**Abstract**

**Objectives**: The Bipolar Continuum Hypothesis (BCH) posits an inverse relationship between compassionate self-responding (CS) and uncompassionate self-responding (UCS), suggesting they lie on a continuum. However, some researchers propose that CS and UCS may function independently. This study aimed to investigate this debate by examining real-time fluctuations of state self-compassion (SC) components in response to contextual factors.

**Method**: Across two longitudinal field studies (Study 1, *n* = 326; Study 2, *n* = 168), 494 participants provided weekly Ecological Momentary Assessment (EMA) data over three months. We assessed how immediate emotional states, decentering (a mindfulness-related skill), and event unpleasantness influenced CS and UCS in daily life.

**Results**: Partial support was found for the BCH, with CS and UCS generally showing inverse fluctuations in response to negative affect and decentering. Negative affect was the strongest predictor, linked to higher UCS and lower CS. Decentering showed a stronger association with reducing UCS than increasing CS, suggesting an asymmetry in their interaction. An idionomic analysis revealed individual variability, with a subset of participants displaying no clear inverse relationship, or even a positive association, between CS and UCS. Event unpleasantness had a minor impact.

**Conclusions**: These findings partly support the BCH, particularly regarding responses to emotional states and mindfulness practices, while also highlighting individual differences. Future research should refine interventions to enhance CS, tailoring approaches to accommodate individual variations in CS and UCS dynamics in therapeutic contexts.

**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. State-level CS and UCS should demonstrate strong temporal dynamics, 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**

## Study 1 investigated the fluctuations of state self-compassion in response to everyday emotional experiences and challenging events. Specifically, we focused on momentary negative affect (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.** The *trait*-level correlation between CS and UCS, estimated using a robust *t*-based approach, was strongly negative, *r* = −0.66 (89% CI [−0.73, −0.60]). At the *state* level, a multilevel analysis accounting for the nested structure of the data (i.e., participants, days, and repeated measurements within each day) revealed a moderate negative correlation between CS and UCS of r = −0.48 (89% CI [−0.49, −0.47]). However, the correlation between state CS at a given time point and state UCS at the immediately preceding time point was notably weaker, at *r* = −0.10 (89% CI [−0.12, −0.08]).

**Multilevel Reliability.** A multilevel reliability analysis, following Lai's (2021) procedure, revealed that for the CS component, the between-subject reliability (), was 0.82, demonstrating the scale's effectiveness in distinguishing stable individual differences. 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 overall composite reliability () for CS was 0.79, suggesting a reliable integration of within- and between-subject variabilities. For the UCS component, the between-subject reliability was robust at 0.88, the within-subject reliability was slightly higher at 0.68, and 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. To isolate variance at three distinct levels—differences between individuals, variations between days, and fluctuations within a single day—we centered both negative affect and event unpleasantness as predictors in our model. 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 results of Study 1 offer partial support for the Bipolar Continuum Hypothesis while revealing important distinctions between trait and state manifestations of self-compassion. The strong negative correlation (*r* = −0.66) between CS and UCS at the trait level supports the Bipolar Continuum Hypothesis core premise of bipolarity. However, the more moderate state-level correlation (*r* = −0.48) and particularly weak temporal association (*r* = −0.10) between consecutive measurements suggest that this bipolar relationship becomes more flexible in response to situational demands.

We also found that negative affect had strong, opposing effects on CS and UCS across all levels of analysis (moment, day, person), aligning with the Bipolar Continuum Hypothesis. However, event unpleasantness showed minimal on CS and UCS, suggesting that the bipolar structure is more responsive to internal emotional states than external circumstances.

The reliability analyses highlight the dual nature of state self-compassion, reflecting both stable individual differences and flexible, context-sensitive responses. High between-subject reliability suggests a stable continuum at the trait level, while moderate within-subject reliability captures the adaptability of CS and UCS in response to changing contexts. These findings support Hypothesis 3, emphasizing the need for a person-centered approach to capture both stable and situational aspects of self-compassion.

In sum, Study 1 supports the Bipolar Continuum Hypothesis by showing an inverse relationship between CS and UCS, particularly under internal stressors like negative affect. However, the modest role of external factors suggests a more flexible and internally-focused bipolar relationship, underscoring the need to consider both trait and state aspects of self-compassion.

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

High-stress environments offer a critical test of the Bipolar Continuum Hypothesis, as stress may affect Compassionate Self (CS) and Uncompassionate Self (UCS) differently. While stress is generally thought to decrease CS and increase UCS (Neff, 2003), recent findings suggest that both components can be elevated under extreme stress, as seen in cancer patients (Wei et al., 2023) and also in some individuals in the general population (Ullrich-French & Cox, 2020). These findings challenge the view of CS and UCS as strict opposites, suggesting they may co-occur under high stress. This aligns with emotion regulation theories, which propose that multiple regulatory processes can be activated simultaneously in response to stress (Gross, 2015; Aldao & Nolen-Hoeksema, 2013). Study 2 thus examines whether CS and UCS maintain an inverse relationship in high-stress contexts or function as distinct, co-occurring responses, exploring whether the dynamics observed in Study 1 hold under more challenging conditions.

## **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. While the Bipolar Continuum Hypothesis suggests a consistent inverse relationship between CS and UCS, it does not propose that this coupling should vary in strength with factors such as decentering. Thus, any observed moderation by decentering would indicate flexibility in the CS-UCS relationship that goes beyond the strict coupling posited by the Bipolar Continuum Hypothesis.

**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 of Study 2 offer nuanced insights into the Bipolar Continuum Hypothesis, particularly in the context of stress and internal versus external factors.

As anticipated by the Bipolar Continuum Hypothesis, Analysis 1 showed that exam-related stress led to a decrease in CS and an increase in UCS during the pre-exam period, indicative of a shift towards self-criticism under stress. After the exam, this pattern reversed, with CS rebounding and UCS decreasing, suggesting recovery to baseline or enhanced levels of self-compassion. This opposing response to academic stress supports the Bipolar Continuum Hypothesis prediction of an inverse relationship between CS and UCS that varies with contextual stress.

Analysis 2 revealed that internal factors, such as negative affect and decentering, had symmetrical but opposing effects on CS and UCS. Elevated negative affect corresponded to reduced CS and increased UCS, while higher decentering was associated with increased CS and reduced UCS across all levels of analysis. This pattern reinforces the Bipolar Continuum Hypothesis by highlighting the opposing impacts of mood and mindfulness-related traits on self-compassion components. In contrast, event unpleasantness showed minimal impact, suggesting that internal states may have a more robust influence on self-compassion than external situational factors.

Analysis 3 examined the stability of the CS-UCS relationship across high-stress (pre-exam) and low-stress (baseline) conditions. The results showed a stable inverse correlation between CS and UCS, with overlapping confidence intervals across stress levels, suggesting that the inverse relationship is resilient and consistent regardless of stress intensity. This finding aligns with the Bipolar Continuum Hypothesis by supporting a stable, inverse coupling of CS and UCS under varying levels of stress.

Analysis 4 explored whether decentering moderates the CS-UCS relationship. Findings showed that individuals with higher trait-level decentering exhibited a stronger inverse CS-UCS relationship, implying that mindfulness-related traits may enhance the coupling between self-compassionate and self-critical responses. However, this effect was observed only at the person level, with minimal influence at the day and moment levels. This specificity challenges the Bipolar Continuum Hypothesis assumption of a universally fixed inverse relationship by suggesting that individual differences in mindfulness-related traits, such as decentering, may influence the strength of the CS-UCS relationship.

In sum, Study 2 provides partial support for the Bipolar Continuum Hypothesis. Analyses 1 and 3 confirm a consistent inverse relationship between CS and UCS across different stress levels, while Analyses 2 and 4 highlight the symmetrical effects of internal factors such as negative affect and trait-level decentering on these components. Nonetheless, certain findings suggest flexibility beyond the Bipolar Continuum Hypothesis framework, particularly the limited effect of external factors like event unpleasantness and the differential influence of decentering. These results indicate that while the Bipolar Continuum Hypothesis holds under many conditions, additional factors, particularly mindfulness-related traits, may moderate the interaction between CS and UCS.

**Multilevel Dimensionality Analysis**

Building on prior evidence supporting the Bipolar Continuum Hypothesis (BCH) for *trait* self-compassion, we examined the dimensionality of *state* self-compassion using multilevel confirmatory factor analysis (CFA). This approach appropriately accounted for the hierarchical structure of EMA data of both studies, where repeated measurements are nested within days and individuals. We compared three theoretical models: a One-Factor Model representing a single self-compassion dimension, a Two-Factor Model with correlated CS and UCS components, and a Bifactor Model incorporating both general and specific factors.

The Two-Factor and Bifactor Models demonstrated superior fit indices compared to the One-Factor Model, suggesting that state self-compassion encompasses both unified and distinct components. However, the Bifactor Model revealed that the general factor accounted for most of the explained variance, supporting what Reise et al. (2013) term "essential unidimensionality." This finding suggests that while CS and UCS can be distinguished statistically, they primarily reflect opposing ends of a single underlying continuum rather than truly independent constructs.

These results provide qualified support for the Bipolar Continuum Hypothesis by showing that the inverse relationship between CS and UCS holds at the latent structural level. However, it is crucial to note that multilevel CFA primarily captures stable, person-level relationships rather than dynamic temporal processes. This methodological limitation means that the multilevel CFA findings may not fully capture the moment-to-moment flexibility in how CS and UCS interact across different contexts and situations.

**Idionomic Analysis of CS-UCS Relationships**

To complement the group-level findings and investigate individual-specific dynamics, we conducted an idionomic analysis (Ciarrochi et al., 2024; Ferrari et al., 2022) on the relationship between CS and UCS, combining samples from both studies. This approach enabled us to capture individual heterogeneity in self-compassion processes that may be obscured 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 (s = 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 (b = 0.38, 89% CI: 0.34 to 0.42), meaning that elevated negative affect typically associated with higher UCS. Yet, individual variability was notable (s = 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 (b = -0.04, 95% CI: -0.07 to -0.01), suggesting that positive situational evaluations slightly reduce UCS. Variability was considerable (s = 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 (BCH) while revealing important individual differences in self-compassion dynamics. Our two-stage hierarchical Bayesian approach show that for 81.0% of participants (89% CI: 79.6% to 82.3%), CS and UCS exhibited the hypothesized negative relationship, supporting the Bipolar Continuum Hypothesis at the individual level. However, the substantial heterogeneity in these relationships (*SD* = 1.25) suggests that the bipolar structure of self-compassion may not be universal, as approximately 19% of participants showed neutral or even positive CS-UCS associations. This result aligns with previous research (Ferrari et al., 2023; Ullrich et al., 2020) and emphasizes the importance of person-specific approaches in understanding self-compassion.

The analysis revealed a consistent positive association between negative affect and UCS (b = 0.38, 89% CI: 0.34 to 0.42), indicating that increased negative emotional states generally enhance uncompassionate self-responding. However, the marked individual variability in this relationship (s = 0.19) suggests that personal factors, such as emotional regulation capabilities or coping strategies, moderate how negative affect influences self-critical responses. The minimal impact of context evaluation on UCS (b = -0.04) further suggests that moment-to-moment fluctuations in self-compassion may be more strongly driven by internal emotional states than external circumstances.

Notably, the absence of a credible CS-negative affect interaction (89% CI: -0.03 to 0.00) challenges previous findings suggesting that emotional states modulate self-compassionate responses (Dejonckheere et al., 2021). Instead, our results indicate that the inverse relationship between CS and UCS remains relatively stable across different emotional states, pointing to a more trait-like underlying structure in how these components interact within individuals.

This idionomic investigation highlights the complexity of self-compassion dynamics and the limitations of a nomothetic approach. While the Bipolar Continuum Hypothesis generally holds at the individual level, the substantial heterogeneity in CS-UCS relationships suggests that self-compassion operates through diverse person-specific patterns rather than a single bipolar continuum.

**General Discussion**

The current study aimed to explore the Bipolar Continuum Hypothesis by examining the dynamic relationship between CS and UCS in real-time, drawing on Ferrari et al.'s (2022) conceptualization of self-compassion as a dynamic process. We tested three hypotheses that addressed whether CS and UCS fluctuate in response to situational factors, how contextual stressors might intensify their inverse relationship, and whether individual differences play a role in this dynamic. Here, we summarize our findings in light of these hypotheses and discuss their implications for the BCH and clinical practice.

The first hypothesis proposed that state-level CS and UCS should exhibit strong temporal dynamics, capturing moment-to-moment regulatory processes. Our data strongly supported this hypothesis. Both CS and UCS revealed notable fluctuations in response to immediate emotional and contextual changes, with negative affect consistently emerging as a predictor. Increased negative affect was associated with decreased CS and heightened UCS across time points, suggesting that self-compassionate responses adapt dynamically to real-time emotional contexts. This finding aligns with Neff’s (2022) perspective on self-compassion’s role in emotional regulation and highlights the flexibility of CS and UCS as they respond to varying emotional demands.

The second hypothesis suggested that contextual stress or negative affect might intensify the inverse relationship between CS and UCS, reflecting situation-specific activation of self-regulatory mechanisms. Our findings indicate that while stress impacts the levels of CS and UCS individually, the strength of their inverse association remains stable across stress levels. During high-stress situations, such as the period before university exams, stress led to a reduction in CS and an increase in UCS, demonstrating a situational adjustment of these components. After exams, this pattern reversed, with CS levels rebounding and UCS decreasing, suggesting a recovery effect once the stressor was removed. However, the correlation between CS and UCS remained consistent, regardless of stress intensity, suggesting that their relationship is robust and does not fluctuate with stress. This stability aligns with the Bipolar Continuum Hypothesis and does not support the idea that stress elevation may increase the bipolarity of self-compassion (Dejonckheere et al. (2021).

The third hypothesis posited that the CS-UCS relationship would vary across individuals, necessitating a person-centered approach to capture the complexity of self-compassionate responding. Our idionomic analysis provided robust support for this hypothesis by revealing substantial individual differences. While most participants displayed the expected inverse association between CS and UCS, approximately 19% showed neutral or even positive correlations between these components. Such variability suggests that the Bipolar Continuum Hypothesis assumption of a universally inverse relationship may not apply to all individuals. This finding aligns with recent discussions in the literature (Ferrari et al., 2023) advocating for personalized approaches in self-compassion research to account for distinct individual profiles in self-compassionate responses.

Overall, our findings provide substantial evidence supporting the Bipolar Continuum Hypothesis central premise of an inverse relationship between CS and UCS. Negative affect consistently predicted lower CS and higher UCS, affirming BCH’s portrayal of these components as bipolar constructs within a single continuum. Furthermore, the observed pattern of stress-related fluctuations, with UCS increasing and CS decreasing before exams and reversing post-exam, illustrates the adaptive nature of self-compassion as a regulatory process. These findings lend support to the Bipolar Continuum Hypothesis perspective on CS and UCS as context-sensitive, inverse components that shift adaptively in response to emotional demands (Neff, 2022; Ferrari et al., 2022). Additionally, the multilevel dimensionality analyses provided further validation for the Bipolar Continuum Hypothesis, supporting what Reise et al. (2013) term “essential unidimensionality.” While CS and UCS are distinguishable statistically, they primarily reflect opposing ends of a unified construct.

However, some aspects of our results challenge the universality of the Bipolar Continuum Hypothesis. One notable inconsistency was found in the role of mindfulness-related traits, specifically decentering. While decentering consistently reduced UCS, it did not correspondingly increase CS. This asymmetry implies that mindfulness practices might be more effective at reducing self-criticism than at enhancing self-compassion, a nuance that the Bipolar Continuum Hypothesis does not fully account for. Biehler & Naragon-Gainey (2022) have suggested that mindfulness may impact UCS differently from CS, indicating that the relationship between these components may not be as strictly bipolar as the Bipolar Continuum Hypothesis posits. Moreover, the notable individual variability observed in the CS-UCS relationship suggests that the strict bipolarity proposed by the Bipolar Continuum Hypothesis may oversimplify the nuanced ways in which state self-compassionate and self-critical responses interact. For some individuals, these components may operate independently or even complementarily, challenging the view of CS and UCS as universally opposing forces.

These inconsistencies between our findings and the Bipolar Continuum Hypothesis predictions have important implications for clinical practice. Given the individual variability observed in the CS-UCS relationship, clinical interventions may need to move beyond a one-size-fits-all approach. Instead, treatments should be tailored to the specific patterns of self-compassionate responding observed in each individual. For clients who show limited inverse association between CS and UCS, interventions could focus separately on enhancing CS and reducing UCS, rather than assuming that one will automatically impact the other. Additionally, the asymmetrical impact of decentering suggests that mindfulness-based interventions might need refinement. Practitioners could prioritize techniques that specifically address self-criticism, especially when enhancing CS proves more challenging. This tailored approach aligns with emerging models of individualized psychological care, which emphasize the importance of adapting interventions to individual profiles and needs (Ferrari et al., 2022; Ullrich-French & Cox, 2020).

In conclusion, while this study provides strong support for the Bipolar Continuum Hypothesis, especially regarding the inverse relationship between CS and UCS in response to negative affect and stress, it also highlights the hypothesis’s limitations. The differential effect of mindfulness on UCS and the notable individual differences in CS-UCS relationships suggest that the Bipolar Continuum Hypothesis might benefit from expansion to include person-specific and asymmetrical dynamics. These findings underscore the importance of a more flexible model of self-compassion that acknowledges individual variability and allows for a broader range of therapeutic interventions.

**Limitations and Future Directions**. This study has several strengths, including the use of repeated naturalistic sampling within a community-based sample, providing detailed insights into fluctuations of state self-compassion in real-world contexts. However, certain limitations should be acknowledged. First, the sample consisted predominantly of university psychology students, which may not generalize to the broader population. Its non-clinical nature particularly limits its relevance to clinical settings, as our sample displayed a stronger presence of the CS component relative to UCS (Bayesian Cohen’s *d* = 1.48). Clinical populations, by contrast, often exhibit elevated levels of UCS, with lower levels of CS. For example, Neff and McGehee (2010) found that individuals with psychological disorders tend to have higher self-criticism and lower self-kindness, suggesting that further studies on clinical samples are needed to clarify the dynamics of state self-compassion across diverse populations.

Additionally, this study did not account for other potentially influential momentary variables that could impact self-compassion scores and the CS-UCS relationship, such as mindfulness (Biehler & Naragon-Gainey, 2022) and rumination (Raes, 2010). Future research should incorporate these factors to provide a more comprehensive understanding of self-compassion dynamics.

Lastly, the EMA protocol in this study, which involved once-weekly assessments over three months, contrasts with more intensive EMA protocols typically used to capture daily fluctuations. Adopting a higher-frequency sampling approach, such as five notifications per day over two weeks, may offer richer insights into how self-compassion varies across contexts 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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