**Abstract**

**Objectives**: The Bipolar Continuum Hypothesis 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 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 Bipolar Continuum Hypothesis, 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 partially support the Bipolar Continuum Hypothesis, 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 one’s own suffering and perceived shortcomings with kindness and understanding – has emerged as a central construct in contemporary psychological research. Since Neff's (2003) introduction of the Self-Compassion Scale, which has garnered over 9,786 citations, this construct has been rigorously examined across diverse psychological contexts. Nevertheless, despite the substantial body of research, the theoretical foundations of self-compassion continue to be a subject of active debate (Cha et al., 2023).

Central to this debate is the Bipolar Continuum Hypothesis (Neff, 2022), which posits that compassionate self-responding (CS) and uncompassionate self-responding (UCS) operate along a continuum, rather than being entirely distinct constructs. Within this dynamic framework, self-kindness, common humanity, and mindfulness characterize the compassionate end, while self-judgment, isolation, and over-identification represent the uncompassionate end. Importantly, Neff (2022, 2023) describes self-compassion as a multidimensional and dynamic system in which CS and UCS interact synergistically. Psychometric analyses support this view, indicating that the Self-Compassion Scale captures both a global self-compassion factor and six specific subfactors (Neff et al., 2017, 2021). Consequently, Neff (2022) contends that viewing CS and UCS as separate constructs constitutes a conceptual fallacy and advocates for using the Self-Compassion Scale total score as a unified measure.

Competing theoretical frameworks, however, question this unidimensional view. Some researchers argue that CS and UCS are distinct psychological constructs rather than polar opposites (Muris et al., 2018; Muris & Otgaar, 2020; Muris & Petrocchi, 2017). This perspective is supported by studies indicating that UCS has stronger associations with psychopathology than CS (Muris, 2016). Additionally, evidence that individuals can exhibit high levels of both CS and UCS concurrently (Ullrich-French & Cox, 2020) poses a challenge to the strict bipolar continuum model, suggesting a more complex relationship between these constructs.

Until recently, research in this area has largely conceptualized self-compassion as a stable trait, reflecting a relatively enduring personality characteristic. However, recent advances have shifted attention towards viewing self-compassion as a dynamic construct that may vary across time and context. This evolving perspective suggests that observational longitudinal studies, as opposed to traditional psychometric approaches, may be more suitable for capturing the nuanced and context-dependent nature of self-compassion (Ferrari et al., 2022), aligning with broader psychological trends that emphasize state-dependent variability over trait stability.

For instance, Krieger et al. (2016) conducted a longitudinal study across three time points following depression treatment, finding that both the Self-Compassion Scale total score and its subcomponents (CS and UCS) were equally predictive of depression outcomes. Although CS and UCS effects differed in direction due to the polarity of the scales, the strength of these effects was comparable, indicating that the total self-compassion score provides a robust representation of the self-compassion construct. These findings align with Neff’s Bipolar Continuum Hypothesis. Nonetheless, despite its longitudinal design, the study by Krieger et al. (2016) remains rooted in a trait-based framework.

More recently, Mey et al. (2023) proposed investigating self-compassion as a dynamic, state-level construct that varies with momentary emotional and contextual influences. Through Ecological Momentary Assessments (EMA), they explored the relationship between state self-compassion and well-being, distinguishing between the CS and UCS components. Their findings showed that high state CS predicted positive affect, whereas high UCS was more strongly linked to psychological distress. These differential effects, which challenge the Bipolar Continuum Hypothesis, emphasize the importance of analyzing CS and UCS as distinct, state-dependent dimensions.

The use of EMA has proven particularly valuable for capturing the temporal dynamics of self-compassion (e.g., Gavrilova & Zawadzki, 2023). Recent studies indicate that fluctuations in momentary self-compassion are predictive of concurrent changes in affect and stress reactivity, with strong links to adaptive outcomes such as increased mindfulness, reduced stress reactivity, and improved well-being (Biehler & Naragon-Gainey, 2022; Ewert et al., 2021; Sahdra et al., 2023). The consistency of these temporal associations supports a reconceptualization of self-compassion as a dynamic process rather than a stable trait. These findings highlight the importance of state-level assessments over shorter intervals to better capture the nuanced role of self-compassion in everyday life.

Despite progress in understanding self-compassion's temporal dynamics and variability, methodological challenges remain. Previous studies have often used ad hoc measures, raising concerns about the validity of state-level assessments. Additionally, most studies have been limited to short time frames (e.g., seven days; e.g., Mey et al., 2023; Sahdra et al., 2023), which may not capture the full complexity of state self-compassion. Randomly selected time windows may also miss key life events that could influence self-compassion dynamics.

Our study addresses these limitations with a three-month EMA using the validated State Self-Compassion Scale (Neff, 2022), marking the first examination of the Bipolar Continuum Hypothesis in an extended EMA framework. By capturing data at multiple levels—moments, days, and individuals—this design offers a detailed, naturalistic exploration of state self-compassion. We also investigate how significant life events, such as academic exams, affect self-compassion dynamics in university students.

The study design, which involves one day of notifications per week with five repetitions, contrasts with more intensive designs using five notifications daily for a week. The longer time frame increases variability in state self-compassion, capturing changes related to significant life events. Unlike a randomly chosen week, our design includes two academic exams, allowing comparison of self-compassion near and far from these events. Finally, the reduced notification frequency minimizes participant fatigue (Shiffman, Stone, and Hufford 2008), improving data quality and engagement.

This research aims to empirically evaluate the Bipolar Continuum Hypothesis by investigating how situational factors influence the interplay between the CS and UCS components of state self-compassion. According to the Bipolar Continuum Hypothesis, self-compassion operates as a bipolar continuum, with CS and UCS forming distinct but interrelated poles of the same construct. This continuum allows for movement in either direction, such that increases in CS naturally correspond to decreases in UCS. These interactions reflect the complexity of self-compassion as a construct, wherein different aspects of compassionate and uncompassionate responding may respond asymmetrically to contextual factors while remaining interdependent. A rigorous test of this hypothesis requires examining whether changes in CS and UCS align with the predicted dynamics of a bipolar continuum, and whether these patterns are consistently observed across individuals.

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

**H1:** A purely cross-sectional psychometric analysis, conducted at a single time point, may be insufficient to determine the dimensionality of self-compassion because multiple CFA models with distinct theoretical implications can yield comparable goodness-of-fit indices (e.g., Bifactor ESEM vs. Correlated Two-Bifactor ESEM; Neff et al., 2019). By contrast, state-level Compassionate Self (CS) and Uncompassionate Self (UCS) are expected to exhibit robust temporal dynamics, reflecting moment-to-moment regulatory processes in which increases in one component coincide with decreases in the other, depending on the context. These temporal fluctuations thus offer richer insight into the underlying structure of the self-compassion construct. Consequently, to test the Bipolar Continuum Hypothesis, we will examine the factor structure of state self-compassion in EMA data, thereby leveraging these within-person temporal dynamics.

**H2:** According to the Bipolar Continuum Hypothesis, the valence of contextual situations should exert an equal, opposite, and symmetric effect on the two components (CS and UCS) when considered separately. Each component can be predicted independently using a hierarchical Bayesian regression model, with predictors representing contextual valence dimensions. If the Bipolar Continuum Hypothesis holds, we expect the regression coefficients from the two models to be statistically comparable in magnitude but opposite in sign.

**H3:** Contextual stressors or heightened negative affect may amplify the bipolar relationship between CS and UCS by activating self-regulatory mechanisms that intensify the emotional distinction between these two components (Dejonckheere et al., 2021). Previous research indicates that emotionally salient events, which bring central personal concerns to the forefront, can increase affective polarization. In such cases, positive and negative emotional states become more mutually exclusive, serving as an adaptive mechanism to highlight the event's relevance and direct attention toward appropriate responses. This heightened bipolarity focuses cognitive and emotional resources on evaluating success or failure in relation to the concern, streamlining emotional processing to facilitate effective behavioral reactions. By leveraging on this phenomenon, we will assess the association between CS and UCS before and after a salient event that participants experience, where emotional arousal is expected to vary (high vs. low). According to the Bipolar Continuum Hypothesis (BCH), the relationship between CS and UCS should remain stable regardless of changes in emotional arousal.

**H4:** At the individual level, the Bipolar Continuum Hypothesis predicts a consistently negative relationship between CS and UCS for every subject. Notably, if any individuals were to exhibit a zero or positive correlation between these components, such findings would directly challenge the validity of the Bipolar Continuum Hypothesis.

In the previous literature, the evaluation of hypotheses such as those described above is commonly conducted using multilevel models. However, multilevel models have notable limitations that may obscure the temporal dynamics and individual variability inherent in EMA data. Specifically, multilevel models often operate under the assumption of psychological homogeneity, treating individual differences as statistical noise or unexplained variance rather than as meaningful information (Sahdra et al., 2024). Furthermore, multilevel models tend to aggregate data toward group-level trends, thereby "smoothing out" individual-level heterogeneity and potentially misrepresenting within-person associations over time. This limitation is particularly problematic when the ergodic assumption—that group-level effects are representative of individual-level processes—is violated.

To overcome these limitations, we will complement multilevel models analyses with an idionomic approach (Hayes et al., 2022). This approach focuses first on modeling idiographic patterns—those unique to the individual—before generalizing to nomothetic (group-level) patterns. Only nomothetic generalizations that incrementally enhance our understanding of idiographic insights are retained (Ciarrochi et al., 2024; Ferrari et al., 2022; Sahdra et al., 2024; Hayes & Hofmann, 2021; Ciarrochi et al., 2022).

To test these hypotheses, we conducted two EMA studies. Study 1 examined the associations between immediate emotional states, event unpleasantness, and the components of state self-compassion in daily life. Study 2 extended this inquiry by assessing state self-compassion before and after a high-stakes university examination, providing a naturalistic context to investigate how self-compassionate responses vary with situational demands (for stress and self-compassion, see also Scott et al., 2024). Additionally, Study 2 included a measure of decentering (Biehler & Naragon-Gainey, 2022; Naragon-Gainey et al., 2023; Xie, 2023) – a key mindfulness process that allows for observing thoughts and emotions without attachment – to explore its distinct effects on CS and UCS. This approach introduces a novel dimension to testing the Bipolar Continuum Hypothesis by examining whether decentering differentially influences the two components.

Understanding the dynamic interplay between state CS and UCS has important implications for psychological interventions aimed at enhancing well-being (Körner et al., 2015). By clarifying how situational factors shape real-time self-compassionate responses, this research seeks to deepen theoretical insights into self-compassion and provide evidence that can inform evidence-based strategies for promoting adaptive self-relations across varied contexts (Hofmann et al., 2011; MacBeth & Gumley, 2012; Paetzold et al., 2023).

**Common Method**

**Participants and Recruitment.** Participants in both studies were recruited from undergraduate and graduate psychology courses at a university. Enrollment was entirely voluntary, and no incentives or course credits were offered. Inclusion criteria for both studies required individuals to (1) be at least 18 years of age, (2) possess a proficient level of Italian, (3) have prior experience with smartphones, and (4) report no current or past psychiatric disorders or drug/alcohol addictions. Participants who did not meet a minimum compliance threshold (50% response rate) were excluded from analyses.

**Baseline Assessments.** All participants, prior to the Ecological Momentary Assessment (EMA) phase, completed an initial session where baseline questionnaires were administered. These assessed: **Trait Self-Compassion**, using the Self-Compassion Scale (SCS; Neff, 2003); **Depression, Anxiety, and Stress**, using the Depression Anxiety Stress Scale-21 (DASS-21; Lovibond & Lovibond, 1995); **Emotion Regulation Capabilities**, using the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004). Further details on scale items, validity indices, and scoring procedures are provided in the Supplementary Information (SI).

### **EMA Platform and General Procedure.** In both studies, participants were trained to use the **m-Path mobile application** (Mestdagh et al., 2023) on their smartphones. The EMA prompts were configured to appear five times per day (between 10:00–10:30, 15:00–15:30, 17:00–17:30, 19:00–19:30, and 21:00–21:30), though the total number of days and any special context-based prompts varied between the two studies (see Study-Specific Methods below).

In each prompt, participants completed a brief survey assessing the following variables. (1) **Pleasant/Unpleasant Event**: Participants rated the valence of events since the last notification on a 5-point scale (1 = extremely unpleasant, 5 = extremely pleasant). **Positive and Negative Affect**: Using items adapted from the PANAS (Watson et al., 1988; Kuranova et al., 2020), negative affect included "nervous" and "upset," and positive affect included "cheerful" and "satisfied." Ratings were made on a 5-point Likert scale (1 = not at all, 5 = very). (3) **State Self-Compassion**: Measured with the State Self-Compassion Scale–Short Form (SSCS-SF; Neff et al., 2021), augmented by two additional items (one for Compassionate Self [CS] and one for Uncompassionate Self [UCS]), ensuring at least four items per dimension. Items were rated on a 6-point Likert scale (1 = extremely false, 6 = extremely true).

As no validated Italian version of the SSCS-SF was available at the time, the scale was translated into Italian by two independent researchers. Back-translation into English was conducted by a bilingual expert with psychological expertise. Discrepancies between back-translations were resolved, yielding the final Italian version of the SSCS-SF.

**Data Analysis.** Hypothesis **H1**, **H2** and **H3** were tested using Bayesian multilevel models, run via Markov Chain Monte Carlo (MCMC) methods (specifically Hamiltonian Monte Carlo in Stan; Stan Development Team, 2020). Weakly informative priors were used, and posterior distributions were estimated from a minimum of 2,000 samples per chain across four chains, following a 1,000-step warm-up phase. We compared possible fixed and random effects structures using Leave-One-Out Cross-Validation (LOO). All continuous predictors were standardized (mean 0, SD 1) for interpretability of coefficients. We present posterior distributions using means (β) and 89% credibility intervals (CI), with contrasts reported as 89% highest posterior density intervals (HPDI). This choice aligns with Bayesian approaches that prioritize estimation over hypothesis testing (McElreath, 2020). Additional analytic details—such as model specifications, priors, and convergence diagnostics—are reported in the SI.

To ensure the integrity of the data, we conducted a comprehensive quality assessment to identify inattentive or insufficient-effort responding. Metrics such as compliance rate, survey completion times, and response variability indices (e.g., Longstring Index, Intra-Individual Response Variability) were evaluated. Participants with a compliance rate below 50% were excluded. Momentary lapses in engagement were identified using occasion-level analyses, which flagged <2% of occasions for potential inattention. Reanalysis of flagged data showed no substantial impact on primary outcomes, confirming the robustness of the dataset (for details, see SI).

Hypothesis **H4** was tested using a two-stage idionomic analysis. First, we adopted an idiographic approach, using a hierarchical Bayesian model in Stan to estimate the within-person relationship between UCS and CS for each participant. Second, a nomothetic approach employed a hierarchical model in the **brms** package (R) to identify group-level patterns and quantify the variability in UCS–CS associations across participants (e.g., Sahdra et al., 2024).

Traditional multilevel modeling (MLM), while useful for separating within-person and between-person variance, often underestimates individual-level heterogeneity due to shrinkage towards the group mean. In contrast, the idionomic framework integrates idiographic and nomothetic insights, preserving individual variability while identifying shared patterns. This approach allows a more nuanced understanding of individual differences and contextual dynamics in EMA studies, combining detailed within-person analyses with group-level generalizations.

**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 (see Hypothesis 1 in the Introduction).

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), as outlined in Hypothesis 2 of the Introduction. Study 1 tested these predictions through intensive longitudinal assessment of daily experiences.

**Specific Method**

**Design and Procedure.** **Study 1** examined fluctuations in state self-compassion (CS vs. UCS) across everyday experiences over three months. Data collection occurred on **10 specific days**, once per week, and the five daily prompts were delivered **exclusively on Saturdays** via semi-random sampling. On each prompt, participants answered the standard EMA questions on event valence, positive and negative affect, and state self-compassion.

**Sample and Compliance.** The initial sample consisted of students meeting the specified eligibility criteria. Participants who provided data for at least four of the ten EMA days were included in the final analysis, resulting in a sample of 326 individuals (Mean age = 24.08 years, *SD* = 7.88). Seven participants were excluded for failing to meet the 50% response threshold. Compliance was high, with participants responding to 85% of daily prompts and completing an average of 8.7 out of 10 study days.

**Results** **of Statistical Analyses**

**Analysis 1: Multilevel Reliability.** To assess the reliability of the State Self-Compassion Scale and its components (CS and UCS), we conducted a multilevel reliability analysis using Lai’s (2021) procedure. For the CS component, the between-subject reliability () was 0.82, indicating the scale’s robustness in capturing stable individual differences. Within-subject reliability () was 0.63, reflecting moderate consistency across measurement occasions and the dynamic nature of self-compassion as a state. The composite reliability () for CS was 0.79, demonstrating the reliable integration of between- and within-subject variabilities. Similarly, for the UCS component, the between-subject reliability was high ( = 0.88), , within-subject reliability was slightly higher than CS ( = 0.68), and the composite reliability was robust ( = 0.83). These findings suggest that the scale is effective in capturing both stable individual differences and dynamic, context-dependent fluctuations in self-compassion over time.

These results are preliminary for testing the hypotheses of the study. High between-subject reliability supports **H1** by validating the scale’s ability to differentiate stable trait-level self-compassion across individuals. Meanwhile, the moderate within-subject reliability highlights the dynamic state-level fluctuations that align with the Bipolar Continuum Hypothesis (**H3**), where contextual factors are expected to drive moment-to-moment changes in CS and UCS. Moreover, these fluctuations provide the necessary basis for examining the contextual predictors of self-compassion dynamics (**H2**) and evaluating the stability of the CS-UCS relationship across emotional arousal levels (**H4**).

**Analysis 2: Correlations Between the CS and UCS Components.** This analysis evaluates the relationship between the components of state self-compassion (CS and UCS) at both trait and state levels, providing a preliminary test for the Bipolar Continuum Hypothesis and informing subsequent tests of the study hypotheses. At the trait level, a robust *t*-distribution-based approach revealed a strongly negative correlation between CS and UCS (r = -0.66; 89% CI: [-0.73, -0.60]). At the state level, a multilevel analysis accounting for the nested data structure (measurements within days and days within participants) indicated a moderately negative correlation (r = -0.48; 89% CI: [-0.49, -0.47]). However, the lagged correlation between state CS at a given time point and state UCS at the immediately preceding time point was considerably weaker (r = -0.10; 89% CI: [-0.12, -0.08]).

These findings are consistent with **H1**, which posits that state-level self-compassion exhibits dynamic temporal patterns that are critical for understanding its structure. While the stronger negative correlation within single moments supports the bipolar relationship between CS and UCS, the weaker lagged correlation suggests that these dynamics are context-dependent and influenced by immediate emotional and situational factors. This aligns with **H3**, which predicts that emotionally salient events may modulate the bipolar relationship by activating self-regulatory mechanisms. Taken together, these results underscore the need to investigate the role of situational moderators (e.g., momentary negative affect, contextual valence) to fully understand fluctuations in the relationship between CS and UCS at the state level.

**Analysis 3: Impact of Contextual Influences on CS and UCS.** To test **H2** and further evaluate the Bipolar Continuum Hypothesis, we applied Bayesian hierarchical models with CS and UCS as dependent variables. These models accounted for variance at three levels: between individuals, between days, and within days. Predictors included negative affect and event unpleasantness, each centered at the momentary, daily, and person levels, allowing for a nuanced examination of how contextual factors influence CS and UCS oppositely across temporal contexts.

**Negative Affect** exerted strong and opposing effects on CS and UCS at all levels. Higher negative affect was consistently associated with decreased CS and increased UCS, supporting the BCH prediction of symmetric, inverse changes in the two components. For CS, the moment-level effect was β = -0.24 [89% CI: -0.25, -0.23], day-level β = -0.26 [89% CI: -0.27, -0.25], and person-level β = -0.51 [89% CI: -0.57, -0.45]. For UCS, the moment-level effect was β = 0.26 [89% CI: 0.25, 0.27], day-level β = 0.31 [89% CI: 0.30, 0.32], and person-level β = 0.65 [89% CI: 0.60, 0.71]. Notably, the effects were strongest at the person level, indicating that enduring individual differences in negative affect have the most pronounced influence.

**Event Unpleasantness**, in contrast, had weaker and less consistent effects. For CS, moment-level β = 0.04 [89% CI: 0.03, 0.05], day-level β = 0.01 [89% CI: -0.00, 0.02], and person-level β = 0.01 [89% CI: -0.05, 0.07]. For UCS, moment-level β = 0.00 [89% CI: -0.01, 0.01], day-level β = 0.04 [89% CI: 0.03, 0.05], and person-level β = 0.12 [89% CI: 0.07, 0.17]. While event unpleasantness had some positive associations, its effects were minor compared to the dominant role of negative affect.

In summary, these findings provide support for **H2** and the BCH, showing that negative affect drives symmetric, opposing trends in CS and UCS. The minimal impact of event unpleasantness suggests that state self-compassion is primarily sensitive to emotional fluctuations rather than evaluations of specific events. These results further emphasize the importance of considering dynamic emotional states as key moderators of self-compassion.

**Discussion**

The findings of Study 1 support the Bipolar Continuum Hypothesis by showing an inverse relationship between CS and UCS at both trait (*r* = -0.66) and state (*r* = -0.48) levels. While the trait-level correlation reflects stable individual differences, the state-level correlation reveals a more flexible relationship influenced by situational factors. The weak temporal association within the same day, even for lags of only a few hours (*r* = -0.10), underscores the highly dynamic nature of self-compassion. This finding aligns with **H3**, suggesting that state self-compassion is highly responsive to situational demands and fluctuates adaptively, particularly in the presence of heightened negative affect. Contextual predictors (**H2**) showed that negative affect exerts a dominant influence, driving symmetric and opposing changes in CS and UCS across all levels. In contrast, event unpleasantness had minimal effects, suggesting that self-compassion is primarily shaped by internal emotional states rather than external circumstances. Overall, Study 1 highlights the internally driven and context-sensitive nature of self-compassion, supporting its bipolar structure.

**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 CS and 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). Conversely, high stress levels may increase the typical inverse association between CS and UCS, as proposed by Ferrari et al. (2022).

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 (see Hypothesis 2 in the Introduction).

**Specific Method**

**Design and Procedure. Study 2** explored whether the inverse relationship between CS and UCS observed in daily life (Study 1) holds under **high-stress conditions**. The EMA protocol spanned **16 days** (over ~3 months), with the same five daily prompts delivered on Saturdays. Crucially, **four of these 16 days** incorporated **context-specific notifications** around a known stressor—academic exams—to capture responses in the moments immediately before and after the stressor. We divided the study period into three phases: **Pre-Exam Phase** (immediately before the exam); **Post-Exam Phase** (immediately after the exam); **Distant Time Point Phase** (later in the semester, when the stressor was less salient). Beyond the standard EMA items (pleasant/unpleasant events, affect, and state self-compassion), Study 2 included **four decentering items** (adapted from Biehler & Naragon-Gainey, 2022). These items probed participants’ capacity for detached self-observation, theorized to influence how they respond to stress and potentially moderate the relationship between CS and UCS.

**Sample and Compliance.** Participants were recruited from the same pool and met the same eligibility criteria as in Study 1. The final sample included 168 participants (Mean age = 19.6 years, *SD* = 1.9), with two participants excluded for failing to meet the 50% compliance threshold. On average, participants responded to 82% of daily prompts and completed 72% of the 16 total study days.

**Analysis 1: Impact of Academic Exam Stress on State Self-Compassion.** This analysis investigated the contextual effects of academic exam stress on the components of state self-compassion, CS and UCS, as hypothesized in **H2**. We applied two hierarchical Bayesian models to assess changes in CS and UCS across three key time periods: the day before an academic exam (pre-exam), the day after the exam (post-exam), and a baseline period (non-exam days). These models accounted for the hierarchical structure of the EMA data, which included repeated measures collected across multiple days and times. Specifically, the dataset comprised 12 administrations across separate days (with five notifications per day) compared to a single notification collected on the evening following the exam.

To examine the influence of stress, the study period was divided into three distinct phases: 1. Pre-exam phase: Captures the anticipatory stress period the day before the exam. 2. Post-exam phase: Reflects the recovery period the day after the exam. 3. Baseline phase: Represents typical non-exam days, serving as a control. We hypothesized that CS would decrease, and UCS would increase during the pre-exam phase due to heightened stress. Conversely, we expected these trends to reverse symmetrically in the post-exam phase, consistent with the Bipolar Continuum Hypothesis.

**Results. Pre-exam Phase:** CS decreased relative to baseline, beta = -0.29; 89% CI: [-0.51, -0.08], indicating reduced self-compassion. UCS increased relative to baseline, beta = 0.66; 89% CI: [0.38, 0.95], reflecting heightened self-criticism. **Post-exam Phase:** CS rebounded above baseline, beta = 0.23; 89% CI: [0.02, 0.45], suggesting recovery of self-compassion. UCS decreased below baseline, beta = -0.67; 89% CI: [-0.95, -0.39], indicating reduced self-criticism.

These results reveal opposing but symmetric trends in CS and UCS across the pre- and post-exam periods. The observed patterns align with the Bipolar Continuum Hypothesis, demonstrating that academic stress disrupts the balance between self-compassion and self-criticism in a predictable manner, with subsequent recovery once the stressor is removed. The findings emphasize the dynamic and context-sensitive nature of state self-compassion (see Figure 1).

**Figure 1**

*Study 2: Posterior Distribution of CS and UCS Components Before and After Exam Days.* Immagine che contiene diagramma, Diagramma, testo, schermata

Descrizione generata automaticamente

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

**Analysis 2: Impact of Contextual Influences on CS and UCS.** This analysis investigated how negative affect, decentering, and event unpleasantness influenced state self-compassion components (CS and UCS), using data from both exam-related and unrelated moments to explore a wide range of contextual variability. The analysis paralleled Analysis 3 of Study 1 and tested Hypothesis **H2**, which posits that contextual factors exert equal and opposite effects on CS and UCS, consistent with the Bipolar Continuum Hypothesis.

Separate Bayesian hierarchical models were used for CS and UCS as dependent variables, sharing the same structure but differing in the outcome variable. Fixed effects included negative affect (emotional distress), decentering (the ability to observe one’s thoughts without becoming overwhelmed), and event unpleasantness (subjective evaluation of negative experiences). Predictors were centered at three levels—person (inter-individual differences), day (variations between days), and moment (within-day fluctuations). Random intercepts for participants and days accounted for the hierarchical data structure. Predictors were scaled for consistent interpretation across levels. Model specifications are provided in the SI.

**Results**. Negative affect was negatively associated with CS (person-level β = -0.31; day-level β = -0.17; moment-level β = -0.13) and positively correlated with UCS (person-level β = 0.33; day-level β = 0.16; moment-level β = 0.14). Decentering positively influenced CS (person-level β = 0.20; day-level β = 0.12; moment-level β = 0.08) and negatively influenced 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 inverse effects of negative affect and decentering on CS and UCS support the Bipolar Continuum Hypothesis.

**Analysis 3: Levels of Personal Concern and Stress.** The third analysis investigated whether the inverse relationship between CS and UCS remains stable across contexts with differing stress levels, specifically high-stress (pre-exam) and low-stress (baseline) contexts, as hypothesized in **H3**. A multivariate Bayesian model with random slopes and intercepts at multiple levels (participant, day, and within-day occasion) was applied to estimate the correlation between CS and UCS across these contexts. The model incorporated stress levels as predictors and allowed for heteroscedasticity by modeling the residual standard deviation as a function of stress context.

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

**Analysis 4: Decentering and the CS-UCS Relationship.** This analysis tested whether decentering, a mindfulness process promoting non-judgmental awareness, moderates the inverse relationship between CS and UCS (**H2**). Decentering was hypothesized to strengthen this relationship by enhancing CS and reducing UCS, suggesting that mindfulness processes contribute to the flexibility of the bipolar structure.

A Bayesian hierarchical regression model predicted UCS as a function of CS, decentering, and their interaction across person, day, and moment levels. Random intercepts and slopes accounted for variability, and a Student’s t-distribution ensured robustness to outliers.

**Results.** At the person level, the interaction between CS and decentering was negative (β = -0.05; 89% CI: [-0.08, -0.02]), indicating that higher decentering strengthens the inverse CS-UCS relationship. In contrast, interactions at the day and moment levels were near zero, suggesting that decentering’s influence is more relevant to stable, trait-like patterns than short-term fluctuations. These findings provide evidence that decentering reinforces the bipolar structure of self-compassion at the trait level, supporting its role in enhancing psychological resilience and self-compassion as outlined in the Bipolar Continuum Hypothesis.

**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 for the Bipolar Continuum Hypothesis in **trait** self-compassion, we assessed the dimensionality of **state** self-compassion using multilevel confirmatory factor analysis (**H1**) applied to the combined datasets from both studies. Combining these datasets provided a larger sample, allowing for more precise parameter estimates in confirmatory factor analyses. We compared three theoretical models: (1) One-Factor Model positing a single self-compassion dimension; (2) Two-Factor Model distinguishing the CS and UCS components. (3) Bifactor Model incorporating both a general factor and specific CS/UCS factors.

**Results.** The Two-Factor Model fit better than the One-Factor Model (LRT = 1068.792, *df* = 5, *p* < 0.001), supporting distinct CS and UCS dimensions, while the Bifactor Model demonstrated an even better fit (LRT = 506.656, *df* = 17, *p* < 0.001). The Bifactor Model identified a robust general factor—particularly at the between-subject level—indicating that most items reflect a unidimensional construct. UCS-specific items captured unique variance, whereas CS-specific factors showed weaker loadings, underscoring the prominence of a general factor and the unique role of UCS items in explaining individual differences.

Factor intercorrelations in the Two-Factor Model were 0.437 (*SE* = 0.009) at the within level and 0.720 (*SE* = 0.059) at the between level. Table 1 presents standardized factor loadings for the Bifactor Model, while Table 2 reports goodness-of-fit indices for the three CFA models. The hierarchical ω values revealed that the general factor explained more variance than the specific factors at both levels. Specifically, at the within level: ω\_h,gen\_w = 0.26, ω\_h,cs\_w = 0.10, ω\_h,ucs\_w = 0.04; and at the between level: ω\_h,gen\_b = 0.51, ω\_h,cs\_b = 0.07, ω\_h,neg\_b = 0.21.

While the Bifactor Model provided the best statistical fit, it may overestimate fit (Bonifay et al., 2017), so these results alone do not confirm the Bipolar Continuum Hypothesis. Importantly, multilevel CFA reflects stable, person-level relationships and may not fully capture the dynamic CS and UCS interplay across contexts.

**Table 1.** Standardized Factor Loadings for Multilevel Bifactor Model.

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**Table 2.** Goodness-of-Fit Indices for CFA Models

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**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., 2024a; 2024b; 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 state self-compassion processes that may be obscured in aggregate analyses (see **H3** in the Introduction).

**Statistical Analysis.** 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 of the Idionomic Analysis.** The analysis revealed that 81.0% of participants (89% CI: 79.6% to 82.3%) exhibited a negative relationship between CS and UCS, providing support for the Bipolar Continuum Hypothesis at the individual level. However, considerable variability in these associations (*SD* = 1.25) highlighted that the strength—and, in some cases, the direction—of this relationship differs across individuals, with approximately 19% showing neutral or positive associations.

Negative affect was positively associated with UCS (*b* = 0.38, 89% CI: 0.34 to 0.42), suggesting that higher negative emotional states are linked to greater uncompassionate self-responding. Despite this overall trend, the variability in this effect (*SD* = 0.19) pointed to differences in how participants respond to negative affect, possibly reflecting individual differences in coping mechanisms or emotional regulation.

Context evaluation showed a small negative association with UCS (*b* = -0.04, 95% CI: -0.07 to -0.01), indicating that more positive situational evaluations slightly reduce UCS. Substantial variability in this parameter (*SD* = 0.17) suggested that sensitivity to contextual factors varies between participants.

Finally, the interaction between CS and negative affect was minimal, with the 89% CI spanning zero (-0.03 to 0.00), indicating no credible evidence that negative affect moderates the inverse relationship between CS and UCS.

**Discussion.** The idionomic analysis offers nuanced evidence for the Bipolar Continuum Hypothesis, showing that CS and UCS exhibit an inverse relationship for the majority of participants. Nevertheless, substantial variability in these relationships suggests that the bipolar structure of state self-compassion is not universal. Approximately 19% of participants showed neutral or positive associations, underscoring the value of idiographic approaches in capturing diverse self-compassion dynamics.

The positive association between negative affect and UCS reinforces the idea that negative emotional states intensify uncompassionate self-responding, though the observed individual differences highlight the role of factors such as coping strategies and emotional regulation capacities. The minimal impact of context evaluation on UCS suggests that self-compassion dynamics are more influenced by internal emotional states than by external circumstances.

Importantly, the lack of a credible CS-negative affect interaction challenges the suggestion that emotional states modulate self-compassionate responses (Dejonckheere et al., 2021). Instead, our findings indicate that the inverse relationship between CS and UCS remains stable across varying emotional contexts, suggesting a trait-like underpinning to these components’ interaction.

**Potential Response Bias.** To address whether response bias could explain the positive associations between CS and UCS observed in some participants, we analyzed indices of careless responding, including the Longstring Index, Intra-Individual Response Variability (IRV), Even-Odd Inconsistency Index, Mahalanobis Distance, and time to completion. These metrics were compared between participants with positive UCS-CS associations and those with neutral or negative associations.

The analysis found no credible evidence that response biases accounted for the positive UCS-CS associations. Bayesian multilevel models accounted for the nested data structure, and posterior estimates indicated no reliable differences across indices between the groups (see SI for details). This suggests that the unexpected patterns are unlikely to be due to careless or insufficient effort responding.

**General Discussion**

This study investigated 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, multidimensional, and adaptive system. Recognizing that CS and UCS represent distinct yet interrelated components of a bipolar continuum, we tested four hypotheses addressing their temporal dynamics, contextual modulation, and individual variability. By framing self-compassion as a multidimensional system, we investigated whether CS and UCS respond asymmetrically or synergistically to contextual influences, while maintaining their interdependence. Below, we discuss the findings in relation to these hypotheses, highlighting their implications for the Bipolar Continuum Hypothesis and their relevance for understanding self-compassion as an adaptive, context-sensitive process.

**H1** proposed that CS and UCS exhibit dynamic and context-sensitive temporal relationships. Our idionomic analysis, which focused on individual-level dynamics, largely supports the Bipolar Continuum Hypothesis. Most participants displayed an inverse relationship between CS and UCS, consistent with the conceptualization of self-compassion as a bipolar construct. However, individual variability emerged: while the majority showed the hypothesized inverse association, approximately 19% of participants exhibited neutral or positive associations. This variability underscores the contextual and individual factors that shape the CS-UCS relationship and challenges the universality of the Bipolar Continuum framework. These findings highlight the value of idiographic analyses, which reveal nuanced patterns often obscured by group-level approaches (Ferrari et al., 2023; Ullrich et al., 2020).

**H2** posited that CS and UCS would exhibit strong temporal dynamics, reflecting real-time regulatory processes (Ciarrochi et al., 2024a; Gavrilova & Zawadzki, 2023; Mey et al., 2023; Sahdra et al., 2023; 2024). The data supported this hypothesis, showing notable fluctuations in response to immediate emotional and contextual changes. Negative affect reliably predicted decreases in CS and increases in UCS, aligning with Ferrari et al.’s (2022) view of self-compassion as a flexible regulatory system. These findings emphasize the adaptive nature of CS and UCS, which shift dynamically to meet emotional demands (Neff et al., 2021).

**H3** hypothesized that contextual stressors or heightened negative affect would intensify the inverse relationship between CS and UCS. This hypothesis was not supported. Although stress independently influenced CS and UCS—decreasing CS and increasing UCS before university exams, with these trends reversing afterward—the strength of their inverse relationship remained stable across stress levels. This stability suggests that, while CS and UCS adjust to stress, their interdependence is not amplified by heightened stress. These findings contribute to the understanding of self-compassion as a robust regulatory system that maintains a stable inverse relationship across varying levels of stress, contrasting with prior suggestions that stress heightens bipolarity (Dejonckheere et al., 2021).

**H4** proposed that the CS-UCS relationship varies across individuals (Ciarrochi et al., 2024a; Hayes et al. 2020; Sanford et al., 2022; Sahdra et al, 2024). Our findings confirmed this hypothesis, revealing two key patterns: (1) variability in the strength of the CS-UCS association across participants and (2) a subset of individuals exhibiting neutral or positive associations. While the first pattern aligns with the Bipolar Continuum Hypothesis by highlighting inter-individual variability, the second challenges its universal applicability, underscoring the importance of idiographic analyses, which can reveal nuanced patterns obscured by aggregate, group-level approaches (Ferrari et al., 2023; Ullrich et al., 2020).

Further insights into the structure of state self-compassion were provided by our multilevel CFA analysis. While the Bifactor Model showed the best fit indices, recent literature warns that such models may overfit and inflate fit indices (Bonifay et al., 2017). The superior performance of the Two-Factor Model over the One-Factor Model underscores the distinctiveness of CS and UCS as components of state self-compassion. This suggests that, while a general factor may contribute to the construct, it does not fully capture the dynamic interplay between CS and UCS.

Some findings further challenge the universality of the Bipolar Continuum Hypothesis. For instance, mindfulness traits like decentering consistently reduced UCS without correspondingly increasing CS, implying that mindfulness practices may be more effective in reducing self-criticism than enhancing self-compassion. These asymmetries suggest that the relationship between CS and UCS is more complex than strictly bipolar, requiring nuanced frameworks to account for differential sensitivity to contextual factors (Biehler & Naragon-Gainey, 2022; Mey et al., 2022).

To reconcile these findings that diverge from the Bipolar Continuum Hypothesis, one might consider that a single construct could encompass subdimensions or facets that, while embedded within the same overarching framework, demonstrate differential sensitivity to external influences across contextual factors (as evidenced in Study 2). Such an interpretation could align with the notion of a general construct manifesting varied expressions across different contexts. However, this perspective would require additional theoretical support to substantiate the construct's unidimensionality. Notably, this interpretation contrasts with Neff's conceptualization of self-compassion as a singular, bipolar construct (Neff, 2022; 2023).

Clinically, the observed individual variability in CS-UCS associations suggests that personalized approaches may be more effective than one-size-fits-all treatments. Tailored interventions could focus on enhancing CS or reducing UCS, depending on individual needs. The differential impact of mindfulness on UCS also suggests that mindfulness-based interventions could be refined to target self-criticism, especially when enhancing CS proves challenging. These individualized strategies align with emerging psychological care models that prioritize adaptability to individual profiles (Ferrari et al., 2022; Ullrich-French & Cox, 2020).

**Limitations and Future Directions**. This study has several strengths, including the use of repeated naturalistic sampling within a community-based sample, which provides detailed insights into state self-compassion in real-world contexts. However, there are limitations. The sample, predominantly university psychology students, limits generalizability to broader populations, particularly clinical settings where UCS tends to be elevated and CS reduced (Neff & McGehee, 2010). Future research should examine clinical samples to better understand the dynamics of state self-compassion in populations with higher self-criticism.

Additionally, other potentially influential momentary variables, such as mindfulness and rumination, were not included in this study. Incorporating these factors could provide a more comprehensive understanding of the CS-UCS relationship. While the weekly EMA protocol reduced participant burden, higher-frequency sampling (e.g., five prompts per day) could offer finer-grained insights into the temporal dynamics of self-compassion.

Lastly, this study relied on Neff’s State Self-Compassion Scale, which emphasizes an individualistic sense of self common in Western cultures. Alternative frameworks, including those rooted in Buddhist traditions, could provide complementary perspectives on self-compassion by incorporating relational aspects of the self.

In summary, while this study supports the Bipolar Continuum Hypothesis in many respects, it also reveals important limitations. The observed individual variability and the differential impact of mindfulness on UCS highlight the complexity of self-compassion as a construct. By integrating both nomothetic and idiographic approaches, future research can advance our understanding of state self-compassion and inform personalized therapeutic interventions.

**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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