture the full complexity of self-compassionate responding.

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

Understanding the dynamic interactions between state CS and UCS has crucial implications for psychological interventions aimed at enhancing well-being. By elucidating how situational factors influence real-time self-compassionate responding, this research aims to advance both theoretical understanding of self-compassion and inform evidence-based strategies for fostering adaptive self-relations across diverse contextual demands.

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

## This study investigated the fluctuations of state self-compassion in response to everyday emotional experiences and challenging events. Specifically, we focused 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 the 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, once a week. 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 recent noteworthy 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. Recruitment was conducted through university advertisements, and no incentives or course credits were provided for participation. 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.**

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#### **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 noteworthy event that has occurred since you last received a notification. If this is your first notification of the day, consider the most noteworthy 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”). It is important to distinguish this ‘negative affect’ from the DSM-5 personality trait known as ‘negative affectivity’ (American Psychiatric Association [APA], 2013).

*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). For the CS component, we added the item 'In this moment, I am able to accept my flaws and weaknesses' (In questo momento riesco ad accettare i miei difetti e debolezze); for the UCS component, we added the item 'In this moment, I let myself be carried away by my emotions' (In questo momento mi lascio trasportare dalle mie emozioni).

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).

**Statistical Analysis****.** All analyses were conducted using Bayesian multilevel models. Bayesian methods were selected for their ability to yield probabilistic interpretations of model parameters, enhancing the interpretability and robustness of results. We employed Markov Chain Monte Carlo (MCMC) simulations, specifically Hamiltonian Monte Carlo, implemented in Stan (Stan Development Team, 2020). Weakly informative priors were used to ensure proper model specification, and posterior distributions were estimated from a minimum of 2,000 samples per chain across four chains, following 1,000 warm-up steps.

Model selection included a comparison of both fixed and random effects structures, guided by Leave-One-Out Cross-Validation (LOO) to evaluate out-of-sample prediction accuracy. Lower LOO values indicated superior model fit and predictive accuracy. All numerical variables were standardized prior to analysis to facilitate comparability and interpretability of coefficients. Additional details on model selection and fit are provided in the Supplementary Information (SI).

Results are presented as posterior distributions with means (β) and 89% credibility intervals (CI). We chose 89% CIs instead of the conventional 95% to avoid implicit hypothesis testing, aligning with Bayesian principles that emphasize estimation over binary testing (McElreath, 2020). Contrasts were calculated to determine expected differences between predictor levels, reported with 89% highest posterior density intervals (HPDI). In Bayesian analysis, the 89% CI represents the range within which the parameter value is likely to fall with 89% probability, given the data. This approach offers a probabilistic view of parameters, reducing the likelihood of Type I errors and providing greater interpretative flexibility than traditional frequentist methods.

## **Results**

**Correlations between CS and UCS components of State Self-Compassion.** The multilevel correlation between the CS and UCS components of state self-compassion was −0.48 (89% CI [−0.49,−0.47]), accounting for the nested data structure of participants, days, and measurements within each day. This moderate negative correlation indicates an inverse relationship between CS and UCS in daily experiences, suggesting that higher levels of self-compassionate responding are associated with lower levels of self-criticism at the same moment.

However, when considering immediate situational contexts—specifically, the correlation between CS at a given time point and UCS at the immediately preceding time point—the correlation weakened substantially to −0.10 (89% CI [−0.12,−0.08]). This substantial reduction underscores the strong influence of moment-to-moment fluctuations on the relationship between CS and UCS, highlighting the sensitivity of these components to immediate situational factors.

**Multilevel Reliability.** A multilevel reliability analysis, following Lai's (2021) procedure, revealed that for the CS component, the within-subject reliability () was 0.63, indicating moderate consistency across different measurement occasions and reflecting the dynamic nature of self-compassion over time. The between-subject reliability (), was 0.82, demonstrating the scale's effectiveness in distinguishing stable individual differences. The overall composite reliability () for CS was 0.79, suggesting a reliable integration of within- and between-subject variabilities. For the UCS component, the within-subject reliability was slightly higher at 0.68, and the between-subject reliability was robust at 0.88, with a composite reliability of 0.83. These findings indicate that while the scale effectively captures stable individual differences, self-compassion as a state exhibits natural fluctuations due to changing circumstances and internal states.

**The Impact of Negative Affect and Event Unpleasantness on State Self-Compassion**. To investigate the influence of contextual factors on CS and UCS, we employed two Bayesian hierarchical models considering between-day variations within individuals and within-day fluctuations. Negative affect (NegAff) and event unpleasantness were centered to isolate three sources of variance: inter-individual differences, between-day variations, and within-day fluctuations.

For both CS and UCS, negative affect had robust and opposing effects. Higher negative affect was associated with decreased CS and increased UCS. Specifically, for CS, the standardized partial regression coefficients were β=−0.24 (89% CI: −0.25 to −0.23) at the moment level, β=−0.26 (89% CI: −0.27 to −0.25) at the day level, and β=−0.51 (89% CI: −0.57 to −0.45) at the person level. For UCS, the coefficients were β=0.26 (89% CI: 0.25 to 0.27) at the moment level, β=0.31 (89% CI: 0.30 to 0.32) at the day level, and β=0.65 (89% CI: 0.60 to 0.71) at the person level. These results indicate that negative affect exerts a strong, inverse influence on the CS and UCS components across all levels of analysis.

In contrast, the effects of event unpleasantness on CS and UCS were minimal and slightly positive. For CS, the coefficients were β=0.04 (89% CI: 0.03 to 0.05) at the moment level, β=0.01 (89% CI: −0.00 to 0.02) at the day level, and β=0.01 (89% CI: −0.05 to 0.07) at the person level. For UCS, the coefficients were β=0.00 (89% CI: −0.01 to 0.01) at the moment level, β=0.04 (89% CI: 0.03 to 0.05) at the day level, and β=0.12 (89% CI: 0.07 to 0.17) at the person level. These small effect sizes suggest that while event unpleasantness has some impact on state self-compassion, its overall influence is minor compared to the substantial effects of negative affect.

**Discussion**

The findings offer nuanced insights into the Bipolar Continuum Hypothesis within daily experiences. Consistent with the first hypothesis, the moderate negative correlation between CS and UCS at the state level indicates stronger temporal coupling than at the trait level. This suggests that moment-to-moment regulatory processes manifest as an inverse relationship between compassionate and uncompassionate self-responding, reflecting the dynamic interplay predicted.

However, the notable reduction in correlation when considering immediate situational contexts (−0.10 at a one-time-point lag) highlights the sensitivity of the CS-UCS relationship to momentary fluctuations. This observation supports the second hypothesis that contextual stress or negative affect enhances the bipolarity between CS and UCS through situation-specific activation of self-regulatory mechanisms. The strong opposing effects of negative affect on CS and UCS reinforce this, showing that internal emotional states strongly influence the dynamics between these components. Higher negative affect corresponds with decreased self-compassion and increased self-criticism, aligning with the Bipolar Continuum Hypothesis.

In contrast, the minimal and sometimes parallel effects of event unpleasantness on both CS and UCS present a divergence from the hypothesis. The small effect sizes and slightly positive coefficients suggest that external situational factors do not enhance the bipolarity between CS and UCS as internal emotional states do. This discrepancy indicates that the bipolar relationship is more pronounced for internal emotional experiences than for evaluations of external events. Such findings imply that additional factors or more intricate mechanisms may influence how contextual evaluations affect state self-compassion, suggesting a more flexible dynamic than a strictly bipolar continuum.

Regarding the third hypothesis, the multilevel reliability analyses reveal notable individual differences in self-compassionate responding. While the scale effectively captures stable individual differences—with high between-subject reliability—the lower within-subject reliability reflects the dynamic, fluctuating nature of self-compassion as a state construct. This variability underscores the importance of person-centered approaches to fully capture the complexity of CS and UCS relationships, as individual differences may moderate how these components interact in response to various situational factors.

In summary, the findings provide strong support for the Bipolar Continuum Hypothesis concerning internal emotional states like negative affect, which exert robust opposing effects on CS and UCS. However, the influence of external situational factors, such as event unpleasantness, does not conform neatly to the hypothesis, indicating that the dynamic between CS and UCS is more flexible and influenced by the type of situational factor.

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

High-stress environments provide a critical test of the Bipolar Continuum Hypothesis, as stress may differentially influence CS and UCS. Traditionally, stress is thought to decrease CS and increase UCS, consistent with a bipolar model where effective stress management corresponds to higher CS and lower UCS (Neff, 2003). However, more complex relationships may emerge. For example, in situations characterized by exceedingly high stress levels, such as those experienced by cancer patients, Wei et al. (2023) found that some individuals exhibited elevated levels of both CS and UCS concurrently. Similarly, Ullrich-French and Cox (2020) identified individuals within the general population who scored high on both components.

These findings challenge the notion of CS and UCS as strict opposites, indicating they may coexist, especially under high stress. This aligns with contemporary emotion regulation theories, which emphasize the simultaneous engagement of multiple regulatory processes in response to stress (Gross, 2015; Aldao & Nolen-Hoeksema, 2013). Consequently, Study 2 aims to investigate whether CS and UCS maintain an inverse relationship in high-stress environments or function as distinct but co-occurring processes. By examining these components under stress, we seek to determine if the dynamics observed in Study 1 persist or if alternative models better explain self-compassion processes in challenging 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, once a week. 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 well after the exam, when the stressor became less salient). 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, replicating the items used in Study 1. These items assessed: (1) Pleasant and unpleasant events, (2) positive and negative affect, and (3) state-self-compassion using the State Self-Compassion Scale Short Form (SSCS-SF).

A notable distinction from Study 1 was the inclusion of four additional items specifically designed to measure decentering abilities. Adapted from previous EMA research (Biehler & Naragon-Gainey, 2022), these items aimed to provide a deeper understanding of participants' capacity for detached self-observation. Decentering, a fundamental aspect of mindfulness, involves adopting a non-judgmental stance towards one's thoughts and feelings (Bernstein et al., 2015). This ability is crucial in shaping individuals' responses to suffering, a core component of self-compassion (Biehler & Naragon-Gainey, 2022).

By cultivating a decentered perspective, individuals may respond to negative emotions with greater kindness and understanding, thereby enhancing Coping Strategies (CS). According to the Bipolar Continuum Hypothesis, this enhancement should correspond with a decrease in UCS. However, if the Bipolar Continuum Hypothesis does not hold, decentering may impact only CS without affecting UCS. Moreover, decentering may influence how individuals process stress, helping them recognize stressful emotions as transient and not reflective of their identity (Bernstein et al., 2015). This could potentially sustain or enhance CS while reducing UCS.

**Data Analysis Plan.** To test the Bipolar Continuum Hypothesis in Study 2, we conducted four targeted statistical analyses, each addressing a distinct aspect of self-compassion dynamics. These analyses allowed us to examine whether CS and UCS function as opposing components under varying stress and mindfulness-related conditions.

**1. Impact of Stress on State Self-Compassion.** The first analysis explored how academic exam stress influenced CS and UCS. By segmenting the study period into pre-exam, post-exam, and baseline non-exam phases, we aimed to observe shifts in these components in response to increased stress. We expected CS to decrease and UCS to increase in the pre-exam period and anticipated a reversal of this trend post-exam, consistent with the BCH. We employed a multilevel model where CS and UCS were the dependent variables, with predictors including negative affect, decentering, and event unpleasantness, scaled to capture inter-individual, between-day, and within-day variations.

**Results**

Before exams, CS decreased relative to baseline (posterior β = -0.29; 89% CI: [-0.51, -0.08]), while UCS increased (posterior β = 0.66; 89% CI: [0.38, 0.95]), reflecting heightened self-criticism. Following exams, CS rebounded above baseline (β = 0.23; 89% CI: [0.02, 0.45]), while UCS decreased (β = -0.67; 89% CI: [-0.95, -0.39]), suggesting a post-stress recovery. These opposing trends in CS and UCS before and after exams support the BCH – see Figure 2.

**Figure 2**

*Study 2: Posterior Distribution of CS*Immagine che contiene diagramma, Diagramma, testo, schermata

Descrizione generata automaticamente *and UCS Components Before and After Exam Days*

*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.

**2. Impact of Contextual Influences on CS and UCS.** The second analysis assessed how negative affect, decentering, and event unpleasantness impacted CS and UCS under stress, using separate Bayesian hierarchical models. By centering predictors at the person, day, and moment levels, we investigated if these factors affected CS and UCS in opposite directions, as the BCH predicts.

**Results**

Negative affect showed a consistent negative association with CS across all levels (person-level β = -0.31; day-level β = -0.17; moment-level β = -0.13), while positively correlating with UCS (person-level β = 0.33; day-level β = 0.16; moment-level β = 0.14). Decentering had a positive effect on CS (person-level β = 0.20; day-level β = 0.12; moment-level β = 0.08) and a negative effect on UCS (person-level β = -0.36; day-level β = -0.22; moment-level β = -0.15). Event unpleasantness showed minimal impact on both CS and UCS. These findings, with inverse effects of negative affect and decentering on CS and UCS, align with the BCH.

**3. Levels of Personal Concern and Stress.** The third analysis evaluated whether the inverse CS-UCS relationship remains stable across varying stress levels by comparing high-stress (pre-exam) with low-stress (baseline) contexts. A consistent negative correlation between CS and UCS across these conditions would support the BCH, indicating that their inverse relationship does not depend on stress levels.

**Results**

In high-stress situations (e.g., pre-exam), the CS-UCS correlation was strongly negative (correlation = -0.70; 89% CI: [-0.76, -0.62]) and remained similarly negative post-exam (correlation = -0.70; 89% CI: [-0.78, -0.59]). In a low-stress baseline context, the CS-UCS correlation was also negative (correlation = -0.79; 89% CI: [-0.95, -0.60]). Overlapping credible intervals across stress levels suggest that the inverse CS-UCS relationship is stable, consistent with the BCH.

**4. Decentering and CS-UCS Correlation.** The final analysis examined whether decentering moderated the CS-UCS relationship. Using a Bayesian multivariate regression model with UCS as the dependent variable, we included CS, decentering, and their interaction (at person, day, and moment levels) as predictors. According to the BCH, higher decentering should strengthen the inverse relationship between CS and UCS.

**Results**

The interaction between CS and decentering at the person level was negative (β = -0.05; 89% CI: [-0.08, -0.02]), indicating that the inverse CS-UCS relationship is stronger among individuals with higher decentering. The day and moment-level interactions were near zero, with credible intervals including zero, suggesting that decentering strengthens the inverse CS-UCS relationship at a trait level rather than moment-to-moment. This finding supports the BCH by indicating that mindfulness-related processes (decentering) reinforce the bipolar structure of self-compassion.

**Discussion**

The results from Study 2 provide nuanced support for the Bipolar Continuum Hypothesis by showing evidence consistent with, yet also challenging, a strictly bipolar relationship between CS and UCS.Analysis 1 examined the effect of exam-related stress on state self-compassion. As expected under the Bipolar Continuum Hypothesis, we observed that CS decreased and UCS increased in the pre-exam period, reflecting stress-induced shifts toward self-criticism. Post-exam, this pattern reversed, with CS rebounding and UCS decreasing, suggesting a return to baseline or improved levels of self-compassion following the stressor. This clear, opposing pattern in response to academic stressors aligns with the Bipolar Continuum Hypothesis prediction that CS and UCS move inversely to one another, depending on contextual stress.

Analysis 2 explored the effects of contextual factors, specifically negative affect, decentering, and event unpleasantness, across person, day, and moment levels. The results show symmetrical but opposing effects of negative affect and decentering on CS and UCS. Elevated negative affect was associated with reduced CS and increased UCS, while higher levels of decentering correlated with increased CS and reduced UCS across all levels of analysis. This pattern supports the Bipolar Continuum Hypothesis by highlighting that negative affect and mindfulness-related decentering have opposing impacts on self-compassion components, reinforcing the inverse relationship suggested by the hypothesis. However, the minimal effect of event unpleasantness on both CS and UCS introduces complexity. This finding suggests that external situational factors, such as event unpleasantness, may play a limited role in shaping state self-compassion and that internal factors (e.g., mood, mindfulness) exert stronger influences than external contexts.

Analysis 3 tested the stability of the CS-UCS relationship across varying levels of stress by comparing high-stress (pre-exam) and low-stress (baseline) contexts. Results revealed strong negative correlations between CS and UCS across all stress levels, with overlapping confidence intervals, indicating that the inverse relationship holds steady regardless of stress intensity. This stability aligns with the Bipolar Continuum Hypothesis by suggesting that the CS-UCS inverse relationship remains consistent and resilient, even under different stress conditions.

Analysis 4 investigated whether decentering moderates the CS-UCS relationship, specifically testing whether higher trait levels of decentering strengthen the inverse relationship. Findings showed that individuals with higher average decentering levels exhibited a more pronounced inverse relationship between CS and UCS, supporting the Bipolar Continuum Hypothesis prediction that mindfulness may enhance this bipolar relationship. However, the interaction between CS and decentering was minimal at the day and moment levels, suggesting that trait-level decentering has a stronger impact on the CS-UCS relationship than situational or daily fluctuations in decentering.

In summary, the results of Study 2 provide nuanced support for the Bipolar Continuum Hypothesis. While analyses 1 and 3 illustrate a strong, consistent inverse relationship between CS and UCS across stress conditions, and analyses 2 and 4 confirm symmetrical effects of internal factors, such as negative affect and trait-level decentering, on these components, certain findings challenge the Bipolar Continuum Hypothesis. Specifically, the limited impact of event unpleasantness and the asymmetrical influence of decentering (stronger on UCS than CS) suggest that additional factors may moderate how CS and UCS interact.

**Multilevel Dimensionality Analysis**

Building on previous psychometric research supporting the Bipolar Continuum Hypothesis for trait self-compassion, we investigated the dimensionality of state self-compassion using multilevel confirmatory factor analysis. This method accounted for the nested structure of EMA data, with repeated measurements clustered within individuals and days. We compared three models: a One-Factor Model, a Two-Factor Model (with correlated CS and UCS), and a Bifactor Model.

The Bifactor Model demonstrated superior fit indices, suggesting that state self-compassion consists of both a general factor and specific dimensions (CS and UCS; see SI). However, it is crucial to balance statistical fit with model simplicity and interpretability. Although the Bifactor Model provided a better statistical fit, its increased complexity did not enhance the interpretability of the results. The general factor accounted for most of the explained variance, supporting the concept of "essential unidimensionality" in state self-compassion (Reise et al., 2013).

In summary, our multilevel confirmatory factor analysis results align with the Bipolar Continuum Hypothesis by supporting an inverse relationship between CS and UCS. Nevertheless, it is important to recognize that multilevel confirmatory factor analysis captures latent, person-level relationships, reflecting general trends over time and across contexts. This nomothetic approach may not fully capture momentary within-person dynamics, which could reveal more independent or context-specific associations between CS and UCS components.

**Idionomic Analysis of CS-UCS Relationships**

To complement the group-level findings and explore individual-specific dynamics, we conducted an idionomic analysis of the relationship between CS and UCS by combining samples from both studies (Ciarrochi et al., 2024; Ferrari et al., 2022). This approach allowed us to capture heterogeneity in self-compassion processes that may be masked in aggregate analyses.

**Method**

The analysis proceeded in two stages. In Stage 1, we applied participant-specific hierarchical Bayesian models using Stan to estimate the relationship between UCS and CS for each individual, controlling for negative affect, context evaluation, and the lagged effect of CS. For each participant, UCS was modeled as a function of CS at the same observation, with an intercept capturing baseline UCS levels. The primary predictor, CS, was assessed alongside negative affect, context evaluation, and an autoregressive term representing prior CS measurements within the same day. We also included an interaction term between CS and negative affect to test whether the influence of CS on UCS varied by affect levels. The error structure was defined using a Student's t-distribution to handle potential outliers. Posterior distributions were examined for each parameter to assess the strength and direction of associations at the individual level, focusing primarily on the coefficient associated with CS to determine if higher CS consistently related to lower UCS.

Stage 2 aggregated these individual-level estimates using hierarchical models. This allowed us to determine the proportion of participants showing negative CS-UCS relationships and to estimate the general effects of negative affect, context evaluation, and the CS-negative affect interaction across individuals.

**Results**

**CS-UCS Relationship:** Across participants, 81.0% (89% CI: 79.6% to 82.3%) of the posterior estimates for the association between CS and UCS were negative, lending strong support to the Bipolar Continuum Hypothesis at the individual level. However, the substantial variability in these estimates (sd = 1.25, corresponding to 0.196 on the probability scale) highlights marked heterogeneity in the strength—and occasionally the direction—of the CS-UCS relationship across participants, suggesting that person-specific factors influence this dynamic.

**Influence of Negative Affect on UCS:** The analysis indicated a positive effect of negative affect on UCS (mean = 0.38, 89% CI: 0.34 to 0.42), meaning that elevated negative affect typically associated with higher UCS. Yet, individual variability was notable (sd = 0.19, corresponding to 0.547 on the probability scale), implying that the impact of negative affect on UCS varies, likely due to differences in individual coping styles or emotional resilience.

**Effect of Context Evaluation on UCS:** The context evaluation parameter showed a minor negative effect on UCS (mean = -0.04, 95% CI: -0.07 to -0.01), suggesting that positive situational evaluations slightly reduce UCS. Variability was considerable (sd = 0.17, corresponding to 0.543 on the probability scale), indicating that some individuals are more responsive to contextual factors in managing UCS than others.

**Interaction Between CS and Negative Affect:** The CS-negative affect interaction effect was negligible, with the 89% CI spanning zero (-0.03 to 0.00), indicating no credible evidence that negative affect moderates the CS-UCS relationship. This suggests that momentary fluctuations in negative affect do not substantially alter the inverse relationship between CS and UCS within individuals, pointing to a stable underlying dynamic regardless of transient emotional states.

**Discussion**

The idionomic analysis provides nuanced support for the Bipolar Continuum Hypothesis. A majority of participants (81%) exhibited a negative association between CS and UCS at the individual level, aligning with the hypothesis that higher compassionate self-responding corresponds with lower uncompassionate self-responding. However, the substantial heterogeneity observed—where 19% of participants showed no association or even a positive correlation—challenges the universality of the hypothesis. Similar findings have been reported in prior studies (Ferrari et al., 2023; Ullrich et al., 2020), highlighting the necessity of idiographic approaches to fully understand individual differences in self-compassion dynamics.

The robust positive effect of negative affect on UCS indicates that elevated negative emotional states generally increase uncompassionate self-responding. Nonetheless, the considerable individual variability suggests that this impact is not uniform across all participants. Factors such as personal coping mechanisms, emotional regulation strategies, or resilience may influence how negative affect affects UCS, underscoring the importance of considering individual characteristics in self-compassion research.

Importantly, the lack of a credible interaction between CS and negative affect on UCS suggests that the inverse relationship between CS and UCS operates relatively independently of momentary negative emotional states. This finding contrasts with previous research suggesting that emotional states can modulate self-compassionate responses (Dejonckheere et al., 2021). It may indicate that the CS-UCS relationship is governed more by stable, trait-like factors or enduring personal tendencies rather than by transient emotional contexts.

Overall, the idionomic analysis underscores the complexity of self-compassion dynamics at the individual level. While the Bipolar Continuum Hypothesis holds for most participants, the observed heterogeneity highlights that CS and UCS may not function as strict polar opposites for everyone. These insights emphasize the value of personalized analytical approaches to capture the diverse ways individuals experience and regulate self-compassion.

**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.

Previous studies have explored the relationship between negative affect and self-compassion. Consistent with our findings, Neff et al. (2021) reported that higher momentary SC was linked to lower negative affect, while Mey et al. (2023) found a negative correlation between CS and negative affect, and a positive correlation between UCS and negative affect. These studies suggest that SC may serve as a protective factor against negative emotions. However, our results reveal a more complex, reciprocal relationship: while SC can buffer against negative affect, heightened emotional states can also reduce momentary SC. Unlike stable trait SC, state SC fluctuates in response to contextual factors like negative affect, highlighting both its protective role and vulnerability to situational influences.

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 Bipolar Continuum Hypothesis. 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.

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